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E-Wallets: Diffusion and Adoption in Indian Economy

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ABSTRACT

Mobile wallets can be viewed as the digital version of a physical wallet someone would carry. The mobile wallet revolution is well underway, but the winning providers are far from decided. The purpose of this paper is to understand the factors affecting the increase in user proportion and its significance in adoption of e-wallet and also the disparity in user proportion in metro and tier-2 cities. A total 285 valid responses as a part of pilot test are analyzed to establish the outline of the study. In November 2016 aftermath of demonetization affected the user base and increased the number of e-wallets adoption by small vendors in Mumbai area. Looking at the user perspective, the majority of the respondents uses e-wallets; the proportion of users in the metropolitan cities is more as compared to the tier-2 cities. In addition, the only significant variable for e-wallet adoption that was indicated was 'Simplicity', which implies the ease of use of the wallet payment system. Looking at the vendor perspective, the e-wallet adoption is much less than what had anticipated. One of the unexpected factors was the fact that the vendors are approached by the e-wallet representatives to adopt it. Hence e-wallets have been adopted by the user population and are satisfied with it. The vendor market hasn't been diffused into yet, and seeing the difficulties and problem they face, it seems difficult that they will be able to penetrate it in the future.

Keywords*: e-wallets, demonetization, payment.*

Introduction:

Mobile phones are rapidly shaping how consumers search, purchase and pay for goods and services. A lot of innovations have been focused on mobile as a channel, resulting in disruptive business models across industries (Jacques Bughin, 2013).Interoperability and ubiquity of mobile devices, fall in prices of data, the emergence of mobile-based business models, coupled with lower cost of investment in payment hardware for merchants, have set the stage of rapid adoption of mobile wallets across the globe. Mobile payments are defined as the use of a mobile device to conduct a payment transaction in which money or funds are transferred from a payer to a receiver via an intermediary or directly without an intermediary.

Mobile wallets can be viewed as the digital version of a physical wallet someone would carry. It's a mobile platform where people can store their money just like in a bank account. (Shukla, 2016). Money can then be loaded into the wallet using a debit or credit card, online banking, retail outlet or via cash (a rechargeable kiosk). A wallet doesn't require two-factor authentication, unlike card based payments which make wallet payment fast and have a higher success rate. The digital transformation phase that India is entering helps in bringing multiple alternatives to card/cash payment methods. Mobile

payments have been suggested as a solution to facilitate micropayments in electronic and mobile commerce transactions and to encourage reduced use of cash at point-of-sales terminals (SHARMA, 2011). The different M-payment types along with the technology used and the purchase relationships that are currently used in India include: Message or browser payments; Application based payments; Contactless payments; Hybrid Payment devices. (SAMBHY, 2014) Mobile wallets in India can be grouped into three categories- Bank-led wallets, Telco-led wallets, and Independent wallets (M. Manikandan, 2016). The major players in the mobile wallet space are: PayTm, Mobiwik, M-Pesa, Freecharge, Ola – Money, Pockets etc. The demonetization of `1000 and `500 notes announced by the Indian government in November 2016, led to cash crisis in the Indian economy. This forced people to make transactions through electronic modes, especially via mobile wallets (CFO India, 2016). With a surge in wallet adoption due to demonetization, it's thought provoking to see whether people will stick to wallets or abandon it.

Review of Related Literature:

The mobile wallet market in India is expected to grow at over 190 per cent to reach `1,512 billion by the financial year 2022 from the current level of about `1.5 billion, says a study conducted jointly by trade body Assocham and business consulting firm RNCOS. (IANS, 2016)

Ernst & Young LLP, 2016 stated that the number of mobiles across the world far exceeds that of any other device and its adoption is increasing rapidly. There are 997 million mobile phone subscribers and 239 million smartphone users in India. The major factors that support the growth in mobile payments include: Declining handset prices; increased 3G and 4G penetration; the improvement in broadband connectivity because of the NOFN (National Optical Fibre Network) initiative taken by Digital India; interoperability; the ubiquity of mobile devices; Flexibility of technologies. Furthermore, the research was done on trends in Mobile Payments by Denis Dennehy, David Sammon inferred the following as contributing factors to the growth of m-payments: Offering added value for consumers, merchants, financial institutions and other participants in the ecosystem; User Experience; Easy to Use. The challenges for the same include: Complex value-chain with lack of co-operation; Financial regulation; Security/Risk (perception of security/risk); Cost; Unavailability of a broad range of mobile payment capable handset; Lack of interoperability/ lack of technology standards. (Denis Dennehy D. S., 2015) The growth of the Indian digital payments space is expected to be driven by four trends that are also likely to impact how this industry looks in the future. These include: India going digital; "Favourable" regulatory environment; the emergence of Next Gen payment service providers; Enhanced customer experience. (The Boston Consulting Group, Inc. and Google India Private Limited, 2016) The increased customer usage of mobile wallet technology has also benefits for small scale business. These include: Reduced fraud; Decreased payment time; Expected decrease in processing fees; Better customer loyalty. (Shukla, 2016). The demonetization of `1000 and `500 notes led to the removal of 86 per cent of the currency in circulation which has resulted in a very severe contraction in money supply in the economy (National Institute of Public Finance and Policy, 2016). The mobile commerce and payments firm registered a traffic increase of 435% since the evening when the ban on bank notes was made public. The Paytm app also got a big push with a 200% increase in downloads in the past that day (TNN, 2016). The major gap noticed based on the various research papers and articles that were studied was: the main subject of study was digital payments and mobile payments. We referred to (Denis Dennehy D. S., 2015) for understanding the drivers, challenges and willingness to use mobile payments. The research papers have a generalized focus and there is a lack of emphasis on E-wallets.

E-wallets is a new phenomenon which is growing since 2010-11 in India. Based on the literature review performed by us (Shukla, 2016), we realized the perspective adopted for the research is that of retailers and market players. Also, there is an absence of deductive reasoning to link the conclusion provided to the data gathered.

Furthermore, the detailed research reports on E-wallets by consultancy firms (Ernst & Young LLP, 2016) (The Boston Consulting Group, Inc. and Google India Private Limited, 2016) does provide us with relevant data and inferences about the benefits, challenges and characteristics of E-wallets along with the factors responsible for their adoption and growth in Indian Economy. However, they have failed to discuss the retention rate and providing a perspective of the users of E-wallets as a payment method. In addition, there are no suggestions for the e-wallet industry to grow and the changes required to do the same. To understand the current standing of E-wallets in the Indian economy, it is crucial to study the impact of Demonetization on the payment method trends of the citizens and how it has benefitted the E-wallet industry. Along with this, there were various government policies that were changed and implemented to promote digital payments and the impact of the same has not been taken into consideration. The current scenario of the Indian economy is at a crucial turning point with the digital

India initiative, demonetization and the government support that is emphasizing on educating and creating awareness about payment alternatives available to all the citizens. India is on the starting line to go cashless. Since E-wallets are one of the major methods that may be adopted, it becomes crucial to understand their current standing and provide future projections of the possibilities.

Research Methodology:

To study the extent of adoption of e-wallets and the factors affecting the same 'Technology Acceptance Model' (TAM) is used.

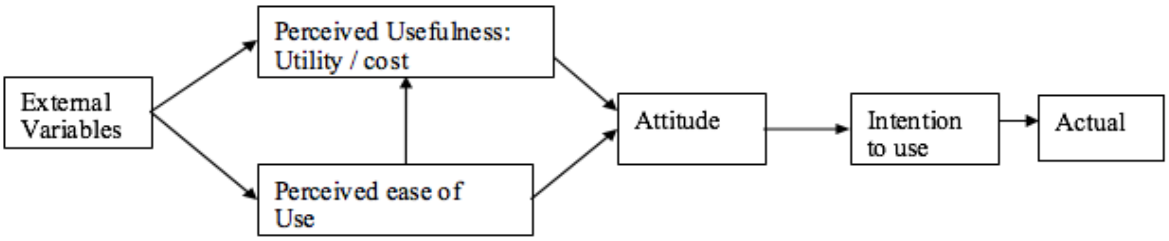
To analyze the diffusion rate of e-wallets in metropolitan and tier-2 cities if there is a change in the mode of payments offered by small vendors following objectives and hypothesis are made.

Research Objectives:

- To understand the factors affecting the increase in user proportion and the significance of them.
- To understand the factors responsible for the variation in user proportion in metro and tier-2 cities.
- To gauge the impact of demonetization.
- To understand the current adoption of e-wallets by small vendors in Mumbai area.
- To study the trends that has increased the e-wallet usage.
- To study what may supplant e-wallets.

Theoretical Framework:

'Technology Acceptance Model' (TAM) is used as the standard reference model for explaining the diffusion of new Information and Communication Technology. This model is an adaptation of the theory of reasoned action proposed by Ajzen and Fishbein to explain and predict the behavior of people in a specific situation.



When one is thinking about using an e-wallet, the perceived usefulness (expectation of result) also take into consideration the cost of this payment instrument, which will determine its relative perceived advantage. We thusly wind up with an expanded TAM that can be utilized to comprehend consumer acknowledgment of an innovation and not just by users inside an association

Figure 1 Modified TAM:

Perceived Usefulness of Mobile Wallet: Perceived usefulness is defined as "the degree to which an individual believes that using a particular system would enhance his or her performance".

Attitude toward Using Mobile Wallet: Attitude toward using is defined as an individual's positive or negative feeling about performing the target behavior. Fishbein and Ajzen have persuasively argued that, in the context of the theory of reasoned action, an individual's actual behavior hinged on that individual's attitude toward that particular behavior.

Hypothesis:

1. Null Hypothysis: Proportion of users of e-wallets was not impacted by demonetization.
Alternate Hypothesis: Proportion of users of e-wallets increased after demonetization.
2. Null Hypothysis: Proportion of users of e-wallets is equal in metropolitan and tier-2 cities.
Alternate Hypothesis: Proportion of users of e-wallets is more in metropolitan cities.
3. Null Hypothysis: Proportion of vendors using e-wallets was not impacted by demonetization.
Alternate Hypothesis: Proportion of vendors using e-wallets increased after demonetization.

Sources of Data:

- Survey
- Questionnaire

Sampling Procedures:

- Simple Random Sampling: Sampling based on small, homogeneous and readily available population.
- Cluster Sampling: Cluster Sampling based on the location i.e. Metropolitan and Tier-2 cities
- Convenience Sampling: Convenience Sampling involves subjects with convenient accessibility and proximity.

Methods of Data Analysis:

Analytical Tools:
To measure the internal consistency of the variables: Cronbach's Alpha
To measure the correlation between the factors: Factor Analysis; Binomial Logistic Regression
Software Tools: Excel; SPSS; Google Forms
Hypothesis Testing
Number of users before and after demonetization:

Ho: p2 ≥ 0.658; H1: p2 < 0.658

p1: Proportion of users using e-wallets before demonetization (0.658)

p2: Proportion of users using e-wallets after demonetization

Z_{Cal} = -8.876; Z_{Tab} = ±1.65

As $Z_{Cal} < Z_{Tab}$, We will reject the null Hypothesis

Therefore, p2 > p1 i.e. Proportion of Users after demonetization is lesser than proportion of Users before demonetization.

Population variation of e-wallet users in metropolitan and tier-2 cities:

Ho: p1 = p2; H1: p1 > p2

p1: Proportion of e-wallet users in metropolitan cities

p2: Proportion of e-wallet users in tier-2 cities

Z_{Cal} = 1.711; Z_{Tab} = 1.65

As $Z_{Cal} < Z_{Tab}$, We will reject the null Hypothesis

Therefore, P1 >P2 i.e. Proportion of users in metropolitan cities is greater than proportion of users in tier-2 cities.

Population variation of vendors using e-wallets before and after demonetization:

Ho: p2 ≤ 0.179

H1: p2 > 0.179

p1: Proportion of vendors using e-wallets before demonetization

p1 = 0.179

p2: Proportion of vendors using e-wallets after demonetization

Z_{Cal} = 8.18; Z_{Tab} = 1.65

As $Z_{Cal} > Z_{Tab}$, We will reject the null Hypothesis

Therefore, p2 > p1 i.e. Proportion of Vendors after demonetization is greater than proportion of Vendors before demonetization.

Data Analysis (User Adoption)

285 people took part in the survey out of which 183 people use E-wallets and 102 do not.

Demographic Overview:

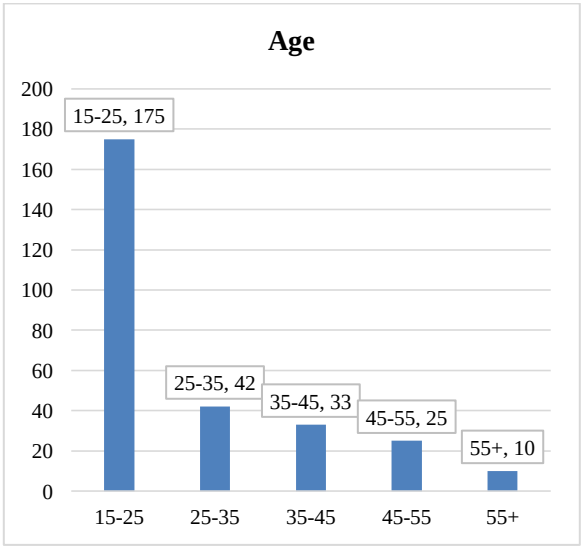


Figure 2: Age

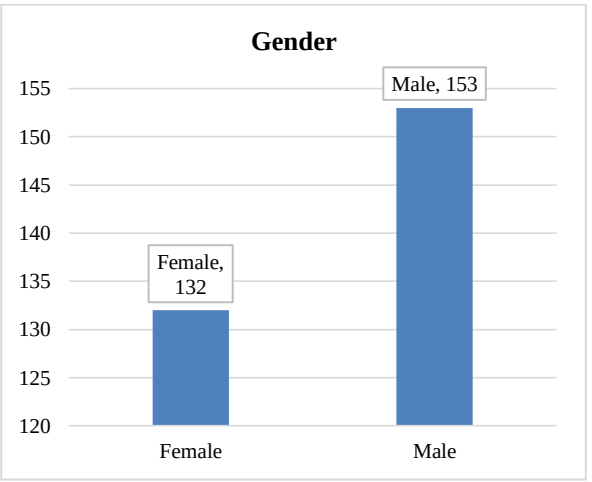


Figure 3: Gender

Figure 4: Location wise user adoption

Analysis of Wallet usage and preference:

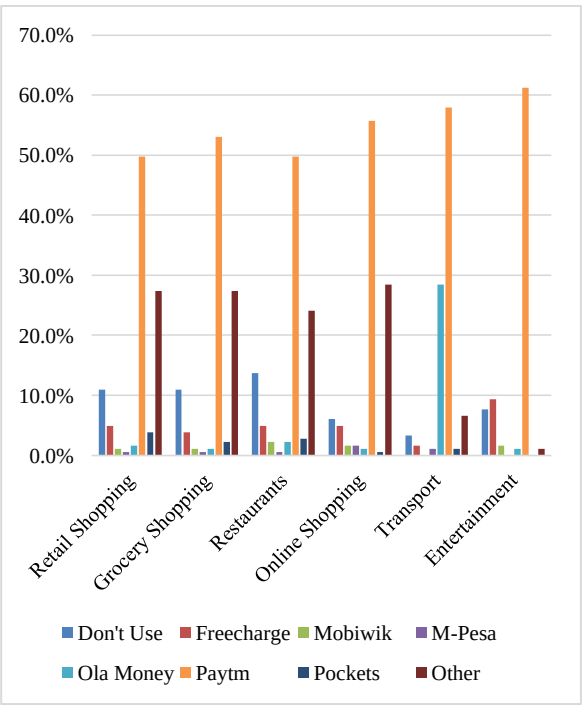


Figure 1: Wallet Usage Analysis

It is quite clear that Paytm takes the lead in all the categories.

Impact of demonetization:

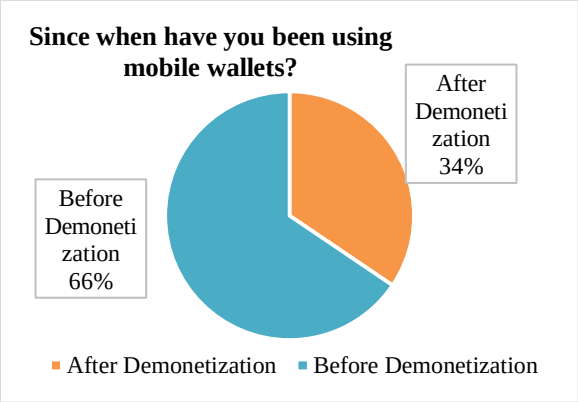


Figure 6: Impact of Demonetization on user adoption from the graph, we see that there is a little impact.

Findings and Discussions (User Adoption):

Binary Logistic Regression:

Since the correlation matrix's determinant (Factor analysis) is close to zero, the independent variables do not have multi-collinearity present. This ensures that the assumptions required for performing the binary logistic regression hold true.

The binary logistic regression:

Comparing our model with the null model:

Table 1: Omnibus Test (User)

Omnibus Tests of Model Coefficients				
		Chi-square	Df	Sig.
Step 1	Step	324.967	1	.000
	Block	324.967	1	.000
	Model	324.967	1	.000
Step 2	Step	5.520	1	.019
	Block	330.488	2	.000
	Model	330.488	2	.000

Interpretation: Since the significance level is less than 0.05, the null hypothesis, i.e. the prediction model is insignificant is rejected. Hence, it can be interpreted that the prediction model is more significant than the null model.

Interpreting the percentage of variance explained:

Table 2: Variance Test (User)

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Sqare
1	63.776	.669	.912
2	58.255	.675	.920

a. Estimation terminated at iteration number 20 because maximum iterations have been reached. Final solution cannot be found.

Interpretation: The Nagelkerke R Square value is analogous to the R square value in linear/ multiple regression. Hence, it tells us the percentage of variance that can be explained by the analysed model. Hence, in this case, our model explains 92% variance.

Interpreting the model accuracy:

Table 3: Accuracy Test (User)

Classification Table					
Observed			Predicted		
			Do you use e-wallets		Percentage Correct
			no	yes	
Step 1	Do you use e-wallets	No	110	0	100
		Yes	9	175	95.1
	Overall Percentage				96.9
Step 2	Do you use e-wallets	No	110	0	100
		Yes	9	175	95.1
	Overall Percentage				96.9
a. The cut value is .500					

Interpretation: The Classification table summarizes the hits and misses in the classification process that was done based on our model. Hence, it can be seen that our model is 96.9% accurate.

Interpreting all the variables:

Table 4: Variable Significance Test (User)

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1	How often do you use mobile wallets	20.432	1321.430	.000	1	.988	746975620.848
	Constant	-22.935	1321.430	.000	1	.986	.000
Step 2	How often do you use mobile wallets	20.754	1303.600	.000	1	.987	1030789659.810
	Simplicity	-.556	.227	5.985	1	.014	.573
	Constant	-21.118	1303.600	.000	1	.987	.000

Interpretation: The null hypothesis is that the variables are insignificant i.e. the B value should be 0. If the value under the Sig. column is less than 0.05, the null hypothesis is rejected and it can be interpreted that

the variable is significant. Hence, from the above table it can be interpreted that the significant variables are:

Simplicity:

With every 1 unit change in simplicity, there is a 0.573% chance of the user adopting e-wallets.

Finding and Discussion (Vendor Adoption):

We took data from 50 different vendors selling fruits, vegetable or small makeshift shops. Out of which 23 vendors use, e-wallets and 27 do not.

Analysing the impact of demonetization

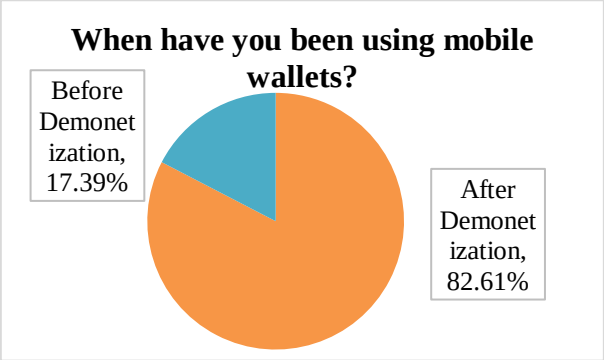


Figure 7: Impact of Demonetization on vendor adoption

It is clear that demonetization has an effect on e-wallet adoption.

Data Analysis using tools (Vendor Adoption)

Binary logistic regression

Since the correlation matrix's determinant (Factor analysis) is close to zero, the independent variables do not have multi-collinearity present. This ensures that the assumptions required for performing the binary logistic regression hold true.

The binary logistic regression:

Comparing our model with the null model:

Table 5: Omnibus Test (Vendor)

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	39.425	1	.000
	Block	39.425	1	.000
	Model	39.425	1	.000
Step 2	Step	4.745	1	.029
	Block	44.170	2	.000
	Model	44.170	2	.000

Interpretation: Since the significance level is less than 0.05, the null hypothesis, i.e. the prediction model is insignificant is rejected. Hence, it can be interpreted that the prediction model is more significant than the null model.

Interpreting the percentage of variance explained:

Table 6: Variance Test (Vendor)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	27.034[a]	.560	.747
2	22.289[a]	.602	.803

a. Estimation terminated at iteration number 20 because maximum iterations have been reached. Final solution cannot be found.

Interpretation: The Nagelkerke R Square value is analogous to the R square value in linear/ multiple regression. Hence, it tells us the percentage of variance that can be explained by the analysed model. Hence, in this case, our model explains 80.3% variance.

Interpreting the model accuracy:

Table 7: Accuracy Test (Vendor)

Classification Table[a]					
Observed			Predicted		
			Do_You_Use		Percentage Correct
			No	Yes	
Step 1	Do_You_Use	No	25	0	100.0
		Yes	5	18	78.3
	Overall Percentage				89.6
Step 2	Do_You_Use	No	25	0	100.0
		Yes	5	18	78.3
	Overall Percentage				89.6
a. The cut value is .500					

Interpretation: The Classification table summarizes the hits and misses in the classification process that was done based on our model. Hence, it can be seen that our model is 89.6% accurate.

Interpreting all the variables:

Table 8: Variable Significance Test (Vendor)

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Frequency	21.154	5847.243	.000	1	.997	1538561206.598
	Constant	-22.764	5847.243	.000	1	.997	.000
Step 2[b]	Frequency	21.153	5723.358	.000	1	.997	1536201862.128
	Awareness	.727	.368	3.895	1	.048	2.069
	Constant	-24.928	5723.358	.000	1	.997	.000
a. Variable(s) entered on step 1: Frequency.							
b. Variable(s) entered on step 2: Awareness.							

Interpretation: The null hypothesis is that the variables are insignificant i.e. the B value should be 0. If the value under the Sig. column is less than 0.05, the null hypothesis is rejected and it can be interpreted that

the variable is significant. Hence, from the above table it can be interpreted that the significant variables are:

Awareness:
With every one unit change in awareness there is a 2.069% chance of the user adopting e-wallets.

Conclusion and Recommendation:

Conclusions and Implications:
User Perspective:
The proportion of users in the metropolitan cities is more as compared to the tier-2 cities.
Demonetization didn't impact the adoption rate as much as we had initially thought.
The only significant variable that was indicated was 'Simplicity' which basically implies the ease of use of the wallet payment system.
Vendor Perspective:
The e-wallet adoption is much less than what we had anticipated. Even though our initial assumption about the impact of demonetization was right, we had overestimated it.
One of the unexpected factors was the fact that the vendors are approached by the e-wallet representatives to adopt it. The fruit and vegetable vendors, which were our target sample, face an issue in the supply chain integration. Our research helped in the discovery that the wholesalers that sell the vegetables and fruits to these vendors don't accept payment from the wallets and moreover, payments by cash are incentivized. This was a major reason behind the reluctance to adopt e-wallets. Also, even though demonetization did encourage few of the vendors to adopt e-wallets, the impact fizzled down after a few weeks, when the cash crunch ended. Hence, even though they had started accepting payments via the wallets, the practical usage which was measured by the ratio of sales, was very less.
Apart from this, there is a fundamental flaw, a significant proportion was hesitant to shift to a smartphone which is a basic requirement for using e-wallets. The reason behind this was the cost of the smartphone and the learning curve that comes with it, which according to them is not worth the hassle. Based on the points mentioned above, as a concluding note we would like to say that e-wallets have been adopted by the user population and are satisfied with it. The vendor market hasn't been diffused into yet, and it will be difficult for them to be able to penetrate it in the future.

Recommendations:

Based on the findings and conclusion, following recommendations are suggested:
The researchers recommend the e-wallets to be integrated better with the bank system.
The researchers recommend that the e-wallets should be integrated in the supply chain, i.e. should be adopted by the suppliers in order to enter the vegetable-vendor market.
The researchers recommend spreading more awareness to smaller sectors, to be better integrated.
The researchers recommend the e-wallets to find a way to diffuse into tier-2 and tier-3 cities as the user population is much more, and the proportion is still untapped.
The researchers recommend making the entire payment method more seamless and ensuring the hardware is easily accessible by everybody. This can be done by partnering with the mobile-phone companies.

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