Moderation effect of demographic factors in adoption of electronic payments

Palak Kanojia, Madan Lal

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Palak Kanojia*

Department of Commerce,
University of Delhi,
A-32 Neb Valley, Opp-Shiv Mandir,
Neb Sarai, New Delhi, 110068, India
Email: kanojiapalak1@gmail.com
*Corresponding author

Madan Lal

Department of Commerce,
Delhi School of Economics,
University of Delhi,
Chhatra Marg, University Enclave, Delhi, 110007, India
Email: madanfms@gmail.com

Abstract: The study examined the relationship of attitude towards intention to use electronic systems in retail payments by the users across demographics. This study is primarily based on the consumer behaviour theories namely 'theory of reasoned action' (TRA) and 'technology adoption model' (TAM). The data was collected from the active users of e-payments services belonging to the Delhi region (India) on a five-point Likert scale. PLS-SEM was used to analyse the data of 414 respondents. Moderation effects of demographic factors gender, age, income, education, and occupation are tested for a difference between sample groups on the effect of attitude towards intention to use e-payments. Results established a moderating effect of age, income, and education level on the effect of attitude towards intention. Further moderated mediation effects for age, income and education revealed that attitude is a strong mediator construct in the total effect of perceived usefulness on intention.

Biographical notes: Palak Kanojia has received her MPhil in Marketing from the University of Delhi. She is an Assistant Professor in the Commerce Department at Hansraj College, University of Delhi. She is pursuing her PhD in Marketing from the Department of Commerce, Delhi School of Economics, University of Delhi, India. She has worked at the position of the Director in a technology start-up in India and provided market research services for product

development. She has authored/co-authored around eight research publications in peer-reviewed journals, books and international conferences. Her research interest includes consumer behaviour, digital psychology and technology management.

Madan Lal is a Professor in the Department of Commerce, Delhi School of Economics, University of Delhi, India. He has received his DLitt degree from the Banaras Hindu University (BHU), Varanasi. He has supervised more than 60 MBA/MPhil dissertations and PhD thesis. He has worked on five major research projects funded by the ICSSR, UGC, AICTE, Ministry of Textile, and completed consultancy assignments of UNDP-IKEA. He has held various academic and administrative positions at the BHU and University of Delhi. He has published 20 research papers in peer-reviewed renowned journals, authored/edited three books, and presented 34 research papers in conferences. His area of research includes international trade and business, managerial economics and marketing research.

1 Introduction

A major chunk of retail payments in India are done with cash despite the fact that economy has slowly shifted towards cashless payments during the last decade (Thomas et al., 2013). India ranked quite low on socio-economic parameters in the 2011 GEAR Report (Economist Intelligence Unit, 2012). The payment systems are primarily dominated by cash and very small percentage is done by digital modes. A large concentration of banking system in urban India makes the developed regions more prone to adopt electronic modes of payments (Bill & Melinda Gates Foundation, 2013), yet there are gaps in the adoption by demographically different groups. Financial inclusion is still a concern in India. Use of digital payments by various demographic groups is contrasting based on gender, education and income (The World Bank, 2014). The share of electronic payments to micro, small and medium retailers is lowest in the developing countries because of low-income consumers, majority of retailers being a part of informal retail sector, small size of the retailers having limited access to financial services (The World Bank, 2016). India makes up for more than 20% of the total unbanked grown-ups globally and around 66% of South Asia's (Demirguc-Kunt et al., 2015).

With the invasion of mobile money, the media and methods for exchange of payments have changed drastically, specifically for the ones who come under the category of 'unbanked population'. The mobile enabled payment systems are changing the opportunities available for exchange, storage and creation of wealth and financial inclusion in the market (Maurer, 2012). Bitner et al. (2000) advocated for the incorporation of technology in service delivery systems which leads to several benefits to the firm, employees and customers. Parasuraman (2000) built-up the innovation availability file to gauge the connection of customers with the innovation and decrease

the administration quality holes through representative connections with the users. Therefore, technology adoption can be defined as the predisposition to accept as well as use a new system or innovation. Innovation availability alludes to the propensity to acknowledge and utilise new innovation by users to accomplish their objectives. The job of innovation in promoting and administrations is very basic in the current situation. Along these lines, innovation selection alludes to the inclination to acknowledge and utilise a framework or advancement. This investigation depends on the writing accessible on the purchaser conduct hypothesis of contemplated activity on reasoned action (theory of reasoned action – TRA). Innovation selection model (technology adoption model – TAM) fills in as the establishment of the proposed model of the examination.

Various researchers have suggested that the difference between the groups across demographic factors such as age, gender, income and occupation exist in technology adoption. However, in the present study, the results have revealed contradictions from previous studies. No significant difference between male and female customers indicates that the adoption of payment technologies may not be affected by the sex. Also, moderated-mediation effects have not been tested widely in prior studies. Hence, present research studies the moderation effects as well as moderated mediation effects in order to explore the differences of demographics in deep in the context of electronic payment adoption.

1.1   Objective

The objective of this research study is to examine the relationship between attitude and intention of users towards adopting electronic systems in retail payments across demographics. Prior research studies on gender, age, income and occupation posit the research question that whether the moderation effect exists among groups across demographic factors. Further, this study aims to find the moderation effects of demographic factors in the mediated relationships between constructs.

2   Literature review

Innovations diffusion theory hypothesis previously recommended that adopters' individual elements may affect the pace of appropriation of innovation and how they see correspondences with respect to advancements (Rogers, 1983). Subsequently, TAM started to investigate the forerunners of innovation acceptance. Scale to gauge the builds apparent usefulness and ease on user acceptance was created (Davis, 1989). The UTAUT model advocated for the cognitive aspect in the adoption process (Straub, 2009). Theory of planned behaviour (TPB) pushed for the critical connection between disposition towards conduct and behavioural beliefs (Ajzen, 1991). TRA posits that conduct aim is a component of attitude towards conduct behaviour (Ajzen and Fishbein, 1977). TRA has been criticised for its limited view point, therefore it is not suitable alone. Therefore, TAM has been suggested to be used because of its ability to add external constructs (ELKheshin and Saleeb, 2020).

This examination is broadly founded on the establishments of TAM and TRA. TAM has been found suitable for the study of adoption of internet of things (Hemalatha et al., 2020). Even today, TAM is advocated by many researchers to study initial adoption of technologies like mobile library (Rafique et al., 2019), artificial intelligence

(Radhakrishnan and Chattopadhyay, 2020), e-government services (Sampat and Sabat, 2020) and electric cars (Prabaharan and Selvalakshmi, 2020). The research by Davis (1989) has studied the role of two constructs which influence the decisions of the users to use information technology. Theoretical underpinnings of TRA and TAM have dealt with the psychological and behavioural factors in the most concise manner. Therefore, for this research study, both the models serve as the foundation for further research. TAM found that perceived usefulness (PU) and perceived ease of use (PEAS) are two significant determinants which impact the behavioural intention of adopting any new technology. Following constructs were derived for this study from prior studies.

PU alludes to how much a customer sees that utilising a digital payment system will prompt the accomplishment of the expected outcomes or improvement of the exhibition or effectiveness or efficiency in the payment. The user will adopt the payment technology if the degree of PU is higher and if the PU is less, there is no inspiration to embrace or proceed with the utilisation of electronic payment system (Davis, 1989). Mobility, reachability, ubiquity and comfort were payment system characteristics that impact PU which was found exceptionally significant variable influencing the expectation to utilise innovation (Venkatesh, 2000), electronic tax filing, mobile payments (Kim et al., 2010), m-wallets (Malik et al., 2019), mobile banking (Luarn and Lin, 2005) for both users and non-users (Jeong and Yoon, 2013). Tan et al. (2014) attributed the convenience as the major factor impacting the benefits of the mobile payment systems which determines the PU of mobile credit card.

H1   PU will have a significant positive effect on attitude towards use of electronic payments.

PEAS alludes to how much the consumer finds or perceives digital payments to be easy to understand and operate and will be free of efforts. Efforts are the apparent cost of using an innovation. Lin (2011) found that mobile banking systems are considered as easy to use due to user friendly interface. Venkatesh and Morris (2000) claimed that PEAS impacts PU and behavioural intentions to use technology. A study examined the determinants of customer interactions with the electronic banking services using TAM found that ease of use influences the PU of e-banking services (Liao and Wong, 2008). The study by Yaghoubi and Bahmani (2010) claims that PEAS has no direct impact on behavioural intention but significantly impacts the intermediary variable attitude which in turn influences the intention to use. PEAS was found to be significantly impacting attitude towards intention to use various electronic systems like online tax filing (Hung et al., 2006), intra-governmental services (Hung et al., 2009), internet banking (Cheng et al., 2006), online banking (Al-Somali et al., 2009), m-payments in social networking sites (Liébana-Cabanillas et al., 2014) and e-HRM (Iyer et al., 2020).

H2   PEAS will have a significant positive effect on attitude towards use of electronic payments.

H3   PEAS will have a significant positive effect on PU of electronic payments.

Attitude refers to the 'favourableness or unfavourableness' towards the target behaviour (Ajzen and Fishbein, 1977). Ajzen (1991, p.188) further refined the definition of attitude as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question." Lin (2011) advocated for a positive connection between attitude and intention to accept an e-payment system. Lee et al. (2013) established this

relationship further influences the conviction to ultimately use an alternative payment system. Disposition toward e-taxpayers in organisations was seen as affected by PU and PEAS fundamentally (Hung et al., 2006). Reasoned action (TRA) emphasises on the significance of including attitude as an important construct in consumer behaviour process. Attitude was observed as strong determinant in both the theoretical models (TRA and TPB) therefore a study (Hansen et al., 2004) suggested that attitude significantly impacted behavioural intention. Ajzen (1991) also argued that behavioural beliefs are influenced by the attitude towards the said behaviour. Consequently, integrating the propositions of TRA and TAM the authors have measured attitude for the proposed model to examine adoption of e-payments (Yaghoubi and Bahmani, 2010).

H4   Attitude towards use of electronic payments will have a significant positive effect on behavioural intention to use it.

Behavioural intention has been viewed as the predictor of the actual behaviour. It refers to the intention of an individual to exhibit the said behaviour. Behavioural intention has been excogitated in the previous consumer behaviour studies to predict the intention of a consumer to purchase and use a product. In the product adoption and technology adoption studies, intention has been viewed as coinciding with the concept of adoption where the intention to use or adopt has been measured to determine the intention to adopt, rate of adoption and actual usage of technology. Before a consumer expresses one's behavioural intention, the attitude of the individual towards a particular behaviour influences the behavioural intention.

3   Demographic factors

According to Rogers (1983), the individual factors are linked with the pace of adoption of an innovation, yet no clarification has been validated to give the proof to the connection among adoption and socio-economic factors. Wang et al. (2008) proposed that the size of impact of consumption attitude on new product adoption is profoundly affected by the segment attributes of the customers. However, no significant effect of demographic factors on intention has been described as positive for the innovators as it indicates no specific reasons for resistance to acceptance (Gupta and Varma, 2019). Among Indian shoppers, occupation and age were claimed as critical elements for selection of e-wallets (Rathore, 2016). The investigation saw age and sex as exceptionally critical components separating between the clients (Laukkanen and Pasanen, 2008). According to World Development Indicators (Table 9), there is a disparity within socio-economic categories and India has proven to perform better in owning of financial accounts under each category as compared to world aggregates (The World Bank, 2019). Other segment factors like education, occupation, family unit salary and size of family were seen as unimportant factors. The impact of the following socio-economic factors on adoption of digital payments needs to be validated in Indian context (Kanojia and Ruchi, 2017).

3.1   Age

Prior studies claimed general age-related changes in ability and interest impact the rate of use of technology. The previous research asserted that users in the age group of 30–49 years are likely to use mobile banking subsequently more than older users and

embrace mobile banking services sooner than others (Laukkanen and Pasanen, 2008). Customers of older age are reluctant to use e-payments (Bertrand and Ahmad, 2014) despite of the fact that it has potential to improve their lives because age-related changes cause attitudinal and cognitive barriers in adoption (Charness and Boot, 2009).

Ha   Age will moderate the relationship between attitude and intention to use electronic payments.

3.2   Gender

Earlier investigations guarantee that there are huge contrasts among the two gender groups on the acceptance of an innovation (Kanojia and Lal, 2020). Likewise, the male clients are bound to adopt and utilise mobile banking when contrasted with the female counterparts (Laukkanen and Pasanen, 2008). For women saw PEAS was a critical determinant of behavioural intention to use a technology while for men PU was increasingly huge determinant of intention (Venkatesh and Morris, 2000).

Hb   Gender of the customer will moderate the relationship between attitude and intention to use electronic payments.

3.3   Income

Prior studies indicate that generally the digital payments users are from affluent segment. Rate of adoption of e-banking is influenced by the income group the user belongs to (Venkatesh and Morris, 2000). Subsequently, it was claimed that the average income of the individuals is associated with the use of the digital payment systems (Mallat and Tuunainen, 2008). The customers having higher income are more willing to go for digital payments including mobile payments (Bertrand and Ahmad, 2014).

Hc   Income level will moderate the relationship between attitude and intention to use electronic payments.

3.4   Education

Level of education of an individual influences the attitude towards the electronic payment system and ultimately its adoption and intention to use. Prior studies have found level of education significantly influencing the attitude of individual towards online banking (Al-Somali et al., 2009). Similarly, it was found that adoption of internet banking is affected by the level of education of the user (Yiu et al., 2007) and years of formal education influences demand for mobile money by farmers in Ghana (Awunyo-Vitor, 2016).

Hd   Education level will moderate the relationship between attitude and intention to use electronic payments.

3.5   Occupation

Occupation impacts the mode of payment as socio-economic factors have an influence over the preferences of the individual. Employed individuals tend to adopt digital wallets

at higher rate as compared to the unemployed ones (Rathore, 2016). However, some of the prior studies found no significant impact of the occupation on the adoption of technology. Furthermore, no difference was found between the early adopters and late adopters of mobile banking in Finland (Laukkanen and Pasanen, 2008).

He   Occupation will moderate the relationship between attitude and intention to use electronic payments.

Figure 1   Proposed model (see online version for colours)
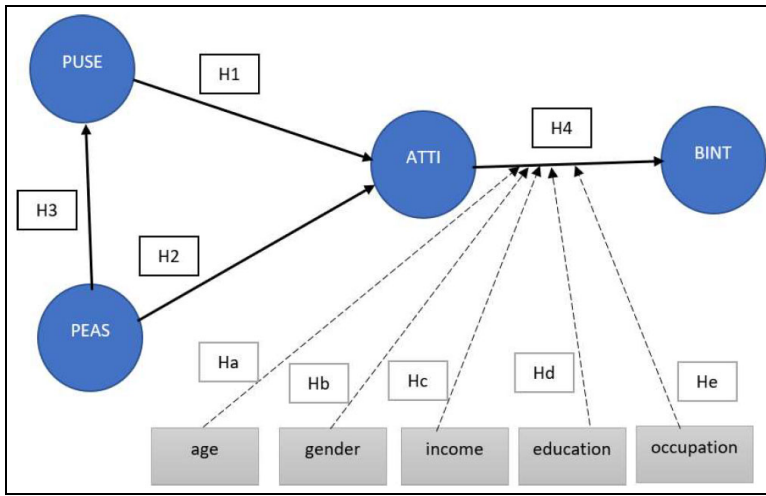
Note: PUSE = perceived usefulness, PEAS = perceived ease of use, ATTI = attitude and
        BINT = behavioural intention.
        Source: Authors' proposed model

4   Research design

Based on the extant literature on technology adoption, attitude and intention, constructs were defined. Items were adapted from prior studies and pools were created, a five-point Likert scale was developed to measure the constructs. To test the overall reliability of questionnaire, a pilot study was conducted, expert opinions were sought, required modifications in wordings and structure resulted into the final questionnaire (Annexure). To determine the minimum sample size, heuristics guideline has been followed which suggests that for structural equation modelling (SEM) at least 15 cases per variable are required (Siddiqui, 2013) further suggesting range from minimum 200 to 400 is to be followed generally when the number of indicators is from 10 to 15. Hence, the target sample size for this study was minimum 400 cases.

To approve the items, evaluation of item and scale reliability was examined using Cronbach's alpha in SPSS software. The data was collected from the respondents residing in the Delhi region via online survey by convenience sampling. It was ensured that the respondents were the active users of e-payment systems prior to filling the questionnaire. The completed surveys were received by 459 respondents. Out of the total of 459 responses received, only 414 responses were found usable for further analysis.

First three measures of PU were adapted from prior research on perceived benefits, the next four items were adapted from literature on technology adoption and the last item was added after discussions with experts. The eight-item scale exhibits a high reliability ($\alpha = 0.882$). The operational items to measure PEAS and PU were adapted from Davis (1989) and Moore and Benbasat (1991). The five-item scale of PEAS exhibits a very high reliability ($\alpha = 0.9$). The operational items to measure attitude towards use of electronic payments were adapted from Lin (2011). There were initially three items used to measure attitude, however due to low factor loading and Cronbach's alpha one item had to be deleted. Remaining two-item scale of attitude exhibited a satisfactory reliability ($\alpha = 0.84$). The three-item scale of behavioural intention adapted from Venkatesh et al. (2003) exhibited a high reliability with $\alpha = 0.85$.

The sample comprised of digital payment users residing in Delhi, India. The number of male and female users was almost equal with 203 males and 211 females (Table 1). 42.8% of respondents are below 25 years and 57.2% above 25 years of age. The mature age group of respondents majorly includes the people below 50 years of age. 54.6% of the total respondents are above 25 years and below 50 years and only 11 respondents are above the 50 years of age. All of the respondents have received basic literacy and approximately all of them owned some kind of financial account. Low level of education represents respondents who have gained no formal education or completed high school at the maximum. High education level represents respondents who possess at least a graduate degree or more. In occupation, respondents not engaged in any employment or students have been clubbed together in the unemployed group and respondents engaged in any kind of formal or informal employment have been clubbed into employed category. A monthly income of rupees ten thousand or below is quite low as far as Delhi as a region considered relating to an expensive place to reside. Monthly income levels of more than 10,0000 rupees translate into middle and high income groups, respectively.

Partial least square was found suitable for modelling as SEM-PLS on the software SMART-PLS version 2.0. To analyse the moderation effects of demographic factors on the relationship between attitude and behavioural intention, the data was split into separate files based on cases belonging to different groups. The separate case files were later used for bootstrapping procedure to test the presence of difference among the demographic groups. The comparison of one group from other was done within each demographic factor using the standard means, standard errors and sample size of each group obtained from the results of path coefficients after bootstrapping and the following formula (Chin, 2000) was used to determine the significance of moderation effect if any differences between the groups were found (formula by Chin, 2000):

$$t = \frac{Path_{sample1} - Path_{sample2}}{\left[\frac{(m-1)^{\sqrt{2}}}{(m+n-2)} * SE + \frac{(n-1)^2}{-2} * \frac{1}{SE}\right] * \left[\sqrt{sample_1 m + n \quad sample_2 m + n}\right]} \tag{1}$$

where m = number of samples in group 1, n = number of samples in group 2, *Pathsample*(i) = sample mean for group (i), and $SE^2 sample(i)$ = square of standard error for group (i).

For those demographic factors which showed significant moderation between the attitude and intention, a further test of significance was conducted to check if the moderated-mediated effect is present. Therefore, moderated-mediation effect was tested

only for those factors which were found to have significant moderation effect on the ATT -> BIN relationship. Moderated-mediation has been advocated as an impactful tool of PLS-SEM to test the significant difference between groups on the total effect on endogenous variables including the indirect effects of the exogenous variables (Aimran et al., 2015). The procedure and formula used for moderated-mediation remains the same as discussed above in the case of moderation in PLS-SEM.

Table 1   Demographics of respondents

| Demographics	Frequency n = 414	%
Gender		
Male	203	49
Female	211	51
Age		
Young	177	42.8
Mature	237	57.2
Monthly income (INR)		
Below Rs. 10,000	148	35.8
Rs. 10,000–Rs. 50,000	148	35.8
Above Rs. 50,000	118	28.5
Education		
Low education level	114	27.43
High education level	300	72.46
Occupation		
Unemployed	162	39.13
Employed	252	60.87
Total	*414*	*100%*

    Source: Authors' data

5   Results

A confirmatory factor analysis (CFA) was conducted to assess the measure model (Figure 2). Since the model in the study is a reflective model, the outer loadings have been used to assess the initially, all items reflecting each variable were loaded and the outer loadings were studied carefully to determine the indicators which have very less outer loading. Ideally, higher loading estimate is 0.7 and above, however, estimates 0.5 are also acceptable. Therefore, all indicators have been retained as they have been estimated above 0.5.

Further PLS-algorithm was run using the path weighing scheme. However, there is satisfactory discriminant validity as per the criteria given by Chin (1998), where discriminant validity exists if cross-loading indicators are higher in their respective latent variables than that of others (Hair et al., 2015). Therefore, the indicators rad1, rad2 and rad3 have been retained because they exhibit estimates lower than 0.7 but are above 0.5 and also higher than the estimates with respect to other latent variables (Table 2).

Figure 2   Measurement model (CFA) (see online version for colours)
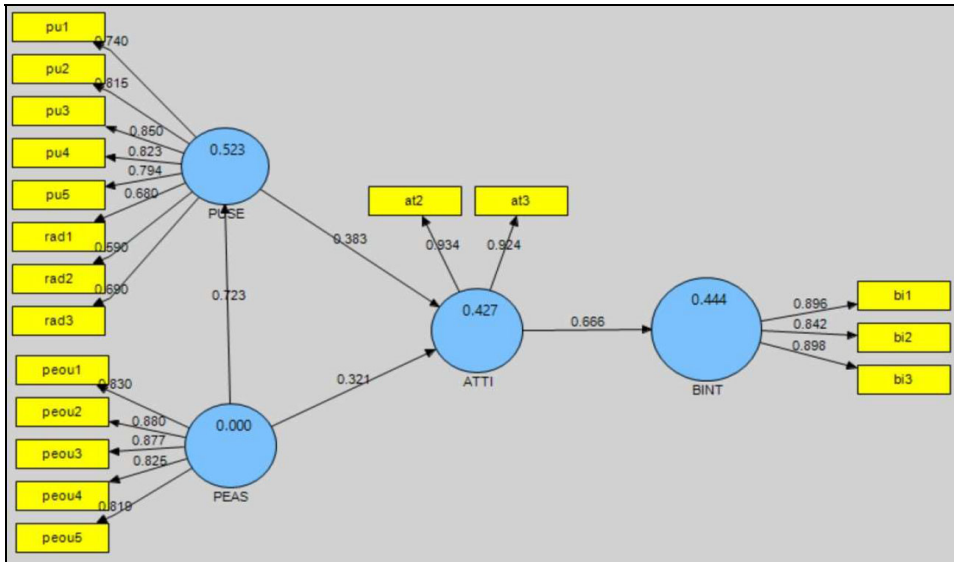
Source: Data analysis result in SmartPLS software

Table 2   Cross-loadings (see online version for colours)

	ATTI	*BINT*	*PEAS*	*PUSE*
at2	0.9341	0.6464	0.5728	0.5816
at3	0.9235	0.5894	0.5365	0.5599
bi1	0.628	0.896	0.4673	0.5059
bi2	0.446	0.8423	0.4061	0.4447
bi3	0.6477	0.8984	0.52	0.5733
peou1	0.4914	0.4662	0.8301	0.5384
peou2	0.5252	0.5024	0.8799	0.6799
peou3	0.5237	0.4452	0.8765	0.6041
peou4	0.5206	0.3986	0.8247	0.6081
peou5	0.4668	0.4453	0.8194	0.6221
pu1	0.4604	0.4924	0.5466	0.7401
pu2	0.4857	0.524	0.5392	0.8147
pu3	0.5193	0.4985	0.6198	0.8498
pu4	0.5308	0.4525	0.6155	0.8228
pu5	0.5257	0.4514	0.6378	0.7938
rad1	0.3381	0.3076	0.4907	0.6803
rad2	0.3604	0.3215	0.3973	0.5899
rad3	0.4353	0.4306	0.4546	0.6902

Source: Data analysis result in Smart PLS software

According to the criteria of Fornell and Larcker (1981), square roots of AVE estimate for constructs are highlighted the latent variable correlations report (Table 3), therefore high discriminant validity exists in the model. In Table 4 (overview), convergent validity exists, the sample size is adequate as communality of all the constructs in the proposed model is higher than 0.4. A high internal consistency is evident by the indicator composite reliability above 0.7 for all the constructs. And most of the constructs have AVE and composite reliability above the threshold of 0.5 and 0.9, respectively.

Table 3   Latent correlations report (discriminant analysis)

	ATTI	*BINT*	*PEAS*	*PUSE*
ATTI	*0.928816*	0	0	0
BINT	0.7149	*0.879318*	0	0
PEAS	0.657	0.5449	*0.846522*	0
PUSE	0.6918	0.6429	0.7627	*0.75233*

Source: Data analysis result in Smart PLS software

Table 4   Overview (AVE, R^2, Q^2, f^2)

	AVE	Composite reliability	R square	Cronbach's alpha	Communality	Redundancy	Construct cross validated redundancy (Q^2)	Construct cross validated communality (f^2)
ATTI	0.8627	0.9263	0.427	0.841	0.8627	0.2419	0.3505	0.4928
BINT	0.7732	0.9109	0.4438	0.8552	0.7732	0.3321	0.3285	0.5222
PEAS	0.7166	0.9266	0	0.9009	0.7166	0	-	0.5671
PUSE	0.566	0.9115	0.5233	0.8881	0.566	0.2943	0.2809	0.4471

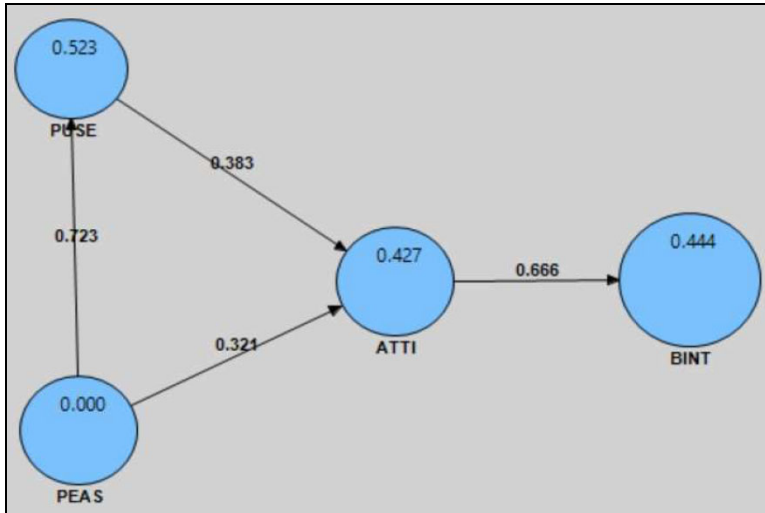*Source:* Data analysis result in Smart PLS software

Using the results of blindfolding technique, the accuracy and predictive quality of the proposed model was assessed. Construct cross-validated redundancy is the Stone-Geisser indicator also called Q square is above zero for all endogenous variables, thus indicating high predictive validity as well as relevance of the proposed model. Value of Cohen's indicator higher than 0.35 from construct cross-validated communality indicates the usefulness of each construct in the model (Table 4). To assess the general adjustment of the model, goodness of fit is determined by calculating geometric mean of median of R^2 and weighted mean of AVE which is 0.56362. An estimate above 0.36 indicates a well-adjusted model.

5.1   Structural model

R-square estimates of endogenous variables are high and indicate that variance explained in structural model is large (Figure 3). Results of bootstrapping module run with no sign changes indicate the path coefficients of the cited relationships. Student t-test or

T-statistics estimates above 1.96 indicate that the cited relationships are significant at 95% confidence level (Table 5). The impact of PEAS on PU is the strongest (beta = 0.7234, t = 20.967) followed by impact of attitude on intention (beta = 0.6662, t = 15.92), PU on attitude (beta = 0.3826, t = 4.9081) and PEAS on attitude (beta = 0.3209, t = 4.345). Therefore, all null hypotheses are rejected and alternate hypotheses (H1, H2, H3 and H4) are not rejected.

Figure 3 Structural model (path analysis) (see online version for colours)

Source: Data analysis result in Smart PLS software

Table 5 Bootstrapping results (path coefficients and significance test)

	Path coefficients (beta)	Sample mean (M)	Standard deviation (STDEV)	Standard error (STERR)	T statistics (|O/STERR|)
ATTI -> BINT	0.6662	0.6684	0.0418	0.0418	15.9294
PEAS -> ATTI	0.3209	0.3194	0.0739	0.0739	4.3455
PEAS -> PUSE	0.7234	0.724	0.0345	0.0345	20.9677
PUSE -> ATTI	0.3826	0.387	0.078	0.078	4.9081

5.2 *Moderation effects*

Table 6 shows the moderation effects of different samples of each demographic factor on the relationship between attitude and intention. It was found that gender and occupation has no moderating effect on the attitude to intention relationship ($p > 0.05$ or $t < 1.96$). There is no significant difference between male and female samples ($p = 0.756$) and employed and unemployed users ($p = 0.067$) in the effect of attitude towards intention. Nonetheless, the effect of attitude towards intention has significant difference between young and mature users ($p < 0.05$ or $t > 1.96$). It is found that there is a highly significant difference between low and middle income group samples ($p = 0.003$) and low and high income group samples ($p = 0.006$) in the effect of attitude towards intention. However, no

significant difference was found between middle and high income groups ($p > 0.05$). There is a significant difference between low and high level of education in the effect of attitude towards intention ($p = 0.016$).

Table 6   Moderation effect on ATTI -> BINT

Demographic factors	Groups	Sample size	Regression weight	Standard error (S.E.)	t-statistic	p-value (2-tailed)	Conclusion on moderating effect on ATTI->BINT
Age	Young	177	0.5899	0.0415	2.343	0.02	Yes
	Mature	237	0.719	0.0363			
Gender	Male	203	0.6843	0.04	0.311	0.756	No moderation
	Female	211	0.6669	0.0394			
Income	below Rs. 10,000	148	0.5646	0.0428	2.978	0.003	Partial moderation
	Rs.10000–Rs. 50,000	148	0.7263	0.0337	2.745	0.006	
	Above Rs. 50,000	118	0.7275	0.0396	0.023	0.981	
Education	Low	114	0.5491	0.048	2.43	0.016	Yes
	High	300	0.71	0.0366			
Occupation	Unemployed	162	0.5946	0.0393	1.833	0.067	No moderation
	Employed	252	0.7088	0.0432			

Source: Data analysis result in Smart PLS software (modified)

5.3   *Moderated mediation effects*

Total effect (Table 7) from PU to intention through mediator latent construct, i.e., attitude (ATTI) is statistically different for young and mature users ($p = 0.031$), low and middle income groups ($p = 0.012$), low and high income groups ($p = 0.032$), low and high education levels ($p = 0.022$). However, there was no effect on PUSE -> BINT though ATTI as significant difference was not found between male and female and unemployed and employed.

The results established that both PU as well as PEAS significantly influence attitude positively. A highly causal relationship between PEAS and PU indicates that reducing complexity for non-users can begin a chain reaction like process and can boost the rate of adoption of electronic payments. The moderated mediation emphasises on the significance of including attitude in the technology or new innovation adoption models. Some demographic factors can be found to moderate the relationships between constructs (Table 8).

Table 7   Moderated-mediation of PUSE -> BINT through ATTI

Demographic factors	Groups	Sample size	Regression weight	Standard error (S.E.)	t-statistic	p-value (2-tailed)
Age	Young	177	0.1556	0.0472	2.164	0.031
	Mature	237	0.719	0.0363		
Income	below Rs. 10,000	148	0.1515	0.0483	2.514849	0.0124
	Rs. 10,000 to Rs. 50,000	148	0.3269	0.0687	2.153165	0.0322
	Above Rs. 50,000	118	0.7275	0.0396		
Education	Low	114	0.1115	0.3333	2.292	0.022
	High	300	0.0386	0.0579		

Source: Data analysis result in Smart PLS software (modified)

Table 8   Summary of hypothesis test results

Hypotheses	Finding	Conclusion
H1: Perceived usefulness will have a significant effect on attitude towards use of electronic payments.	Yes: Significant	Supported
H2: Perceived ease of use will have a significant effect on attitude towards use of electronic payments.	Yes: Significant	Supported
H3: Perceived ease of use will have a significant effect on perceived usefulness of electronic payments.	Yes: Significant	Supported
H4: Attitude towards use of electronic payments will have a significant effect on behavioural intention to use it.	Yes: Significant	Supported
Ha: Age will moderate the relationship between attitude and behavioural intention to use electronic payments.	Yes: Significant	Supported
Hb: Gender of the customer has an influence on attitude towards digital payments and behavioural intention to adopt and use it.	No: Non Significant	Not Supported
Hc: Income level will moderate the relationship between attitude and behavioural intention to use electronic payments.	Yes: Significant	Supported
Hd: Education level will moderate the relationship between attitude and behavioural intention to use electronic payments.	Yes: Significant	Supported
He: Occupation will moderate the relationship between attitude and behavioural intention to use electronic payments.	No: Non Significant	Not Supported

Source: Authors' depiction

6   Discussion

The study makes contribution to the existing literature and helps in understanding the characteristics of the users of digital payments. The results indicated that the intention to adopt and use e-payments is influenced by some of the demographics such as age, income and education level of the user. Gender in this study has not impacted the attitude to intention of the users. Similarly, occupation of the user has no moderation effect on the said relationship. Contradicting the previous studies, there was no difference found between men and women and the two gender groups of users of electronic payments were similar in their attitudes and intentions (Venkatesh and Morris, 2000). As per World Development Indicators (Table 9) for females in India, the scenario is better than males in the world aggregates, however the disparity exists among the two groups within India.

The study coincides with the results of study claiming that middle age group are bound to embrace innovation (Charness and Boot, 2009). In this study, mature users were also found more likely to intend to use e-payments than the younger generation, also they perceive it more useful and beneficial to use e-payments than young users. Most of the mature individuals have gained more experience with the e-payments usage leading to higher confidence levels. Also, a higher percentage of older adults tend to have ownership of some kind of financial account including mobile money than the younger adults (Table 9). In this case, numbers for India show a much better picture for younger adults (71.4%) compared to the world aggregates (56.21%) (The World Bank, 2019).

Table 9   Demographics of financial account ownership

Account ownership at a financial institution or with a mobile-money-service provider (% of population)		
Socio-economic	*India*	*World*
Young adults (ages 15–24)	71.40	56.21
Older adults (ages 25+)	83.08	71.98
Female (ages 15+)	76.64	64.85
Male (ages 15+)	83.01	72.27
Poorest (40% ages 15+)	77.08	60.54
Richest (60% ages 15+)	81.74	73.85
Low education (primary education or less)	75.37	55.94
High education (secondary education or more)	84.94	78.66

Source: Authors' depiction of World Development Indicators (The World Bank, 2019)

The adoption of payment system is not affected by the occupation of the user (Laukkanen and Pasanen, 2008). Consequently, this study upholds the arguments of Bertrand and Ahmad (2014), Mallat and Tuunainen (2008) and Yiu et al. (2007) which stated that higher income groups are more affluent having higher tendency to adopt payment technologies. Both middle and higher income groups consider it beneficial to use e-payments. Similarly, conforming to prior studies level of education has moderating effect on the attitude to intention (Al-Somali et al., 2009) and intention to use (Yiu et al., 2007). Higher level of education is associated with more knowledge, understanding and ease of use to adopt technologies. Higher education level results in self-confidence to

acquire skills to understand and learn how to operate technology. There are disparities within the groups based on economic status and education level in India as well as globally (The World Bank, 2019).

7 Implications

Low income and less developed countries will continue to thrive on cash largely due to presence of unorganised sector (Balan and Pal, 2020). Also, lack of infrastructural facilities like internet bandwidth, costly data and expensive devices, the penetration of e-payments will continue to be at slow rate. Most of the people in India do not have a bank account because they do not have appropriate documents and lack of national identification system may become the reason for the footfall of mobile payments if the regulations continue to follow the document procedures for the mobile payment transactions (Kanojia and Ruchi, 2017). Therefore, it is required to have liberal procedures in the mobile payment system especially for the less educated and low income groups who do not perceive the banks as beneficial as mobile banking (Bertrand and Ahmad, 2014).

Young users may feel more comfortable with the technology than the mature users, however, mature users in this study perceived e-payments more useful. Relative advantages of alternative payment technology solutions should be promoted among younger population (Laukkanen and Pasanen, 2008). Low income groups may prefer cash over micro e-payments and less educated population is lacking on the awareness and financial literacy. Also, it has become essential to liberalise the mobile banking regulations for successful financial inclusion in the country keeping in mind the demographic profile of the potential users (*Economic and Political Weekly*, 2010). To understand the demographic profile of online spenders, the profile of web surfers should also be understood (Kalia, 2019). Customer profiling will assist in better reach out to the target audience and in making customised promotions. Theoretically, this study advocates that different customer segments should be reached out to bring behavioural changes differently. For example, young population should be made more aware about usefulness while mature users should be made more comfortable.

8 Conclusions

From the results obtained, it can be argued that gender of the clients of digital payment services does not have direct or indirect effects on the usage or acceptance. It can be considered that gender groups and occupation groups are homogenous but there is a need to consider observed and unobserved heterogeneous groups in future studies. The limitation of the study is that users primarily belong to urban city (Delhi) and there are inequalities between urban and rural areas with respect to demographics. It was found that there is a moderating effect of age, income level and education level on the effect of attitude towards intention as well as on the effect of PU to intention through mediator attitude. Attitude has been found as a strong mediator constructs in this study and therefore the research advocates for the inclusion of attitude in TAM (Kanojia and Lal,

2020). The moderating impact of few socio-economic factors calls for additional exploration on the segmented population.

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Annexure

Adapted scale

Construct	Source	No. of items
Perceived usefulness	Moore and Benbasat (1991)	rad1, rad2, rad3
	Davis (1989)	pu1, pu2, pu3, pu4
	self	pu5
Perceived ease of use	Davis (1989), Moore and Benbasat (1991)	peou1, peou2, peou3, peou4, peou5
Attitude	Lin (2011)	at1, at2
Behavioural intention	Venkatesh et al. (2003)	bi1, bi2
	Lin (2011)	bi3

Source: Five-point Likert scale adapted from prior studies and used by authors in survey