

## EXTENDING DIGITAL PAYMENT SYSTEM ADOPTION TO SATISFACTION: EMPIRICAL EVIDENCE FROM INDIAN RURAL HOUSEHOLDS

K. GEETHA AND K. KANNIAMMAL

**ABSTRACT.** Digital payment systems are expanding quickly, but they are still not widely accepted, particularly in developing countries. Few academics have, however, examined this topic in the context of emerging nations. The purpose of this study is to identify the characteristics that influence rural households' adoption of digital payment systems and their subsequent satisfaction. A solid integrated research model has been built to achieve this goal based on some reliable ideas. The research findings imply that the components related to the technology acceptance model and the unified theory of acceptance and use of technology withstand in this study are the most often investigated constructs for predicting consumers' behavioral intention to utilize digital payment systems. This study shows that the most widely looked-at behavioral predictors of users' intention to use digital payment systems such as perceived usefulness, perceived ease of use, social influence, and facilitating conditions are domineering. The integrated model tracked how behavioral intention to use the digital payment system mediated the association between facilitating conditions and satisfaction. The output generated from the study can be used by banks and other providers of digital financial services to review and enhance their current business models.

### 1. INTRODUCTION

Today the world keeps moving, and financial operations exploit the most advanced technologies. People aim to complete their banking and other financial activities from the comfort of their homes with the greatest amount of convenience, even when large amounts of money must be transported immediately across the globe, transacted in the real world without using physical cash, etc. Alternative Delivery Channels, including ATMs (Automated Teller Machines), bank cards, point-of-sale devices, AEPS (Aadhar Enabled Payment System), mobile banking, etc., have emerged, risen, and proliferated as a result. The creation and application of alternative delivery channels have significantly impacted the digital payment system (DPS). DPS has the potential to bring significant benefits to rural people including increased convenience, reduced cost, improved financial inclusion and increased transparency which can help to reduce fraud and corruption. Digital payment system is sprouting fast but they are yet to be widely espoused mostly in developing countries (P. P. Patil et al., 2018). The factors which deter the usage of DPS include lack of awareness, lack of infrastructure, cost, and trust. Researchers are being encouraged to perform more introspective research on both the phenomenon of using digital payments and how people modify their behavior (Tiewul, 2020). A study by the World Bank

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(2017) found that the use of mobile money services is more widespread in urban area than in rural area.

Studies conducted till date in DPS by several authors by sticking on any one digital channel like mobile banking/payments, internet banking, UPI (Unified Payment Interface), etc., in developed nations (B. Sivathanu,2018). Studies testing FC (Facilitating Conditions) from UTAUT (Unified Theory of Acceptance and Use of Technology) are rather limited in number. Several studies have examined BI (Behavioural Intention) but very few studies conducted on UB (Usage Behaviour) (P. P. Patil et al., 2018) .Following the Covid pandemic, digital payment uptake and penetration are rising, making UB a key area of concern. What makes novelty to this research is that the investigators integrated TAM (Technology Acceptance Model) and UTAUT constructs coupled with awareness and satisfaction and its effect on usage behavior (UB). The output of the study will be fruitful to those with a stake in the survival and growth of DPS.

<b>Construct</b>	<b>Description</b>
Perceived Usefulness (PU)	The degree to which a person feels that utilizing a certain method will improve his or her ability to perform at work is what is meant by PU (Davis et al., 1989).
Perceived Ease of Use (PEOU)	PEOU is defined as the extent to which a person thinks utilizing a specific system would be effortless (Davis et al., 1989).
Social Influence (SI)	Social influence is the idea that an individual feel under social pressure from family or friends to engage in the action in an issue or not (in this study, the use of digital payment systems) (Patil PP et al., 2018)
Facilitating Conditions (FC)	The consumer's impression of the resources and assistance available to engage in the activity is referred to as FC (Venkatesh et al., 2012).
Behavioral intention (BI)	The "confidence" with which a person intends to employ a certain technology is referred to as behavioral intention. One of the most important elements influencing real behavior is behavioral intention (Venkatesh et al., 2012).
Usage Behavior (UB)	UB is the instant response to the given target in a specific context (Venkatesh et al., 2018).
Awareness (AW)	For many clients, utilizing online banking services is a relatively new experience, and a major barrier to the adoption of online banking is lack of user knowledge on it (Patil PP et al., 2018). It was shown that clients were unaware of the advantages, limitations, and benefits of internet banking (Sathye 1999). This supports the finding that customers' hesitation to utilize the online banking services offered by banks is due to a lack of awareness about those services and their perks (Howcroft et al.,2002).
Satisfaction (SAT)	Expectations must be met for there to be satisfaction. In the post-purchase assessment process, a customer's level of satisfaction will be higher if they believe that the performance of the goods or service is better than anticipated. The opposite is also true. Additionally, pleased customers frequently have strong repurchase intentions and spread the favorable word of mouth (Marinkovic et al., 2020).

Even though our country has been moving towards the 'Digital India' strategy, many people from rural areas still facing the glitches of the digital divide. Rural households are the building blocks of our nation and their DPS usage contributes a splendid growth to our nation. Hence,

this research work is focused to investigate the factors influencing rural households to adopt the digital payment system and exploring how this adoption leads to ultimate satisfaction. The study has the following research objectives:

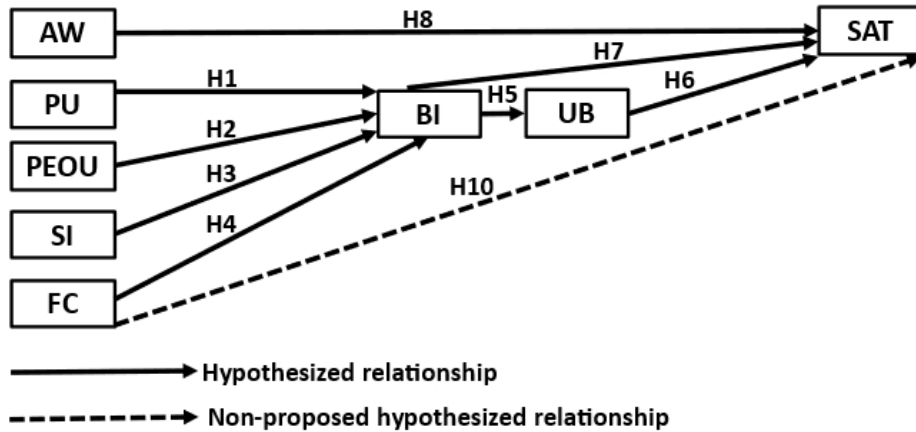
1. To investigate what factors, lead rural households to adopt digital payment system.
2. To determine the extent to which awareness and usage behaviour of digital payment systems affect rural households' satisfaction.

## 2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The integration of the technology acceptance model (TAM) (Davis, 1985) and unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) coupled with awareness (Patil PP et al., 2018) and satisfaction (Marinkovic,2020) constructs are used to build our theoretical model. The four primary predictors of behavioral intention (BI) of technology are perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI) and facilitating conditions (FC). PU and PEOU is taken from the TAM and SI and FC is from UTAUT model. This integrated model posits the influence of these four key constructs (PU, PEOU, SI, and FC) on behavioral intention (BI) and usage behavior (UB) and how UB ultimately leads to satisfaction (SAT).

Table 1 above describes the constructs used to build our proposed integrated research model.

**2.1. Hypothesis development.** The proposed research model (figure 1) and its theoretical background are explained in this section.



**Figure 1: Hypothesized conceptual framework**

**2.1.1. Perceived usefulness (PU).** PU measures how much a person thinks utilizing the system would improve their work performance (Venkatesh et al., 2003). Perceived Usefulness (PU) is empirically substantially connected with BI to the use of digital payment system (DPS) (Shaw, 2014; Tarhini et al., 2016). We have proposed the following hypothesis based on the TAM model (Davis, 1985) and supporting evidence establishing a relationship of PU with BI.

H1: Perceived usefulness positively affects behavioral intention to use digital payment systems.

**2.1.2. Perceived ease of use (PEOU).** Users' seamless experience while using DPS is known as perceived ease of use (Venkatesh et al., 2003) and influences the users' BI to use DPS (Venkatesh et al., 2012). The relationship between PEOU and BI was first empirically explained by the TAM model (Davis, 1985). Furthermore, several studies further substantiated this (Ariffin & Lim, 2020). We are also expecting a positive relationship with PEOU and BI. Hence the following hypothesis is formulated.

H2: Perceived ease of use positively affects behavioral intention to use digital payment systems.

2.1.3. *Social influence (SI)*. SI is the consumer's view of what friends, family members, and other consumers think about using technology (Venkatesh et al., 2012). SI significantly impacts BI for technology usage (Tarhini et al., 2016). When consumers believe using technology would help them improve their social position and reputation in their peer networks, they start to see it favorably (Sivathanu, 2019).

H3: Social influence positively affects behavioral intention to use digital payment systems.

2.1.4. *Facilitating conditions (FC)*. FC must stand for consumers' perceptions of the tools and resources at their disposal for engaging in the activity (Venkatesh et al., 2012). When consumers can quickly access and use digital resources, they adopt the usage of digital payment systems (Joshua & Koshy, 1970). Based on this reflection, we have formulated the following hypothesis.

H4: Facilitating conditions positively affects behavioral intention to use digital payment systems.

2.1.5. *Behavioural intention (BI)*. While several researchers have looked at consumers' behavioral intentions to embrace DPS, only a few have sought to look at influence of BI on actual usage behavior (UB) (P. P. Patil et al., 2018).

H5: Behavioral intention positively affects the usage behavior of digital payment systems.

2.1.6. *Usage behavior (UB) and Satisfaction (SAT)*. A customer's level of satisfaction will be higher in the post-purchase evaluation process if they feel that the DPS performs better than expected. The inverse is also accurate. Additionally, happy consumers typically have strong intentions to make additional purchases and share the good news (Marinković et al., 2020)

According to researchers' knowledge, not much of the previous research has looked at how actual usage behaviour (UB) lead to satisfaction (SAT) in the usage of DPS, which is a crucial relationship to explore (P. P. Patil et al., 2018). Thus, it is an organic way of thinking about whether actual usage leads to satisfaction and previous studies also support such a relationship in various contexts (Bokhari, 2005; Maillet et al., 2015; Shukla, 2004). The following hypothesis is expected to be significant in the study.

H6: Usage behavior positively affects satisfaction on digital payment systems

2.1.7. *Behavioral intention and Satisfaction*. Even though there is abundant empirical evidence providing relationship of SAT to BI in marketing perspective (Liao et al., 2017; Seyal & Rahim, 2011), there is a possibility that to have a positive relationship from BI to SAT. This is because BI is a critical antecedent to UB, and UB is the antecedent of SAT and it is logical though that one's intention to consume DPS itself is indicator a way to satisfaction. Hence, the following hypothesis is proposed.

H7: Behavioral intention positively affects satisfaction on digital payment systems.

If a positive significant relationship arrives from H7, we can also expect UB as a significant mediator variable explaining the relationship between BI and SAT. As part of this thought process following hypothesis is proposed.

H9: Usage behavior mediates the influence of behavioral intention on satisfaction in digital payment systems.

2.1.8. *Awareness and satisfaction*. Technological awareness (AW) is the knowledge of how to utilize and features of DPS (Lingmont & Alexiou, 2020). As per (Al-Somali et al., 2009), customers' hesitation to use DPS has been attributed to their lack of awareness about the advantages of digital payments. Moreover, satisfaction stems from awareness in the sense that only an informed user can fully appreciate the viability of DPS. Based on this, we put forward a less-researched hypothesis as follows.

H8: Awareness positively affects satisfaction with digital payment systems.

2.1.9. *Additional hypotheses derived from SEM analysis.* When the following hypotheses were included and examined, better fitting statistic and theoretical support were emerged, despite they were not originally part of the research model that was stated.

H10: Facilitating conditions positively affects satisfaction with digital payment systems.

H11: Behavioural intention mediates the influence of facilitating conditions on satisfaction in digital payment systems

### 3. RESEARCH METHODOLOGY

The study is structured by following a descriptive and empirical research design. Descriptive research is used to describe the demographic as well as DPS usage profile of the rural households. Empirical research is used to test various stated hypotheses. The study consists of a mix of both original and secondary data. Palakkad is the largest district in the state of Kerala. According to the Government of India census 2011, there are 476318 rural households in the Palakkad district as a whole. The threshold limit of sample size for the given population is 384, according to the Krejcie & Morgan table. However, the sample size is extended to 424 by adding 10 percent of threshold limit with the aim of reducing the sampling error. The targeted sample of 424 rural households is interviewed based on a well-structured interview schedule by using simple random sampling method. Enumerators personally met every respondent to gather data. Out of 424 respondents, 24 samples are not familiar with DPS and hence samples limited to 400. Statistical tools applied to analyse data includes percentage analysis and SEM analysis executed through SPSS and AMOS respectively. This paper is mainly employed structural equation modelling (SEM) to test the effect of PU, PEOU, SI, and FC on BI and UB and the way it is extended to SAT.

<b>Table 2 Number of Rural Households in Palakkad District asper 2011 Census Data and sample size calculation</b>				
<b>Sl No.</b>	<b>Taluk</b>	<b>Number of Rural Households</b>	<b>Proportionate Sample</b>	<b>Resultant Sample</b>
1	<b>Ottapalam</b>	143171	127	119
2	<b>Mannarkad</b>	74763	67	62
3	<b>Palakkad</b>	73710	66	63
4	<b>Chittur</b>	88207	79	77
5	<b>Alathur</b>	96467	86	79
	<b>Total</b>	<b>476318</b>	<b>424</b>	<b>400</b>

Source: compiled data

### 4. DATA ANALYSIS

We have performed exploratory factor analysis (EFA) on 36 variables/items identified from multiple sound theories like the unified theory of user acceptance and use of technology (UTAUT) of (Venkatesh et al., 2003), the Technology Acceptance Model (Davis, 1985), and some other theories (Hanafizadeh & Khedmatgozar, 2012; Pikkarainen et al., 2004; Slade et al., 2015; Zhou et al., 2010). When EFA is performed on items which already based on sound theories, it is equivalent to confirmatory factor analysis (Warner, 2012). From the 36 items in the questionnaire, two items were deleted (AW5 and FC3) with communalities less than 0.50. Finally, from the rest 34 items, eight constructs are extracted using the Principal Component Analysis (PCA) with subsequent rotation (Varimax). Eight factors (Performance Usage, Perceived Ease of use, Social Influence, Facilitating conditions, Behavioural Intention, Actual Usage, Awareness, and Satisfaction) had been extracted from these 34 items whose communalities ranged from 0.63 to 0.89. The sample adequacy was tested using Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity for evaluating correlations among items. The KMO (0.94) value was adequate and Bartlett's test of sphericity ( $\chi^2 = 16542.644$ ;  $df = 561$ ;  $p < 0.001$ ) is significant, implying that the present study has an adequate sample size and have enough correlations among the

items. The rotated component matrix was used from 34 items; eight constructs were extracted and were able to capture 86 per cent of the variability in the data. These eight constructs were selected based on Kaiser’s Rule (i.e., factors having eigenvalues greater than 1 were only considered).

**Table 3: Model-fit indices**

Fit indices	Model value	Recommended value
$\chi^2/df$	2.842	$\leq 5.000$
CFI	0.945	$\geq 0.900$
GFI	0.830	$\geq 0.900$
NFI	0.918	$\geq 0.900$
AGFI	0.800	$\geq 0.800$
RMSEA	0.068	$\leq 0.080$
SRMR	0.037	$\leq 0.080$

Note: The recommended values are derived from the following sources: Bagozzi & Yi, 1988; Hair et al., 2019; Hu & Bentler, 1998

The overall measurement model fit was confirmed by conducting Confirmatory Factor Analysis (CFA) and assessing some standard model fit measures. The model fit measures evaluated include: normed Chi-square (CMIN/DF), Comparative Fit Index (CFI), Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), Bentler-Bonett’s Normed Fit Index (NFI), Standardized Root Mean Squared Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA). Recommended values and measurement model values of model fit indices are depicted in Table 3. Furthermore, the CFA model of measurement constructs is provided in the following figure. All the model fit measures are within the threshold values recommended except the GFI value. But a GFI value of 0.83 is also acceptable (Zikmund, 2003).

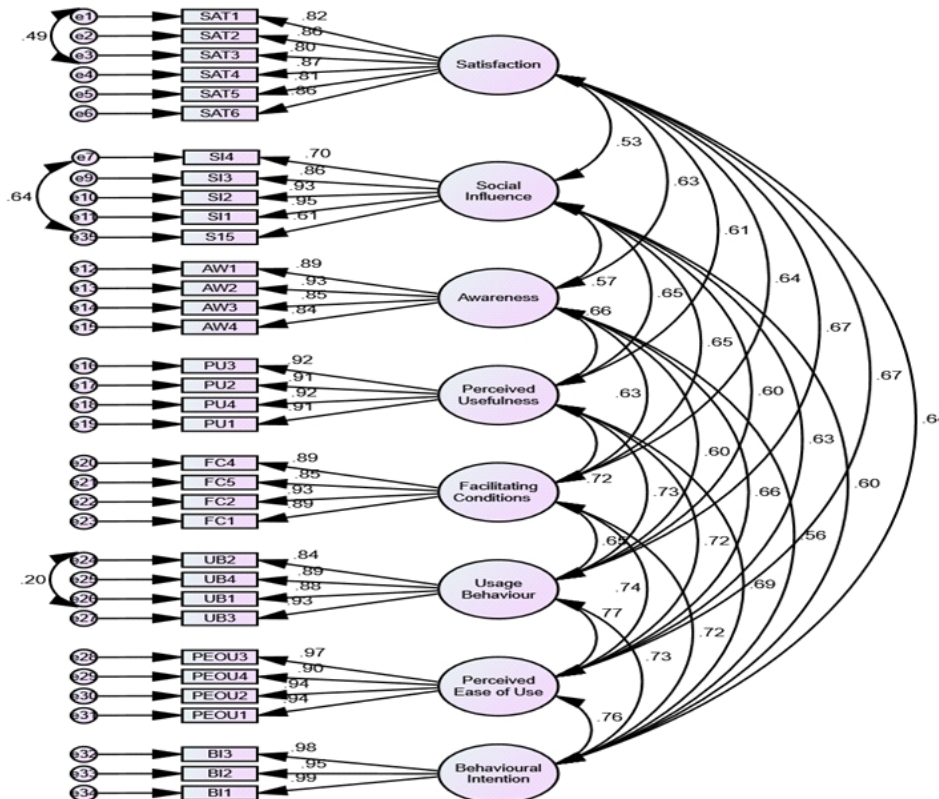


Figure 2: Measurement model

Figure 2 provides the result of the Confirmatory Factor Analysis (CFA) with the total eight constructs viz a viz, Perceived usefulness (PU), Perceived ease of use (PEOU), Social influence (SI), Facilitating conditions (FI), Behavioural intention (BI), Usage behavior (UB), Awareness (AW) and Satisfaction (SAT). These constructs were confirmed by CFA.

The internal consistency reliability was appraised by Cronbach's alpha values ( $\alpha$ ) and composite reliability values (CR). The convergent validity was assessed using average variance extracted (AVE) and factor loadings ( $\beta$ ). The discriminant validity of all the constructs in the study was confirmed using the (Fornell & Larcker, 1981) criterion.

<b>Table 4a: Demographic characteristics of respondents (N =400)</b>		
<b>Demographics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
Male	163	40.75
Female	237	59.25
<b>Age</b>		
18-24	32	8.00
25-34	103	25.80
35-44	118	29.50
44-54	65	16.30
55-64	69	17.30
65+	13	3.30
<b>Gender</b>		
less than 3 members	28	7.00
3-4 members	265	66.30
More than 4 members	107	26.80
<b>Highest Educational Qaulification</b>		
Primary education	23	5.80
10th grade	88	22.00
Higher Secondary	24	6.00
Undergraduate	92	23.00
Post-Graduation and above	173	43.30
<b>Employment Status</b>		
Government employee	80	20.00
Private employee	215	53.75
Business	35	8.75
Professional	15	3.75
Daily wages	55	13.75
<b>Income (Monthly)</b>		
Less than Rs. 10,000	89	22.30
10,000-20,000	135	33.80
20,001-30,000	50	12.50
30,001-40,000	32	8.00
40,001-50,000	36	9.00
Rs.50,001+	58	14.50
Source: Computed Data		

The final stage of the study was the building and evaluation of an integrated research model. Hence, the structural equation modeling (SEM) was conducted with AMOS 23 software which follows a co-variance-based SEM approach. Path analysis was carried out to determine whether the path coefficients are significant. The coefficient of determination (R<sup>2</sup>) was calculated for the three endogenous constructs. The effect size of each exogenous construct on the endogenous construct was measured using f<sup>2</sup>. The f<sup>2</sup> measure is calculated based on the change R<sup>2</sup> value

when the specified exogenous construct is excluded from the model. The study also considered the mediating effect of variable usage behavior between behavioral intention and satisfaction and the mediating effect of variable behavioral intention between facilitating conditions and satisfaction. To trap mediating effect of variables, we ran the bootstrap according to (Preacher & Hayes, 2004) with 400 observations per sub-sample. and set 2000 as bootstrap samples with a biased confidence level of 95. We set 2000 as bootstrap samples with a biased confidence level of 95. We have calculated Variance Accounted For (VAF) factor according to the (Preacher & Hayes, 2004) approach, which is derived by dividing the indirect effect by the total effect ( $VAF = ab / (ab + c')$ ). Testing VAF indicates the strength of the mediating construct.

## 5. RESULTS

This section is divided into four sub-sections as follows: descriptive analysis, measurement model, structural model, and mediation effect analysis.

**5.1. Descriptive analysis.** The demographic characteristics of respondents are provided in tables 4a (previous page) and 4b (below).

<b>Table 4b: DPS profile of rural households (N = 400)</b>		
<b>Variables and items</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>DPS user experience level</b>		
Low	154	38.50
High	246	61.50
<b>Source of information about DPS</b>		
Bank staff	122	30.50
Direct promotion	26	6.50
Social network	86	21.50
Friends/Colleagues	166	41.50
<b>DPS modes used</b>		
ATMs	389	97.25
Debit Cards, Credit Cards	366	91.50
Point of Sale (POS)	163	40.75
USSD	1	0.25
AEPS	2	0.50
UPI	245	61.25
BHIM Apps	25	6.25
Mobile Banking	181	45.25
Internet Banking	85	21.25
QR (Quick Response) Code	247	61.75
Source: Computed Data		
Note. USSD - Unstructured Supplementary Service Data;		
AEPS - Aadhaar Enables Payment System;		
UPI - Unified Payment Interface;		
BHIM- Bharat Interface for Money.		

**5.2. Measurement model.** By confirming the goodness of fit in the measurement model by assessing the model fit indices, we also verified the internal, convergent, and discriminant validity (Tables 4 and 5). Results provided in Table 4 shows that Cronbach alpha coefficient values for eight constructs ran from 0.92 and 0.97, and the composite reliability values ran from 0.91 and 0.97. Both Cronbach's alpha and composite reliability (CR) coefficients were well above the recommended threshold levels of 0.70, for Cronbach's alpha are acceptable, and 0.60 for composite reliability (Hair et al., 2019a; Ursachi et al., 2015). Both Cronbach's alpha and composite reliability (CR) affirm the internal consistency of the studied constructs. The convergent validity was ensured by verifying the factor loadings (FL) and Average Variance



Extracted (AVE). The standardized factor loadings (FL) varied from 0.61 to .99, which is above the threshold level of 0.50 recommended by (Gefen et al., 2000). Moreover, the AVE values of the constructs were well above the minimum value of 0.50 (Henseler et al., 2009), ensuring the eight constructs' convergent validity.

<b>Construct</b>	<b>FL</b>	<b>Cron Bach's alpha</b>	<b>CR</b>	<b>AVE</b>
<b>PU1</b>	0.91			
<b>PU2</b>	0.91			
<b>PU3</b>	0.92			
<b>PU4</b>	0.92			
<b>Perceived usefulness (PU)</b>		0.95	0.95	0.84
<b>PEOU1</b>	0.94			
<b>PEOU2</b>	0.94			
<b>PEOU3</b>	0.97			
<b>PEOU4</b>	0.90			
<b>Perceived ease of use (PEOU)</b>		0.97	0.97	0.88
<b>SI1</b>	0.95			
<b>SI2</b>	0.93			
<b>SI3</b>	0.86			
<b>SI4</b>	0.70			
<b>SI5</b>	0.61			
<b>Social influence (SI)</b>		0.92	0.91	0.67
<b>FC1</b>	0.89			
<b>FC2</b>	0.93			
<b>FC4</b>	0.89			
<b>FC4</b>	0.85			
<b>Facilitating conditions (FC)</b>		0.94	0.94	0.79
<b>BI1</b>	0.99			
<b>BI2</b>	0.95			
<b>BI3</b>	0.98			
<b>Behavioural intention (BI)</b>		0.98	0.98	0.94
<b>UB1</b>	0.88			
<b>UB2</b>	0.84			
<b>UB3</b>	0.93			
<b>UB4</b>	0.89			
<b>Usage Behaviour (UB)</b>		0.94	0.93	0.78
<b>AW1</b>	0.89			
<b>AW2</b>	0.93			
<b>AW3</b>	0.85			
<b>AW4</b>	0.84			
<b>Awareness (AW)</b>		0.93	0.93	0.77
<b>SAT1</b>	0.80			
<b>SAT2</b>	0.83			
<b>SAT3</b>	0.87			
<b>SAT4</b>	0.86			
<b>SAT5</b>	0.87			
<b>SAT6</b>	0.81			
<b>Satisfaction (SAT)</b>		0.94	0.93	0.70

Note: FL = factor loading, AVE = Average Variance Extracted, CR = Composite reliability

The Fornell-Larcker criterion was employed to assure the discriminant validity. According to this criterion, the discriminant validity was ensured since the square roots of AVE for each construct were more significant and higher than inter-construct correlations (Fornell & Larcker, 1981), as shown in Table 5 (previous page).

	<b>AVE</b>	<b>PU</b>	<b>PEOU</b>	<b>SI</b>	<b>FC</b>	<b>BI</b>	<b>UB</b>	<b>AW</b>	<b>SAT</b>
<b>PU</b>	0.84	<b>0.917</b>							
<b>PEOU</b>	0.88	0.723	<b>0.940</b>						
<b>SI</b>	0.67	0.652	0.627	<b>0.819</b>					
<b>FC</b>	0.79	0.723	0.739	0.647	<b>0.891</b>				
<b>BI</b>	0.94	0.687	0.761	0.596	0.716	<b>0.891</b>			
<b>UB</b>	0.78	0.734	0.767	0.598	0.651	0.735	<b>0.972</b>		
<b>AW</b>	0.77	0.663	0.659	0.573	0.632	0.563	0.604	<b>0.884</b>	
<b>SAT</b>	0.70	0.611	0.669	0.531	0.643	0.637	0.674	0.633	<b>0.879</b>

Note: AVE = Average Variance Extracted; the square roots of AVE are along the diagonal

**5.3. Integrated research model.** Structural equation modelling (SEM) was conducted to develop and ensure the authenticity of our proposed integrated research model. Before path analysis, we verified the adequate model fit indices reported in Table 6. The result of structural model fit indices is satisfactory, with a  $\chi^2$  value of 1426.719 and 504 degrees of freedom, providing a  $\chi^2/df$  ratio (normed Chi-square) of 2.831. The fit indices such as CFI = 0.945, AGFI = 0.802, RMSEA = 0.068, NFI = 0.917 were satisfactory according to the threshold levels provided (see Table 7). After ensuring model fit, the significance of the path coefficients was evaluated. The coefficient of determination (R<sup>2</sup>) was calculated for the three endogenous constructs, and the effect size of each exogenous construct on the endogenous construct was measured using the f<sup>2</sup> measure. Path analysis has revealed and supported all the nine proposed structural hypotheses from H1 to H9 (see Table 8). We have found statistically significant and positive relationships observed between the outcome variable behavioural intention (BI) and its predictors, perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI), and facilitating conditions (FC) (confirming H1, H2, H3 and H4). The study affirmed a statistically significant and positive relationship between the outcome variable usage behaviour (UB) and its predictor behavioural intention (BI) (confirming H5). The outcome variable in the study satisfaction was statistically significantly predicted by the predictor variables such as awareness (AW), usage behaviour (UB) (confirming H8 and H9) and also by facilitating conditions (confirming H10). Inclusion of this result (H10) in the path analysis, a positive relationship between satisfaction and facilitating conditions apart from the proposed hypotheses, provided better fit statistics. Results are shown in figure 3 (next page).

<b>Fit indices</b>	<b>Model value</b>	<b>Recommended value</b>
$\chi^2/df$	2.831	$\leq 5.000$
<b>CFI</b>	0.945	$\geq 0.900$
<b>GFI</b>	0.828	$\geq 0.900$
<b>NFI</b>	0.917	$\geq 0.900$
<b>AGFI</b>	0.802	$\geq 0.800$
<b>RMSEA</b>	0.068	$\leq 0.080$
<b>SRMR</b>	0.038	$\leq 0.080$
Note: The recommended values are derived from the following		
sources: Bagozzi & Yi, 1988; Hair et al., 2019b; Hu & Bentler, 1998		

The coefficient of determination (R<sup>2</sup>) for the three endogenous constructs are 0.654 for BI, 0.501 for UB and .0619 for SAT and are considered to be moderate (Hair et al., 2017). That means how well the predictors explained the variance of their respective endogenous constructs.

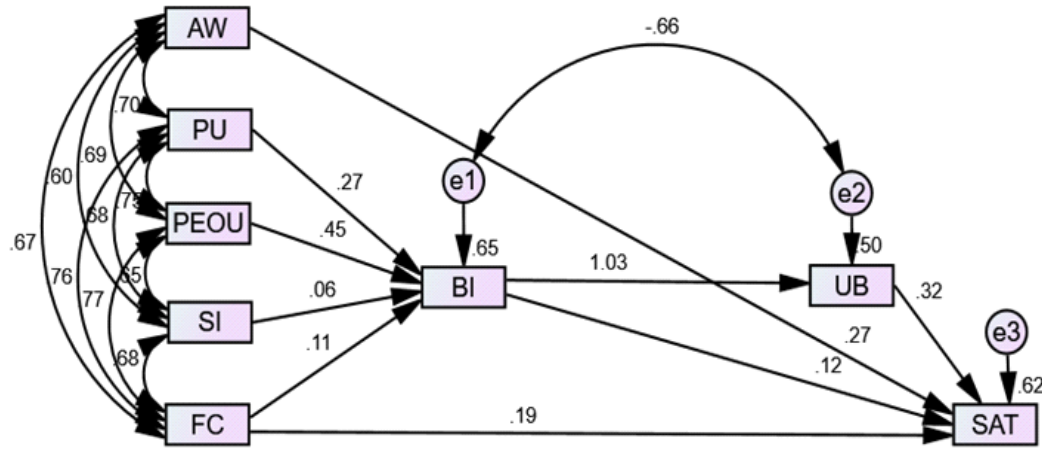


Figure 3: Result of analysis of structural model

The effect size of each exogenous construct on the dependent construct assessed using the f-squared (f2) value. F2 value is calculated by eliminating each independent construct from our model. This procedure of calculating effect size (f2) will provide the influence of each independent construct on an outcome variable. The criterion suggested by (Henseler et al., 2009) for effect size (f2) values were values between .02 and 0.14 (small effect size), between 0.15 and 0.34 (medium effect size), and 0.35 and above (large effect size). Table 8 shows behavioral intention as a single predictor of usage behavior has a substantial effect size of 1.00. While evaluating the effect size of predictors of behavioral intention, perceived ease of use has a moderate effect size of 0.17. It has a negligible effect size, while the other two predictors (social influence and perceived usefulness) have no significant effect size (f2 is less than 0.02). The predictors of satisfaction such as usage behavior, awareness, and facilitating conditions have a negligible effect size of 0.10, 0.09, and 0.04, respectively. At the same time, behavior intention has no significant effect size.

Table 8: Summary results of Structural relationships: direct effects

Hypothesis	Relation / Path	R <sup>2</sup>	f <sup>2</sup>	Estimates				
				SRW	SE	t-stat	p-Value	Decision
H1	PU → BI	0.654	0.009	0.252	0.036	6.907	0.001	**
H2	PEOU → BI		0.171	0.43	0.038	11.372	0.001	**
H3	SI → BI		0.003	0.071	0.035	1.987	0.047	**
H4	FC → BI		0.040	0.112	0.041	2.736	0.006	**
H5	BI → UB	0.501	1.000	0.966	0.041	23.667	0.001	**
H6	UB → SAT	0.619	0.0971	0.304	0.051	6.015	0.001	**
H7	BI → SAT		0.0105	0.106	0.045	2.347	0.019	**
H8	AW → SAT		0.0892	0.23	0.037	6.154	0.001	**
H10	FC → SAT		0.0367	0.18	0.047	3.854	0.001	**

Note: SRW = standardized regression weight; R2 = coefficient of determination; SE = Std. Error

5.4. Mediation effect analysis. We have analyzed mediating effect of variables:

- i) Usage behavior between behavior intention to satisfaction.
- ii) Behavior intention between facilitating condition to satisfaction.

The mediating effect of variables was analyzed by running bootstrap according to (Preacher & Hayes, 2004) with 400 observations per sub-sample and set 2000 as bootstrap samples with a biased confidence level of 95. According to this procedure, we have calculated the total effect without a mediator (c), the direct effect with a mediator (c'), and the indirect effect (a\*b). All the paths were significant as shown in Table 8 in both cases leading us to conclude usage

behavior as a mediator variable in the relationship between behavior intention to satisfaction and behavior intention as a mediator variable in the relationship between facilitating condition to satisfaction.

We have calculated Variance Accounted For (VAF) factor according to (Preacher & Hayes, 2004) approach which indicates the strength of the mediating construct. VAF values range from 0% to 100%, where 100% represents full mediation and less than 20% represents no mediation (Hair et al., 2017). The VAF values for mediator variables' usage behavior and behavioral intentions are 20% and 73% respectively. Our conclusion is that usage behavior partially mediates the relationship between behavior intention to satisfaction and behavior intention also partially mediates the relationship between facilitating condition to satisfaction (confirming H9 and H11).

<b>Relationship</b>	<b>Standardized direct effect without mediation</b>	<b>Standardized direct effect with mediation</b>	<b>Standardized indirect effect</b>	<b>VAF</b>
<b>BI on SAT</b>	0.449 (p = 0.001)	0.119 (p = 0.032)	0.329 (p = 0.001)	73%
<b>FC on SAT</b>	0.242 (p = 0.001)	0.194 (p = 0.001)	0.048 (p = 0.008)	20%

Note: VAF = Variance Accounted For

## 6. DISCUSSION

We have proposed an integrated model for tapping digital payment system adoption and how this adoption comprehensively leads to satisfaction. The developed integrated model makes use of constructs mainly from two sound theories of the unified theory of user acceptance and use of technology (UTAUT) ((Venkatesh et al., 2003) and the Technology Acceptance Model (TAM) (Davis, 1985). The current model found that PE and PU were significant predictors of BI, as seen in many studies (Shaw, 2014; Tarhini et al., 2016). In addition, the two constructs from the UTAUT model such as SI and FC, are also found to be significant predictors of BI, and BI ultimately leads to UB, which is in line with many technology adoption studies purely established on the UTAUT model (Dwivedi et al., 2019; Morosan & DeFranco, 2016; P. Patil et al., 2020; P. P. Patil et al., 2018; Sivathanu, 2019; Slade et al., 2015; Zhou et al., 2010). Unlike previous studies, we have combined the factors of BI from two theories of TAM and UTAUT which account for 65 per cent variance of BI ( $R^2 = 0.65$ ), and BI explained 50 per cent variance of UB BI ( $R^2 = 0.50$ ). PU was the most substantial predictor variable among the BI predictors, with an effect size of  $f^2 = 0.17$ . The integrated research model is extended from mere DPS usage or adoption to absolute satisfaction. This extension to UB to SAT is found to be significant, and it is also found that AW and BI are also significant predictors of SAT. Unexpectedly we also got the fourth predictor of SAT, FC, which was not proposed in our model, but the inclusion of FC has improved the model. All these four predictors of SAT explained the 62 per cent variance of SAT ( $R^2 = 0.62$ ), and as expected, UB is the predominant predictor of SAT ( $f^2 = 0.10$ ).

The satisfaction with the usage of DPS is directly explained by AW, which proves satisfaction is the outcome of expectation and actual perception of DPS. This expectation and perception of DPS can only be built by proper awareness generated from information on DPS. This result confirms a recent study on technology adoption for online purchasing (al Halbusi et al., 2022).

FC in this study is closely connected to tools and assistance required for using the DPS, including digital devices like mobile phones, Point of sale (PoS) machines, application software, internet support, etc. FC significantly influences satisfaction, which was not hypothesized in our study, while some previous studies supported such a hypothesis (Chan et al., 2010; Maillet et al., 2015). Furthermore, this relationship from FC to SAT is partially mediated by BI (VAF = 20%). This is because one of the glitches in connection with technology is the 'digital divide. Even though one intends to use DPS without enough facilitating resources, the intention may

not crystallize into satisfaction. Moreover, having enough resources cannot warrant satisfaction in using DPS without a positive intention. Thus, it affirms that an indirect effect exists from FC to SAT, which the BI can explain.

As researchers expected, the critical relationship of BI to SAT is mediated or explained by UB (VAF = 73%). BI indirectly affects SAT since satisfaction cannot be evolved without actual usage behavior.

## 7. CONCLUSION

We have applied the Technology Acceptance Model (TAM) (Davis, 1985) and Unified Theory of User Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) along with awareness and satisfaction constructs in our integrated research model to track the way from DPS adoption to absolute satisfaction. This approach evolved into an excellent structural model, confirming that usage behavior positively affects one's satisfaction with the usage of DPS. The study also found that facilitating conditions indirectly affect satisfaction with his or her behavioral intention to use DPS. This key finding provides the policymakers to ensure enough infrastructure that boosts one's intention to use DPS and its ultimate satisfaction. The significant predictor of behavioral intention was found to be perceived usefulness. Additionally, a crucial prerequisite for educating individuals about the advantages of DPS in their daily lives is the strong link between awareness and satisfaction. The behavioral predictors of rural households' intention to use DPS can be a valuable tool for policy makers who want to promote the adoption of these systems. By understanding what factors influence people's decision to use DPS, policy makers can develop policies that make them more attractive to users and that can have a positive impact on society.

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## INTERVIEW SCHEDULE FOR RURAL HOUSEHOLDS

## 1. DEMOGRAPHIC PROFILE

- 1 **Name** .....
- 2 **Gender**  Male  Female  Others  
(Please tick (✓) on the required option)
- 3 **Age** .....  
(Please specify age in years., e.g., 35)
- 4 **Highest Educational qualification** (Please tick (✓) on the required option below)  
 Primary education   
 10<sup>th</sup> grade   
 Higher secondary   
 Undergraduate   
 Postgraduate and above
- 5 **Employment Status**  
 Government employee   
 Private employee   
 Business   
 Professional   
 Daily wages
- 6 **On average what is your monthly income Level?**  
(Please specify in (₹) whole number. E.g., 50,000)  
 .....
- 7 **Number of family members**  
 Less than 3 members   
 3 -4 members   
 More than 4 members



## 2. DPS PROFILE OF RURAL HOUSEHOLDS

1	Level of your Digital payments' usage experience?	
	Low	<input type="checkbox"/>
	High	<input type="checkbox"/>
2	How did you get information about Digital Payments? <i>(Tick (✓) all that apply)</i>	
	From the bank staff	<input type="checkbox"/>
	Direct promotion from the bank (SMS/Email)	<input type="checkbox"/>
	Social networks	<input type="checkbox"/>
	Friends/Colleagues	<input type="checkbox"/>
3	Please Tick your preference for making digital payments <i>(Tick (✓) all that apply)</i>	
	<b>DIGITAL PAYMENT MODES</b>	<i>Tick (✓)</i>
	ATMs	<input type="checkbox"/>
	Debit Cards, Credit Cards	<input type="checkbox"/>
	Point of Sale (POS)	<input type="checkbox"/>
	USSD (Unstructured Supplementary Service Data)	<input type="checkbox"/>
	AEPS (Aadhaar Enables Payment System)	<input type="checkbox"/>
	UPI (Unified Payment Interface)	<input type="checkbox"/>
	BHIM Apps (Bharat Interface for Money)	<input type="checkbox"/>
	Mobile Banking (By using apps of banks)	<input type="checkbox"/>
	Internet Banking	<input type="checkbox"/>
	QR Code scanning payment	<input type="checkbox"/>

### 3. AWARENESS LEVEL OF DIGITAL PAYMENTS AMONG RURAL HOUSEHOLDS

Mark your awareness level on the following statements:

HA-Highly Aware, AW-Aware, N-No opinion, SWA-Somewhat Aware,  
HUAW-Highly Unaware

Sl no	Opinion	HAW	AW	N	SWA	HUAW
<b>I</b>	<b>Awareness level</b>					
AW1	I received enough information about digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AW2	I received enough information about the benefits of digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AW3	I think I get enough information about the ways to transfer funds/payment via debit cards or credit cards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AW4	I'm aware about how to login, transfer funds or check balance through internet banking, mobile banking or UPI app channels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AW5	I'm aware about how to use UPI app, bank cards, or QR code scanning in making PoS (Point of sale) transactions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 4. ADOPTING DIGITAL PAYMENT METHODS

Mark your opinion on the following statements:

SA-Strongly Agreed, A-Agreed, N-Neutral, DA-Disagreed SD-Strongly Disagreed

		SA	A	N	DA	SD
<b>I</b>	<b>Performance Usage (PU)</b>					
PU1	Using digital payment systems helps me accomplish transactions (i.e. shopping, purchases, transfers, etc) more quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PU2	Using digital payment systems increases my productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PU3	Using digital payment systems makes it easier for me to do transactions like shopping, purchases, transfers etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PU4	Using digital payment systems improves my overall payment performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>II</b>	<b>Perceived Ease of Use (PEOU)</b>					
PEOU 1	Learning how to use digital payment systems are easy for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PEOU 2	My interaction with digital payment systems are clear and understandable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PEOU 3	I find digital payment systems easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PEOU4	It is easy for me to become skillful at using digital payment systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>III</b>	<b>Social Influence (SI)</b>					
SI1	People who are important to me think that I should use digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SI2	People who influence my behavior think that I should use digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SI3	People whose opinions that I value prefer that I use digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SI4	People around me who use digital payment systems have more prestige than those who do not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SI5	Using digital payment systems is considered a status symbol among my friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>IV</b>	<b>Facilitating Conditions (FC)</b>					
FC1	I have the resources (like digital device, internet etc.) necessary to use digital payment systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FC2	I have the knowledge necessary to use digital payment systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FC3	I can get help from others when I have difficulties using digital payment systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FC4	Digital payment system we use is compatible with our digital devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FC5	Specialized instructions concerning use of digital payment systems are available to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>V</b>	<b>Behavioral Intention (BI)</b>					
BI1	I intend to continue using digital payment system in the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BI2	I will always try to use digital payment systems in my daily life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BI3	I plan to continue to use digital payment systems in future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>VI</b>	<b>Usage Behavior (UB)</b>					
UB1	I use digital payment systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UB2	I pay for purchases using digital payment systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UB3	I use digital payment systems for transferring money to my family, friends and/or other contacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UB4	I use digital payment systems when doing online shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 5. SATISFACTION LEVEL OF DIGITAL PAYMENTS AMONG RURAL HOUSEHOLDS

Mark your satisfaction level on the following statements:

HS- Highly satisfied- satisfied-No opinion, DS- Dissatisfied, HDS- Highly Dissatisfied

Sl. no.	Opinion	HS	S	N	DS	HDS
SAT 1	I am satisfied with the technical functioning of the DPMs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAT2	I received prompt responses to my request by email / service line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAT3	I am satisfied with the DPMs to find the desired product and information associated with it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAT4	I am satisfied with delivery of the services in the promised time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAT5	I am satisfied with the visual appeal of the search functions, fast access and ease of error correction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAT6	Overall, I am satisfied with my digital payments experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>