

# Digital Payments Adoption by Indian Households and Retailers Post Demonetization: Combined TAM and Decomposed TPB Approach

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# INTRODUCTION

- Indian economy has been primarily cash dependent.
- 8th November 2016 demonetization influenced the economy in all pervasiveness.
- The ultimate aim of demonetization move was to make India a cashless economy in order to boost public revenue through reduced corruption and achieve the objective of inclusive growth.
- Demonetization acted as a forced motivation for the households and retailers of which more than ninety percent are in unorganized retail sector, to adopt digital payments.

# Rationale for the Study

- Previous demonetization attempts in 1946 and then in 1978 aimed at curbing black money but encouraging digital payments was not an existing viable option in that era.
- Therefore the existing body of literature on demonetization in India does not include studies on digital payments adoption and further diffusion of this technology among the people.
- Need for a comprehensive study on the factors responsible for people not adopting digital payments even after a long driven IT revolution in India.

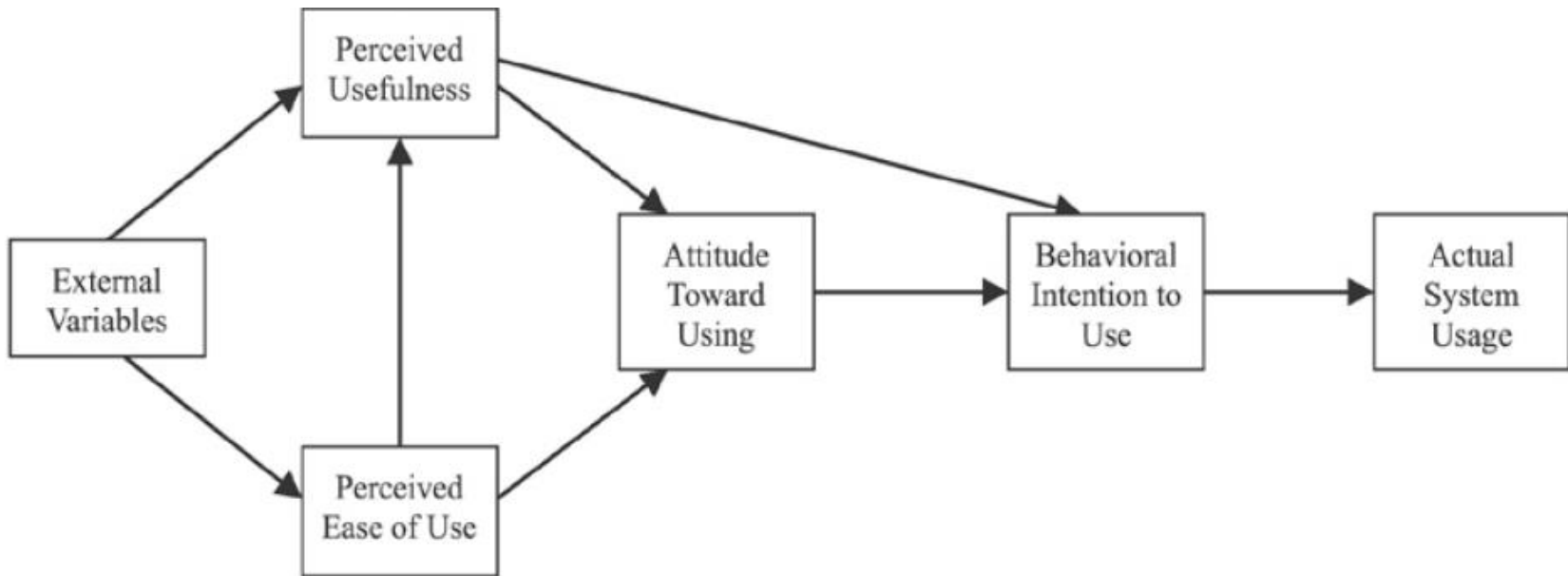
# Objective of the Study

- This study is aimed at understanding the factors influencing the digital payments adoption decision of households and retailers in India .
- For the purpose of this study, digital payments were taken to include payments through bank cards, internet and mobile banking, mobile or e-wallets and UPI (Unified Payment Interface) apps.
- Since behavioural intention may not always be transformed into actual usage, this paper also examined the relationship between intended and actual use of digital payments.

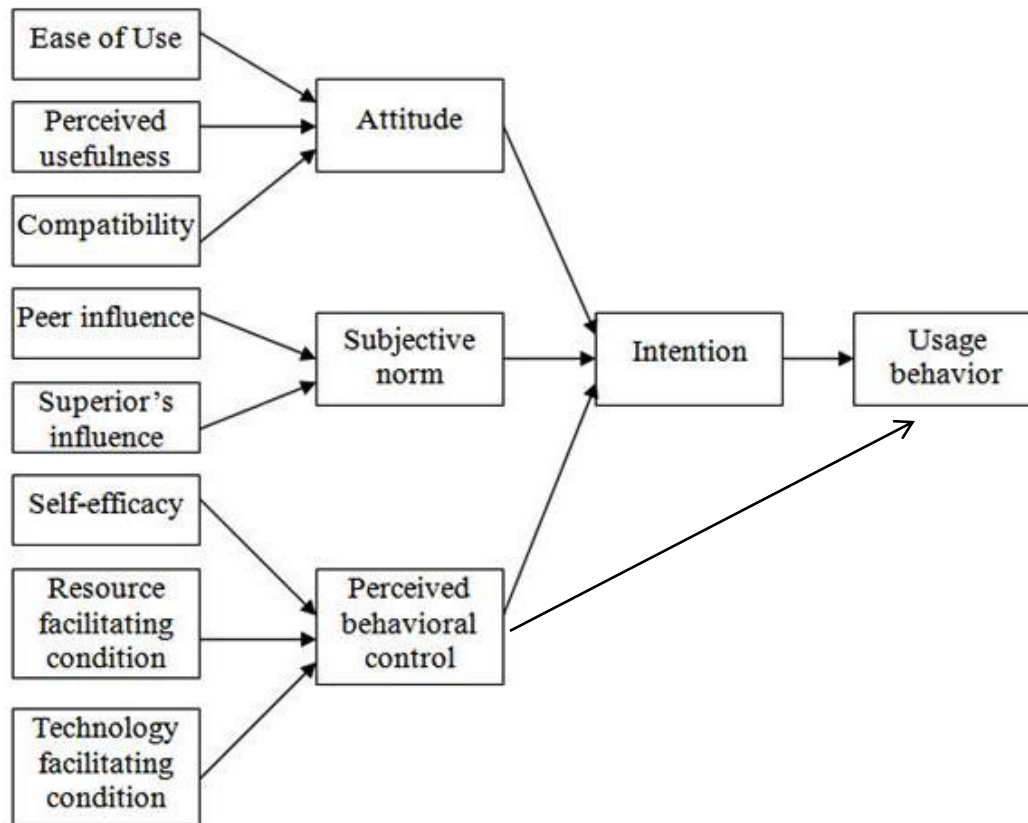
# RESEARCH FRAMEWORK

This study uses a combination of Technology Acceptance Model (TAM) and Decomposed Theory of Planned Behaviour (TPB) for analysis of digital payments adoption decisions by Indian households and retailers.

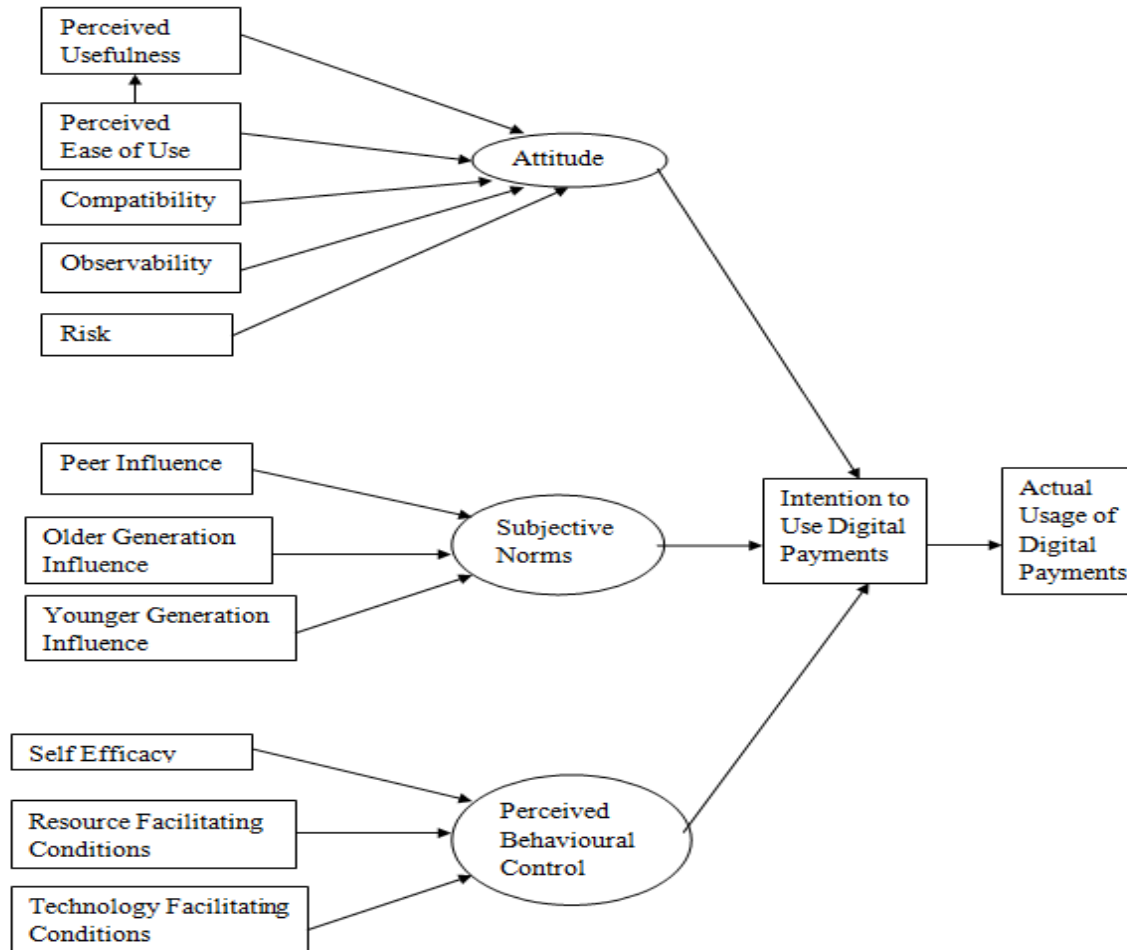
# Technology Acceptance Model (TAM): Davis (1989)



# Decomposed Theory of Planned Behaviour: Taylor & Todd (1995)

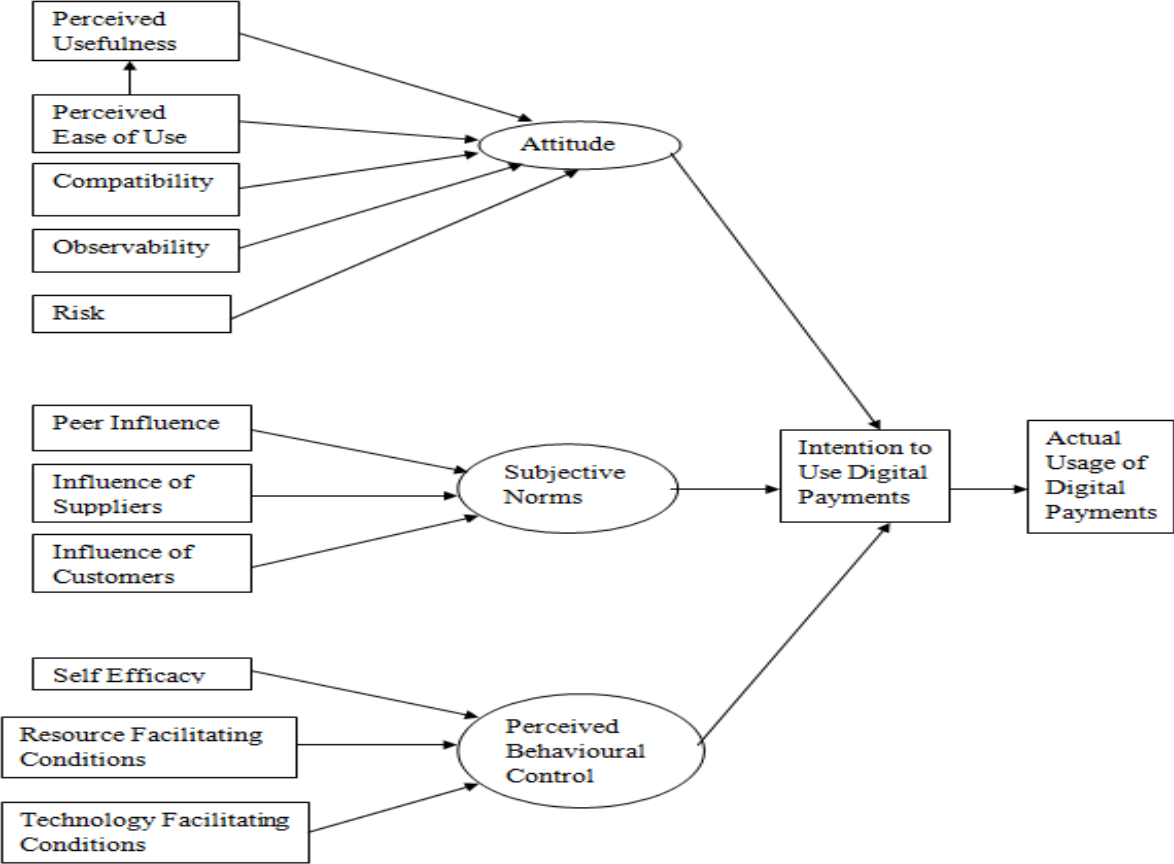


# Combined TAM and Decomposed TPB Framework for Adoption of Digital Payments by Households





# Combined TAM and Decomposed TPB Framework for Adoption of Digital Payments by Retailers



# RESEARCH METHODOLOGY

- **Subjects and Procedure**

- Primary data was collected through a nationwide survey which included direct personal contact through enumerators, internet survey as well as structured telephonic interviews.
- As digital payments is a two way process, therefore its acceptability was assessed in both the household consumers and the retailers.
- A combination of quota sampling and snowball sampling was used in order to have a reasonable sample size of respondents who would be willing to give genuine responses from different regions of India including cities, small towns and villages from Northern, Eastern, North Eastern, Western, Central and Southern India.
- Major part of the survey was conducted during June and July 2017.

**Table 1A: Sample Characteristics of Household Consumers (n = 1682)**

Demographic characteristics	Frequency	Percent (%)	Cumulative (%)
<b>Gender</b>			
Male	1021	60.7	60.7
Female	661	39.3	100
<b>Age</b>			
<25 years	394	23.4	23.4
25–45 years	717	42.6	66.0
>45 years	573	34.0	100
<b>Region</b>			
Northern	496	29.5	29.5
Eastern	331	19.7	49.2
North Eastern	121	7.2	56.4
Western	318	18.9	75.3
Central	190	11.3	86.6
Southern	226	13.4	100
<b>Urban</b>			
Urban	923	54.9	54.9
Semi-urban	396	23.5	78.4
Rural	363	21.6	100
<b>Use of Digital Payments</b>			
Several times	693	41.2	41.2
Sometimes	360	21.4	62.6
Rarely	232	13.8	76.4
Never	397	23.6	100

**Table 1B: Sample Characteristics of Retailers (n = 781)**

Demographic characteristics	Frequency	Percent (%)	Cumulative (%)
<b>Gender</b>			
Male	758	97.1	97.1
Female	23	2.9	100
<b>Age</b>			
<25 years	143	18.3	18.3
25–45 years	527	67.5	85.8
>45 years	111	14.2	100
<b>Region</b>			
Northern	225	28.8	28.8
Eastern	158	20.2	49.0
North Eastern	46	5.9	54.9
Western	169	21.7	76.6
Central	79	10.1	86.7
Southern	104	13.3	100
<b>Urbanity</b>			
Urban	446	57.1	57.1
Semi-urban	199	25.5	82.6
Rural	136	17.4	100
<b>Acceptance of Digital Payments</b>			
Several times	416	53.3	53.2
Sometimes	133	17.0	70.2
Rarely	124	15.9	86.1
Never	108	13.8	100

# RESEARCH METHODOLOGY

- **Measurement**

- Measures adapted from relevant previous studies, making minor wording changes to tailor in the context of digital payments.
- The measures of actual usage, behavioural intention, perceived usefulness and perceived ease of use were adapted from Davis (1989).
- Two items were used to assess respondents' intentions to adopt digital payments asking the extent to which they would be interested in using digital payments and the likelihood that they will adopt digital payments in the next 6, 12, and 18 months (responses weighted as suggested by Babbie 1990).

- The belief items for measuring compatibility and observability were adapted from Moore and Benbasat (1991). Along with compatibility with values, compatibility with financial needs was also measured.
- Measures for risk were adapted from Tan and Teo (2000).
- Measures for subjective norms were revised from Taylor and Todd (1995).
- Under perceived behavioural control, the measures for self efficacy were adapted from Compeau and Higgins (1995).
- Measures for facilitating conditions were adapted from Tan and Teo (2000).

- All items were measured using a seven-point Likert scale with anchors in most cases ranging from strongly disagree to strongly agree.
- Content validity was established through careful selection and adaptation of items from previously validated instruments while developing the questionnaire.
- The hypothesized model was empirically tested using the structural equation modelling (SEM) approach.

# ANALYSIS AND FINDINGS

- **Measure Reliability and Validity**

- Internal consistency reliability was assessed by Cronbach's alpha which ranged from 0.73 to 0.89, which were above the acceptable threshold 0.70 suggested by Nunnally and Bernstein (1994).
- Convergent validity was assessed based on factor loading, composite reliabilities, and average variances extracted (Hair et. al. 1995).
- The results show that the factor loading for all items exceeds the recommended level of 0.6 (Chin et. al. 1997).
- Composite reliability values, which depict the degree to which the construct indicators capture the latent construct, range from 0.76 to 0.91 thus exceeding the minimum recommended level of 0.7 (Hair et. al. 1995).
- The average variances extracted, which reflect the overall amount of variance in the indicators accounted for by the latent construct, were in the range between 0.56 and 0.77 thereby exceeding the minimum recommended level of 0.5 (Hair et. al. 1995).
- The square correlations for each construct is less than the average variance extracted by the indicators measuring that construct, indicating adequate discriminant validity for the constructs.



# Structural Model Results

**Table 4A: Fit Indices and Explanatory Power of the Structural Model (Households)**

Fit index	Value	Recommended Criteria
df	728	
$\chi^2$	1317.68	
Normed Chi-Square ( $\chi^2/\text{df}$ )	1.81	$\leq 2.00$
AGFI <sup>a</sup>	0.87	$\geq 0.80$
CFI	0.93	$\geq 0.90$
NNFI	0.94	$\geq 0.90$
RMSEA <sup>b</sup>	0.041	$\leq 0.08$

Explanatory power ( $R^2$ )	
$R^2$ Actual Usage (AU)	0.41
$R^2$ Behavioural Intention (BI)	0.52
$R^2$ Attitude (ATD)	0.58
$R^2$ Subjective Norms (SN)	0.43
$R^2$ Perceived Behavioural Control (PBC)	0.57
$R^2$ Perceived Usefulness (PU)	0.36

# Structural Model Results

**Table 4B: Fit Indices and Explanatory Power of the Structural Model (Retailers)**

Fit index	Value	Recommended Criteria
df	728	
$\chi^2$	1397.76	
$\chi^2/df$	1.92	$\leq 2.00$
AGFI <sup>a</sup>	0.81	$\geq 0.80$
CFI	0.91	$\geq 0.90$
NNFI	0.96	$\geq 0.90$
RMSEA <sup>b</sup>	0.053	$\leq 0.08$

Explanatory power (R <sup>2</sup> )	
R <sup>2</sup> Actual Usage (AU)	0.37
R <sup>2</sup> Behavioural Intention (BI)	0.47
R <sup>2</sup> Attitude (ATD)	0.51
R <sup>2</sup> Subjective Norms (SN)	0.54
R <sup>2</sup> Perceived Behavioural Control (PBC)	0.53
R <sup>2</sup> Perceived Usefulness (PU)	0.31

# Structural Model Results

**Table 5A: Path coefficients for Household Consumers**

Paths	Coefficient
$\beta$ Intention, Attitude	0.67*
$\beta$ Intention, Subjective Norms (SN)	0.14
$\beta$ Intention, Perceived Behavioural Control (PBC)	0.40*
$\beta$ Usage, Intention	0.48*
$\gamma$ Perceived Usefulness, Perceived Ease of Use	0.36**
$\gamma$ Attitude, Perceived Usefulness	0.72*
$\gamma$ Attitude, Compatibility	0.06**
$\gamma$ Attitude, Perceived Ease of Use	0.34*
$\gamma$ Attitude, Observability	0.19**
$\gamma$ Attitude, Risk	- 0.59*
$\gamma$ SN, Peer Influence	0.26*
$\gamma$ SN, Elders Influence	0.09
$\gamma$ SN, Young Generation Influence	0.27**
$\gamma$ PBC, Self Efficacy	0.65*
$\gamma$ PBC, Resource Facilitating Conditions	0.24**
$\gamma$ PBC, Technology Facilitating Conditions	0.31*

Note: \*Significant at  $\alpha = 0.01$

\*\* Significant at  $\alpha = 0.05$

# Structural Model Results

**Table 5B: Path Coefficients for Retailers**

Paths	Coefficient
$\beta$ Intention, Attitude	0.72*
$\beta$ Intention, Subjective Norms (SN)	0.17**
$\beta$ Intention, Perceived Behavioural Control (PBC)	0.39*
$\beta$ Usage, Intention	0.19*
$\gamma$ Perceived Usefulness, Perceived Ease of Use	0.41**
$\gamma$ Attitude, Perceived Usefulness	0.81*
$\gamma$ Attitude, Compatibility	0.28**
$\gamma$ Attitude, Perceived Ease of Use	0.37**
$\gamma$ Attitude, Observability	0.13
$\gamma$ Attitude, Risk	- 0.76*
$\gamma$ SN, Peer Influence	0.51*
$\gamma$ SN, Suppliers Influence	0.03
$\gamma$ SN, Customers Influence	0.62*
$\gamma$ PBC, Self Efficacy	0.37*
$\gamma$ PBC, Resource Facilitating Conditions	0.11
$\gamma$ PBC, Technology Facilitating Conditions	0.24*

Note: \*Significant at  $\alpha = 0.01$

\*\* Significant at  $\alpha = 0.05$

# DISCUSSION AND CONCLUSIONS

- The combination framework of Technology Adoption Model (TAM) and Decomposed Theory of Planned Behaviour (TPB) postulates that a person's intention to adopt digital payments is determined by attitude, subjective norms; and perceived behavioural control which were further decomposed using constructs from innovation literature.

- The significance of ease of use in influencing digital payments adoption increases in Indian scenario as there is a large proportion of population which is not technology savvy and many do not have the minimum level of education and skills required to operate complicated applications or tools based on digital technology.
- Perceived usefulness is judged by a consumer or retailer in a comparative perspective relative to doing the transactions in cash. Digital payments are more likely to be adopted if the benefits of digital payments in terms of efficiency and effectiveness are significant when compared to cash payments.
- The support for compatibility with values and lifestyle is consistent with Rogers' suggestion that compatibility of an innovation with a previously introduced idea can influence the adoption of the innovation.

- Support for observability in case of household consumers is consistent with Rogers' argument that the degree to which the results of an innovation are visible to others has a positive influence on the rate of adoption of the innovation.
- The insignificant path coefficient for observability in case of retailers may be due to the fact that results of adoption of digital payments by retailers are not explicitly visible to other retailers as they are not disclosed openly to an extent which may create a significant influence on intention of retailers to adopt digital payments.

- The significant negative coefficient for risk reflects similar arguments in the literature (Bhimani 1996; Cockburn and Wilson 1996; Lee 1996; Quelch and Klein 1996).
- This implies that enhancement in cyber security; strict laws and assurance of privacy by the government may lead to faster adoption of digital payments.
- As expected, self-efficacy is found to be significant for both household consumers and retailers. Hence, users who are confident of their abilities to use digital payment methods are more likely to adopt such tools.



- The technology facilitating conditions is also found to have a significant influence on intentions to adopt digital payments as expected because the required technology support through internet connectivity along with mobile applications is essential for consumers to be able to adopt digital payments more easily.
- The resource facilitating conditions including money and time required for digital payments is also found to be significant in case of household consumers.
- The affordability of mobile phones has been a positive influence on digital payments adoption while the charges on digital payments have a negative influence as it is perceived as an extra cost over cash transactions. Hence, digital payments are more likely to be adopted if the usage charges are lower.

- Conversely, the resource facilitating conditions are found to have a positive but insignificant effect in case of retailers in contrast with previous findings.
- This may be due to the fact that retailers were surveyed for accepting digital payments and not for making them.
- The costs for acceptance of digital payments are not significant except for acceptance of card payments which attract the merchant discount rate (MDR). Other methods of digital payments such as e-wallets do not incur any significant charges on the retailers for accepting digital payments.
- The retailers surveyed for this study were the ones in the unorganized sector as organized retail sector has been accepting digital payments in the form of card payments since long now.
- These retailers started accepting payments through e-wallets during cash crunch after demonetization as firms like Paytm ensued aggressive marketing to cash on the opportunity.
- Still, there are very few small retailers who have installed the PoS machines to enable card payments though payments through e-wallet are becoming increasingly acceptable. This might have led to the coefficient of resource facilitating conditions to be insignificant in case of retailers in the study.

- The results also show that the influence of the user's consumer relevant groups on his or her adoption is not significant. This result is in contrast with the results reported in earlier studies.
- A possible explanation for the lack of support for this hypothesis is that the easy access to information about the digital payments methods encouraged by government support has made potential adopters less reliant on their referent groups and also because the referent group in the smaller towns and rural areas itself does not comprise of a significant proportion of digital payments users.
- This result is similar to that obtained by Tan and Teo (2000) in the context of internet banking adoption in Singapore.

- In case of retailers, subjective norms were found to be significant in influencing adoption of digital payments.
- The peer group which comprises of other retailers are in fact a competition and therefore the adoption of digital payments by them influences adoption of digital payment methods by the retailers.
- Similarly the customers are the most influential referent group for the retailers in their decision to accept digital payments.
- This implies that if household consumers can be convinced for adopting digital payments, this will in turn lead to a rise in acceptance of digital payments by the retailers.

# Scope for Further Research

- This study was conducted to explore the factors influencing intentions to adopt digital payment methods. This study incorporated the constructs on perceived characteristics of innovation as given by Rogers (1983) for decomposing attitudinal influence on adoption of digital payments.
- Future research in this direction may include the analysis on the characteristics of the decision making unit (consumers or retailers in this study) which include socio-economic characteristics, personality variables and communication behaviour.
- Most studies in innovation diffusion literature have focussed on the perceived characteristics of innovation. The other four dimensions influencing the rate of adoption of an innovation mentioned by Rogers which are type of innovation decision- optional, collective or authority; communication channels; nature of social system; and extent of change agent's promotion efforts need to be given attention in future research on digital payments adoption.
- The characteristics of decision making unit and the above mentioned four dimensions are expected to be significant in further explaining the adoption of digital payments adoption particularly in emerging economies like India which also has a diverse socio-cultural environment.

Thank You

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