

An Analysis of Cyber Security and Concerns Among Citizens of Navi Mumbai and Panvel Zone

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Abstract: *Demonetization decision coupled with government's initiative to make India a cashless economy is expected to bring a phenomenal transformation in the way people make payments and expected to increase inclination towards online payment. The covid-19 pandemic has expedited the shift towards digital payments, increased digital channel adoption, spurred consumer interest in savings and safer investments in India. Anxiety of spread of virus made physical transactions almost crashed, the digital payments in India have witnessed an exponential spike in the last few months of lockdowns. Among the various modes of online payments, the mode gaining popularity during present time is E-wallets. In a nation such as India where during COVID-19 crisis larger part of vendors / customers favours Cash-On-Delivery, thus emphasizing increasing adoption rate. The diffusion of technology-based payment solutions hinges on addressing the needs, perceived or real, of consumers whose adoption will determine whether any specific mobile payment system becomes a standard (S. Ezell, 2009). When smartphones can function as leather wallets, it is called "Digital Wallet" or widely known as "Mobile Wallet". (Rathore, 2016). This generates research interest to study the readiness of people to use E-wallets and factors influencing the adoption of E-wallets including the factors refraining the usage of it, during the crisis epoch. This research paper is explorative by nature and aimed at examining the adoption of E-wallets followed by concerns on cyber security and preventive measurements in Navi Mumbai and Panvel zones, India.*

Keywords: Digital Payment, E-wallet, cyber security, preventive measurements, Navi Mumbai

I. INTRODUCTION

The diffusion of technology-based payment solutions hinges on addressing the needs, perceived or real, of consumers whose adoption will determine whether any specific mobile payment system becomes a standard (S. Ezell, 2009). This paper is also about the attitude of people towards adoption of Digital Payments methods amid pandemic. Digital Payments were encouraged by Government of India after the announcement of demonetization on 8th November 2016. Mobile wallet with the support of mobile technology as allowed the owners of smartphone to carry out many financial transaction and identification implements the mobile wallet money is used in the various areas in India across businesses like banks, retailers and online shopping etc. The present study aims to explain the increasing impact of e-wallet money endorsed by different companies during this pandemic crisis. When smartphones can function as leather wallets, it is called "Digital Wallet" or widely known as "Mobile Wallet". (Rathore, 2016).

The technological advancement has made smartphone as devices where the mobile users can make money transaction or payment by using application installed in phone. India is currently at the top in usage of digital payments and will be seen in the next six months. However, India's mobile data penetration is still only 57 per cent even as mobile penetration is 87 per cent. Many e-retailers are also requesting payments via digital mechanisms, which is also contactless and reduces risk of spreading coronavirus. Besides the National Payments Corporation of India (NPCI) has also urged people to use digital payment methods, so that people do not step out even to go to the ATM, reduce social contact and curb the spread of Covid-19. As the market for essential services has expanded, the retail stores have also

witnessed a growth in the number of payments made via payment apps. According to a survey by consultancy firm Local Circles, when consumers were asked what digital payment app they have been using the most in the last three weeks, since the coronavirus outbreak, 33% said Paytm, 14% Google Pay, 4% PhonePe, 10% Amazon Pay, 6% BHIM while 33% used other apps. In the past three months from March end till June 2020, over 42% Indians have used digital payment mode multiple times as compared to the pre lockdown period.

India also topped demand for insurance coverage with 83% consumers opting for an increase in life insurance coverage in the six-nine months from 80% currently, and 70% in the pre-Covid period. RBI Governor Shaktikanta Das on Monday urged Indians to use the Digital Payment infrastructure of the country in order to reduce the fallout of the Coronavirus Pandemic. Public can use these modes of digital payment from the convenience of their homes through online channels like mobile banking, internet banking, cards, etc. and avoid using cash which may require going to crowded places for sending money or paying bills. Physical cash handling as a daily routine, is being considered as a major cause of concern for risk of contamination," said Mandar Agashe, the Founder of Banking Technology provider Sarvatar Technology. "Contactless payments could be the way ahead and payment modes like UPI, IMPS, RTGS, Mobile wallets and Net banking could contribute effectively in reducing human interactions," he added whilst suggesting sterilising of Physical Notes and Providing Incentives for Digital Payments as other counter-measures for the outbreak.

Despite technological measures being adopted by corporate organizations and individuals, we have witnessed that the frequency of cyber crimes has increased over the last decade. Cyber crime refers to the act of performing a criminal act using computer or cyberspace (the Internet network), as the communication vehicle. Though there is no technical definition by any statutory body for Cyber crime, it is broadly defined by the Computer Crime Research Center as - "Crimes committed on the internet using the computer either as a tool or a targeted victim." All types of cyber crimes involve both the computer and the person behind it as victims; it just depends on which of the two is the main target. Cyber crime could include anything as simple as downloading illegal music files to stealing millions of dollars from online bank accounts. Cyber crime could also include non-monetary offenses, such as creating and distributing small or large programs written by programmers called viruses on other computers or posting confidential business information on the Internet.

Inception of cyber crime

Hart in his work "The Concept of Law" has said 'human beings are vulnerable so rule of law is required to protect them'. Applying this to the cyberspace we may say that computers are vulnerable so rule of law is required to protect and safeguard them against financial cyber crime. The reasons for the vulnerability of computers may be said to be:

Capacity to store data in comparatively small space-

The computer has unique characteristic of storing financial data of financial institutes in a very small space. This affords to remove or derive information either through physical or virtual medium makes it much easier.

Easy to access-

The problem encountered in guarding a computer system of a financial institute from unauthorised access is that there is every possibility of breach not due to human error but due to the complex modern technology. By secretly implanted logic bomb, key loggers that can steal access codes, advanced voice recorders; retina imagers etc. that can fool biometric systems and bypass firewalls can be utilized to get past many a security system of banks.

Complex-

The systems of financial institutes work on operating systems and these operating systems in turn are composed of millions of codes. Human mind is fallible and it is not possible that there might not be a lapse at any stage of performance. The cyber criminals take advantage of these loopholes and penetrate into the computer system.

Negligence-

Negligence is very closely connected with human conduct. It is therefore very probable that while protecting the computer system there might be any negligence, which in turn provides a cyber criminal to gain access and control over the systems of financial institutes.

Loss of evidence-

Loss of evidence is a very common & obvious problem as all the data are routinely destroyed. Further collection of data outside the territorial extent also handicaps this system of crime investigation.

II. REVIEW OF LITERATURE

Mobile payment instruments fall under the category of electronic money, which "includes all non-cash and non-paper payments instruments such as plastic cards and direct transfer and all money transactions via electronic channels"(S. Singh, 1999). L. Van Hove. (2004) notes that electronic wallets, although frequently compared to debit cards, should instead be compared to cash. He explains that "the rationale behind their introduction - from the mid-1990s onwards - was indeed to provide consumers and merchants with an electronic payment instrument that could handle small transactions cost effectively (L. Van Hove, 2004). The Committee on Payment and Settlement Systems of the Bank for International Settlements defines an electronic purse or wallet as "a reloadable multipurpose prepaid card which may be used for small retail or other payments instead of coins" (Committee on Payment and Settlement Systems, 2003). Unlike debit or credit cards, transactions using an electronic wallet are carried out off-line without the direct involvement of financial intermediaries and the burden of these institutions' high fixed costs (Z. M'Chirgui and O. Chanel, 2008).

Electronic-Wallet allows users to make electronic commerce transactions quickly and securely. (Upadhayaya, 2012). A mobile wallet is a much-advanced versatile application that includes elements of mobile transactions, as well as other items one may find in a wallet, such as membership cards, loyalty cards and travel cards. (Shin, 2016). Through digital wallets, the payment infrastructure with immense advancement in technology has become highly consumer friendly. (Kunal Taheam, 2016). However, the idea of a digital wallet is not new. Indeed, Japan, America, Sweden and South Korea have already rolled out cell phone-based digital wallet solutions. Consumers in those countries can use their cell phones to pay for groceries, order drinks from a vending machine, and even identify themselves at airline ticketing counters. (Rathore, 2016).

Poonam Painuly And Shalu Rathi (2016) in their research paper "Mobile wallet :An upcoming mode of business transaction "have analysed that ease of transaction ,secured profile and convenience in handling application put forth the benefits of wallet money and also concluded that business sectors like banking ,retail, hospitality etc., are making use of wallet money and mobile payment instruments including contactless and remote payment in the customers – business and customers to customers areas.

Rajesh Krishna Balan, Narayan Ramasubhu, Giri Kumar Tayi (2006) in their research paper "Digital wallet: Requirement and challenges "have identified about Singapore's use of digital wallet and analysed the key challenges in building and deploying a digital wallet. Dr. Hem Shweta Rathore in her research paper "Adoption of Digital wallet by consumers "have analysed about the factors that influence consumers in adoption of digital wallet and also analysed the risk and challenges faced by consumers in usage of digital wallet and concluded that shoppers are adopting digital wallet largely due to convenience and ease to use and in the future years digital wallet will gain more widespread acceptance.

Rathore Hem Shweta studied various factors affecting adoption of digital wallet as a mode of payment by consumers and different risk and challenges encountered by users while using digital wallet. The study was conducted by collecting primary data through a structured questionnaire from 132 smart phone users (respondents). Researcher found that main factors contributing towards the adoption of digital wallet as a mode of payment are convenience in making payment online, brand loyalty and usefulness of digital wallet. It was found that users of digital wallet are satisfied with the services provided by them. The most crucial and challenging issues for adoption of digital wallet are security and

safety. Shoppers are adopting digital wallets at an incredibly rapid pace, largely due to convenience and ease of use. (Rathore, 2016)

TahemKrunal, Sharma Rahul, Goswami Saurabh (2016), conducted a descriptive study to examine the factors driving use of digital wallets in state of Punjab. The study was conducted during the fourth quarter of 2015 by collecting primary data from 386 (Selected using snowball sampling) users of digital wallets in state of Punjab. The results of this study indicated that People in Punjab have been found using digital wallets due to the motives of controllability & security, societal influence & usefulness and need for performance enhancement. This study indicates that people of Punjab use any type of digital wallet due to one or all of these identified motives. (Kunal Taheam, 2016)

Kalyani Pawan in his paper studied the awareness and usage of paperless E-Currency transaction like E-Wallet using ICT in the youth of India. The paper elaborately explains features of various E-wallets in India. Researcher found that the most preferred modes of payment among the selected respondents are Cash on Deliver (COD) and credit card and debit card. It was found that respondents have good amount of information about the e-payment and e-wallet services available in India, but they know very little about the same types of services available outside India. Researcher concluded that awareness and practical usability of the E-wallet is low, that should be increased by adding more value added services to it. (Kalyani, 2016)

Sardar Ramesh studied the preference towards mobile wallets among the urban population of Jalgaon city of Maharashtra. The study was collected by collecting primary data from 60 users of mobile wallet through a structured questionnaire. The study aimed at examining the awareness and preference towards the usage of Mobile wallets in Jalgaon and to find out the impact of various demographic variables on the usage of mobile wallets. Data was analyzed using chi-square and t-test. It was found that Majority (29%) of the respondents are preferred to use Mobile wallet payment to transfer money followed by recharging mobile or DTH payment and so on. Majority of respondents (90%) believes that an instant payment is an important factor to opt for Mobile payments. Respondents opined that security is the most critical issue while making online payment. (Sardar, 2016).

Shukla Trilok Nath in his research paper "Mobile Wallet: Present and the Future" stated that Based on current developments, it is safe to say that mobile wallets will soon be a self-reliant ubiquitous ecosystem. In the near future, mobile wallets will be used to engage with the customer by the marketers and digital businesses. With the addition of the value-added services that go beyond just payment, experts believe that mobile wallets will become a new marketing channel. Mobile wallets won't just be about mobile payments; they would become one of the major contributors of a seamless shopping experience for the customers. Simply offering faster and more-secure payments would no longer be good enough; the industry players will have to counter the real pain points such as giving consumers the ability to see what's on stored value cards at any moment in time, access loyalty points, or automatically receive digital copies of payment receipts. (Shukla, 2016)

Hee Shin-Dong, in his study "Towards an understanding of the consumer acceptance of mobile wallet" seeks to validate a comprehensive model of consumer acceptance in the context of mobile payment. It uses the unified theory of acceptance and use of technology (UTAUT) model with constructs of security, trust, social influence, and self-efficacy. Structural equation modelling is used to construct a predictive model of attitudes toward the mobile wallet. While the model confirms the classical role of technology acceptance factors (i.e., perceived usefulness and ease of use are key antecedents to users' attitude), the results also show that users' attitudes and intentions are influenced by perceived security and trust. (Shin, 2009)

Sanghita Roy, Dr. Indrajit Sinha stated that E- payment system in India, has shown tremendous growth, but still there has lot to be done to increase its usage. Still 90% of the transactions are cash based. Technology Acceptance Model used for the purpose of study. They found Innovation, incentive, customer convenience and legal framework are the four factors which contribute to strengthen the E- payment system. Sanghita Roy, Dr.Indrajit Sinha (2014)

Rakesh H M & Ramya T J in their research paper titled "A Study on Factors Influencing Consumer Adoption of Internet Banking in India" tried to examine the factors that influence internet banking adoption. Rakesh H M & Ramya T J (2014)

Gap identification

Here a study is conducted to understand the need of my research and to have a proper platform which is not researched earlier on some banks in the locality in terms of cyber security and fraudulent. Human risk is a big problem for Indian financial institutions and banks needs to commence proactively educating their employees and customers to prevent cyber threats. Banks should work on improving awareness of the different threats that currently exist, including e-mail fraud, phishing and malware. Banks and financial institutions need to work on how to have affective customer awareness programs as far as cyber fraud and banking fraud are concerned. In our studies we give an overall understanding of cyber security measurements and how users of digital financial instruments safekeep themselves. Another main goal is trying to find out what technique customers want to use for carrying their digital transactions in safest way and if information positively affects customers' will to use the new service.

Objective of the Study

- To examine the impact of cybercrimes on increasing adoption of digital payment platforms during pandemic.
- To understand the views of customers regarding the cyber security provided by their financial institutions.

Research Design

Mixed research - Qualitative and Quantitative

- testing theory through observation and data (Primary & secondary).

Exploratory Study

- Purposive, (deliberate) self-selection sampling and area sampling.

Length of study

Approximately 3 years.

Collection of data

- In- depth personal interview with respondents from hospitality sector.
- Survey method to be applied for data collection from stake holders.
- online / offline questionnaire method.

Delphi method / expert advice for probable solutions and understanding.

Self-completion diaries

- to track issues and dynamism in industry.

Sample size

1,106 customers / bankers / cyber experts, [structured and semi-structured] approximately

Location of study – Navi Mumbai and Mumbai

Analysis – SPSS package and tools

Hypothesis of Research

- The research hypothesis is designed based on literature review and objectives.
- There exists statistically significant correlation between cyber literacy and growth of e wallet digital payment dependencies.
- There exists statistically significant correlation between usage of e wallet online payment modes and perceptions of customers regarding cyber safekeeping.

Reliability Testing

Case Processing Summary

Reliability Statistics

Cronbach's Alpha	N of Items
.796	25

		N	%
Cases	Valid	1106	100.0
	Excluded ^a	0	.0
	Total	1106	100.0

a. List wise deletion based on all variables in the procedure.

Reliability analysis for each parameter was done using Cronbach’s Alpha and the calculated value is given above. The value is found to be above 0.796 for most of the cases for 25 items in total. Hence we conclude that the values of reliability are satisfactory and we shall proceed with the further analysis of data.

Testing of Hypothesis of research

Hypothesis 1

H0- There exists no statistically significant correlation between cyber literacy and growth of e wallet digital payment dependencies.

H1- There exists a statistically significant correlation between cyber literacy and growth of e wallet digital payment dependencies.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q19The acceptance and adaptability of online transaction systems have increased in contemporary times *	1106	100.0%	0	0.0%	1106	100.0%
Q23There exists a need of cyber awareness and cyber literacy among masses as digital dependencies have geared up amid pandemic	1106	100.0%	0	0.0%	1106	100.0%

Q19 * Q23 Cross tabulation

Count

		Q23					Total
		1	2	3	4	5	
Q19	1	7	0	0	7	0	14
	2	0	0	0	7	7	14
	3	7	0	189	84	21	301
	4	0	14	84	287	147	532
	5	7	0	21	49	168	245
Total		21	14	294	434	343	1106

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	645.214 ^a	16	.000
Likelihood Ratio	507.592	16	.000
Linear-by-Linear Association	226.938	1	.000
N of Valid Cases	1106		

a. 11 cells (44.0%) have expected count less than 5. The minimum expected count is .18.

As the Pearson Chi-Square significant level is $0.00 < 0.05$ from the results driven thus null hypothesis H0 is rejected and alternate hypothesis H1 is accepted showing good fit. Thus, we conclude that at 90% confidence level, there exists a statistically significant correlation between cyber literacy and growth of e wallet digital payment dependencies.

Hypothesis 2

H0 -There exists no statistically significant correlation between usage of e wallet online payment modes and perceptions of customers regarding cyber safekeeping.

H1 -There exists statistically significant correlation between usage of e wallet online payment modes and perceptions of customers regarding cyber safekeeping.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q11 You feel safe while making an online transaction via any online payment mode* Q24There exists statistically significant correlation between usage of online payment modes and perceptions of customers regarding cyber safekeeping	1106	100.0%	0	0.0%	1106	100.0%

Q11 * Q24 Crosstabulation

		Count					Total
		Q24					
		1	2	3	4	5	
Q11	1	7	7	21	21	7	63
	2	0	7	63	42	21	133
	3	0	7	105	112	42	266
	4	0	28	154	280	49	511
	5	0	7	49	35	42	133
Total		7	56	392	490	161	1106

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	199.846 ^a	16	.000
Likelihood Ratio	119.250	16	.000
Linear-by-Linear Association	19.101	1	.000
N of Valid Cases	1106		

a. 6 cells (24.0%) have expected count less than 5. The minimum expected count is .40.

As the Pearson Chi-Square significant level is $0.00 < 0.05$ from the results driven thus null hypothesis H_0 is rejected and alternate hypothesis H_1 is accepted showing good fit. Thus, we conclude that at 90% confidence level, There exists statistically significant correlation between usage of e wallet online payment modes and perceptions of customers regarding cyber safekeeping.

Major challenges/ problems of digital payments

1. Lack of trust among people in digital payments.
2. Lack of knowledge and awareness among uneducated or less advanced people.
3. Less reliability due to scams and hacking cases.
4. Loss of internet connection sometimes.
5. Delay in cashback processing by E-commerce Companies and e- wallet Companies.
6. Sometimes the payments get blocked and no confirmation is sent to customer regarding status of payment.

Preventive measures

Sharing is said to be a good ethical practice at times but not when it comes to data or information and to be specific when it comes to financial transactions and relevant sectors. Never share crucial information such as card details, CVV (customer verification value), password, PIN (personal identification number) and OTP (one time password) (VivinaVishwanathan 2017) with any one even very close to you at times.

The activities of fraud prevention, monitoring, investigation, reporting and awareness creation should be owned and carried out by an independent group in the bank. The group should be adequately staffed and headed by a senior official of the Bank, not below the rank of General Manager/DGM.

Fraud review councils should be set up by the above fraud risk management group with various business groups in the bank. The council should comprise of head of the business, head of the fraud risk management department, the head of operations supporting that particular business function and the head of information technology supporting that business

function. The councils should meet every quarter to review fraud trends and preventive steps taken that are specific to that business group.

Various fraud prevention practices need to be followed by banks. These include fraud vulnerability assessments, review of new products and processes, putting in place fraud loss limits, root cause analysis for actual fraud cases above Rs.10 lakhs, reviewing cases where a unique modus operandi is involved, ensuring adequate data/information security measures, following KYC and Know your employee/vendor procedures, ensuring adequate physical security, sharing of best practices of fraud prevention and creation of fraud awareness amongst staff and customers.

Banks have initiated shore up negative/fraudulent lists of accounts through CIBIL Detect. Banks should also start communicating the details of employees who have defrauded them so that they do not get hired by other banks/financial institutions.

Quick fraud detection capability would enable a bank to reduce losses and can also serve as a deterrent to fraudsters. Various important requirements recommended in this regard include setting up a transaction monitoring group within the fraud risk management group, alert generation and redressal mechanisms, dedicated e-mail id and phone number for reporting suspected frauds, mystery shopping and reviews.

Banks should set up a transaction monitoring unit within the fraud risk management group. The transaction monitoring team should be responsible for monitoring various types of transactions, especially monitoring of potential fraud areas, by means of which, early alarms can be triggered. This unit needs to have the expertise to analyze transactions to detect fraud trends. This unit should work in conjunction with the data warehousing and analytics team within banks for data extraction, filtering, and sanitization for transaction analysis for determining fraud trends. Banks should put in place automated systems for detection of frauds based on advanced statistical algorithms and fraud detection techniques.

It is widely accepted that fraud investigation is a specialised function. Thus, the fraud risk management group should undergo continuous training to enhance its skills and competencies.

III. CONCLUSION

Mobile wallet usage awareness as spread among the people in India due to government policy of demonetization and this as forcefully induced the usage of mobile wallet .The security issues are tighten and risk factors are reduced will automatically increase the adoption of mobile wallet .Apart from these issues the convenience and ease of use as gained an credit to mobile wallet and it can be concluded that they will be a tremendous growth in adoption of mobile wallet in the forthcoming years. The study identifies that the pandemic epoch has made an increase in the rate of online payment. Customer shall be made aware of cyber and digital literacy. There shall be proper knowledge sharing among users of digital wallets and other online financial services.

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