

The Influence of Adopters' Perceptions to decision process stages of Digital Payment Applications in Adoption Intention and Adoption Behaviour in the Time of the Covid-19 Pandemic: Evidence from Saudi Arabia

Abdullah Yahia Moqbile Ahmed

College of Administrative Science, Najran University, Najran, Saudi Arabia

ABSTRACT:

Purpose -This study proposes a new method to investigate adoption of digital payment applications (DPAs) by looking into the determinants adoption decision of digital payments in said Arabia. This study aimed at identifying the factors that affect using DPAs process from the customers' point of view in the context of Saudi Arabia. The study investigated the impact of Innovation Characteristics which are: (Relative advantage, Compatibility, Complexity, Trialability, and Observability) on digital payments adoption process adoption intention which occurs during the first three stages of the innovation-decision process (knowledge, persuasion, and decision), and the influence of these behavioural Intention on the adoption behaviour which occurs during the implementation and confirmation stages of the innovation-decision process.

Methodology: The samples were distributed over the five regions in the Kingdom of Saudi Arabia in varying proportions. For data collection purposes, questionnaire was administrated to a sample size of 223 customers who use digital payment applications. The electronic analysis program SPSS in version 24 was used to find the results of hypothesis testing of the study.

Findings – While compatibility and trialability displayed significant positive relationships, relative advantage, complexity, and observability exhibited a significant negative impact on behavioural intention. On the other hand, behavioural intention significant positive impacts on the adoption of the Digital Payment applications

Conclusion- Finally the study stress to the importance of making more efforts, time and cost to make customer more convenient and provide sufficient data that need when using DPAs, in addition to facilitating, the procedures related to getting these services from the customer's bank. The researcher also recommended that the customers pay attention to the factor of compatibility, as it is one of the most important factors that contribute to increasing the use of adoption.

Originality -The findings indicate that the proposed study model plays a major role in explaining the stages of decision-making by using electronic digital payments to that of the models elected by previous studies.

KEYWORD: Innovation Characteristics, Individual characteristics, digital payment applications, and adoption processes stages.

Date of Submission: 01-12-2021

Date of Acceptance: 14-12-2021

I. INTRODUCTION

With the remarkable growth of e-commerce, new technologies such as Near Field Communication (NFC) (Ondrus and Pigneur, 2007), and the accelerated use of digital payment applications has played a pivotal role in changing the ways of completing commercial buying and selling deals for consumers, highlighting the position of digital payment. Compared to traditional payments, such as cash, the main advantage of digital payment applications is their convenience, as they are not limited to a specific time or location (Shao, Zhang, Li, and Guo, 2019).

According to statista (2021), the total transaction value in the digital payments sector is expected to reach 6,685,102 million USD in 2021, and from a global comparison perspective, it is clear that the highest accumulated transaction value has been reached in China (2, \$915,347 million in 2021). Likewise, digital payments are spreading among the mobile user community with high penetration rates in both India and China, compared to Western societies that did not adopt it as much as expected (Liebana-Cabanillas et al., 2018a, b). There are many reasons why digital payment adoption is different across countries, one of the main ones being that there are many factors that influence digital payment adoption.

Therefore, and in order to avoid exposure to the COVID-19 virus, digital payment methods are becoming more preferable to distance from physical contact. Based on studies collected from all over the world, it became clear that there is a change in consumer behaviour in Africa and the Middle East (Nnabugwu, 2020), the United States of America (Businesswire.com, 2020) and Latin America (Globenewswire.com, 2020). Without a doubt, all these rapid and radical changes are pushing researchers towards contactless payment methods.

In the Kingdom of Saudi Arabia, it is noticeable that digital payment transactions have reached an accelerating rate of 75% in 2020, as Saudi consumers have adopted online shopping as an ideal option during the Corona pandemic (COVID-19), while other withdrawals have declined, such as cash withdrawals from ATMs and points Other payments up to 30% during the same period (Arabnews.com , 2021). It added that, Point of sale (PoS) mention to a place where customers can execute payments for products or services by using debit or credit card .This can be a credit card in a clothes store, a digital payment in a coffee shop or through a food delivery applications.

Based on an article published in the Saudi Gazette (2021), financial expert and economic analyst Talaat Hafez indicated that, the number of points of sale by 2020 reached 2.8 billion, an increase of 75% over the previous year, while the value of commercial operations reached roughly to 349 billion Saudi riyals, an increase of 24.1 present compared to the same period in 2019. These happened in conjunction with consumers' shift to digital and electronic payments during the Covid 19 pandemic. He added that, cash withdrawals decreased by more than 318 million, or 30 present on an annual basis (Arabnews.com, 2021). Hafiz mentioned that, these statistics and indices confirm the trend and the increasing and steady demand for members of society and business sectors to use electronic payment technologies through POS devices, (Saudi Gazette, 2021).

In 2007, the Payment and Settlement Act defined digital payments as transferring money to individuals or companies by order of banks, whether deducting or depositing in customer accounts using various electronic tools such as ATM transactions, point-of-sale transfers, small teller machines, direct deposit and withdrawal, phone payments Mobile, and finally net banking etc. (Sarkar, 2019). Digital transfers using applications have played a noticeable change in the behaviour of individuals and contributed to the use of digital payment (Kamatchi Eswaran, 2019).

The digital payment system is one of the electronic means that helps consumers to conduct electronic purchasing transactions. The growing awareness of consumers about digital payment helps and this varies according to their different social and economic levels and their perception towards digital payment (Gokilavani, Venkatesh, Durgarani, & Mahalakshmi, 2018). Several studies in recent periods have focused on digital payments, while the study of technology adoption has taken long periods. Accordingly, we find that Dahlberg, Guo, and Ondrus, reviewed (2015) studies on one type of digital payment, which is mobile payment, during the period from 2007 to 2014 and he concluded that these researches focused mainly on three axes: strategy and ecosystems, technology, and adoption. In the business field most studies have focused on the factors that influence digital payment adoption Liébana-Cabanillas, Mu~noz-Leiva, and Sanchez-Fernandez, 2018b; Musa, Li, Abas, and Mohamad, 2016; Sarkar, 2019: Shao, Zhang, Li, and Guo, 2019; Yang, 2007).

The decision to adopt an innovation acceptance or rejection optional for individuals and organizations (Rogers, 2003). The adopters of innovations and new ideas in the same social system vary in terms of the different degrees of adoption and the time of adoption on the one hand, and on the other hand, the degrees innovation itself (Rogers, 2003). Moreover, the process of making a decision to adopt ideas or innovations passes through five stages: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003).

Researchers have developed frameworks and models for regulating the adoption of new technologies and the factors that influence user choice (Taherdoost, 2018). Researchers are interested in organizing the process of adaptation to new technologies and knowing the factors affecting users through building frameworks, theories, and models developed such as: Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) (Fishbein & Ajzen, 1975) , Technology of Acceptance Model (TAM) (Davis, 1985), Technology - Organization- Environment (TOE) Framework (Tornatzky & Fleischer, 1990), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis , 2003) and Diffusion of Innovations (DOI) (Rogers, 2003). Subsequently, other researchers appeared depending on their research environment adding and removing some variables (Barrane, Karuranga, & Poulin, 2018).

The present study proposes the adoption intention and the adoption behaviour of Digital payments applications. The specific objectives are: (1) to investigate the attributes factors that determine the consumer's to Intention and Adoption Behaviour Digital Payment Applications; (2) to give an overview of the role of Innovation Characteristics in behaviour intention of DPAs (knowledge, persuasion, and Decision) form one side, and from other side the role of behaviour intention in behaviour adaptation (implementation and confirmation); and (3) to provide implications for both academic researchers and practitioners. The study hypothesizes that Innovation characteristic (Relative advantage, Compatibility, Complexity, Trialability, and Observability) that influence DPAs adoption. Other relationships among the variables are also tested.

This study is this study is consisted of three parts. The first the Conceptual framework and development of the hypotheses reviews the previous literature on Technology adoption models and, and develops the conceptual model of Stage Adoption process of digital payments applications and the related hypotheses. In the second, the methodology is introduced, including Survey Instrument, scale development, Pilot Study, and data collection. Next, the findings, based on SPSS analysis, are included: demographic characteristics for this study's respondent, Reliability Test and Descriptive Statistics for the individual items, Linear Regression analysis to exam the hypothesis relationship. Finally, discussion the result of the hypothesis, limitations guidance for future research are provided, and research contribution, implications, and conclusion.

II. CONCEPTUAL FRAMEWORK AND DEVELOPMENT OF THE HYPOTHESES

2.1 Technology adoption models Research Objectives

The adoption of technology has been a fertile field for researchers during the last thirty years of this century (Chuttur, 2009). Where a set of theories were discussed that focus on the mechanism of users' adoption of technologies that explain and predict their behaviour, and the technology acceptance model (TAM) by Davis (1986, 1989), the theory of reasoned action (TRA) by Fishbein and Ajzen (1975) , to investigate the determinants of Information System (IS) acceptance. Furthermore, this model extended by (Venkatesh and Davis, 2000 and Venkatesh and Bala, 2008, Theory of Planned Behaviour (TPB) of Ajzen (1991), and Unified Theory of Technology Acceptance and Use Theory (UTAUT) by Venkatesh et al. (2003, 2012) has been extensively applied to describe the adoption of a wide variety of innovations.

Other theories and models have been adopted by some researchers, for example, the innovation diffusion theory (Shao et al., 2019; Johnson, Kiser, Washington, and Torres, 2018; Oliveira, Thomas, Baptista, and Campos, 2016), mental accounting theory (Park, Ahn, Thavisay, and Ren, 2019) adopted mental and accounting theory to illustrate how anxiety and social influence affect the benefits of mobile payment services, as it explains consumer behaviour under conditions of risk and uncertainty. None of these theoretical models is without flaw. Therefore, many researchers have to consider scientific matters by combining two or more of them. For instance, Alam et al. (2018) integrated the TAM, the TPB and DOI theories to study Mobile payments adoption in Saudi Arabia.

2.1.1. Adoption and rejection of a technology

When a technology is developed and diffused among potential adopters, two different adoption decisions can be made: adopt or the reject it. According to Rogers (2003, p. 177), the adoption is the “decision to make full use of an innovation as the best course of action available” and the rejection is the “decision not to adopt an innovation” and arises at the decision stage of the innovation-decision process. The following sub-sections will describe the three main factors of the DOI Theory suggested by Rogers (2003) that explain the adoption of innovations: the innovation-decision process, characteristics of the innovation under adoption, and characteristics of the adopter.

2.1.2 . Innovation-decision process

The process of innovative decisions is the transfer of the individual or organization from the stage of knowledge to the formation of a position towards innovation, and thus the formation of the decision to adopt or reject, and then implement this new idea and confirm this decision, so the process of innovation decisions consists of five stages of knowledge, persuasion, decision, and implementation and confirmation (Rogers, 2003).

The decision-making unit or adopter becomes acquainted with the functions of innovation in the stage of knowledge, while he has an opinion about innovation, whether positive or negative at the persuasion stage (Rogers, 2003). In this latter stage, the decision-making unit creates perceptions about the innovation, that will influence the intention of acquiring it or not. In the decision stage, the adoption or rejection of the innovation is decided (Rogers, 2003) and, if adopted, its benefits will only emerge if the outcomes of the implementation stage are positive (Linton, 2002). Linton (2002) also indicated that implementation includes all the activities that exist at the commitment time to adoption until the innovation become part of the organizational routine, or delayed the using to be new, or completely neglected. Finally, the confirmation is the last adoption process stage, and during this period, the decision-making unit can make re-evaluated the adoption decision, because it may have got an unexpected or surprising information (Rogers, 2003).

There are two fundamental factors in the decision-making process about innovation: adoption intent and adoption behaviour. The intent to adopt is related to the adopter's initial perception of the innovation before buying it, only when he will to get it. (Arts, Frambach, & Bijmolt, 2011). The latter authors argued that the majority of adoption behaviour studies analysed the post innovation purchase, except Rogers (2003) who assumes the adoption behaviour definition as the moment of the innovation purchase. In these studies, Adoption

behaviour will be analysed as a post-innovation moment of use, which includes adopters' perceptions, as was done in previous studies (Arts et al., 2011).

The decision of adopting an innovation requires acquiring it, whether it is used or not. For this reason, adoption intention occurs during the first three stages of the innovation-decision process - knowledge, persuasion and decision – and adoption behaviour during the implementation stage. Depending on the outcomes of this behaviour, the adopter will confirm or not the adoption.

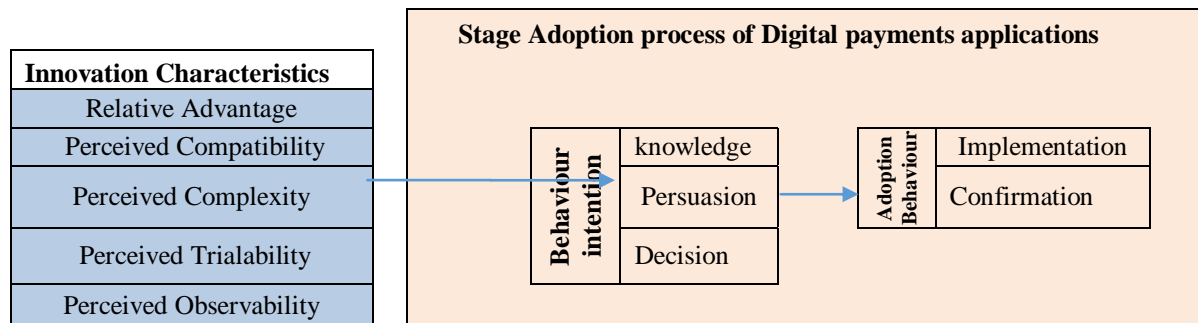


Figure 1: Research framework

2.2 The influence of Behaviour intention on the adoption of DPAs behaviour

2.2.1 Relative advantage

A relative advantage is defined as the level to which people assume that the new innovative is better than the old traditional one. Thus, this term is used in the current study to refer to the degree where users believe that using DPAs can enhance their using performance. Relative advantage, in one sense, indicates the strength of the reward or punishment resulting from the adoption of an innovation. Sub-dimensions of competitive advantage include the level of economic profit, reduced inconvenience, effort and wasted time (Rogers, 1983).

In addition to that, this construct is similar to the perceived usefulness in the Technology Acceptance Model, defined as the degree to which a person believes that a particular information technology would enhance his or her job performance. By the way, competitive advantage affected the morale of the veterans by increasing their tendency towards adopting e-government services (Lawson Body, Illia, Willoughby, & Lee, 2014). Also, there is an impact on the intent to use group software (group chat for work) for the benefit of the organization (Slyke, Lou, & Day, 2002).

Moreover, Ko, Kim, Kim, and Woo (2008) in their study on CRM adoption; advocate that the decision makers perceive advantages of an innovation during persuasion phase and the benefits affect the decision phase positively. Findings of Chong and Chan (2012) study on RFID adoption confirm that perceived advantages are significantly relevant for pre-adoption and adoption stages. Hence, this study hypothesizes:

H1: relative advantage will significantly influence the users' DPAs behavioural intentions on decision process stages adoption.

2.2.2 Perceived compatibility

Perceived compatibility refers to the fact in which users feel that the innovation is compatible with their standards, previous involvements and the desires of the probable adopters. Moore and Benbasat (1991) were also of the same view stating that if DPAs goes in line with the users' values, needs and experiences, then the level of perceived compatibility is considered high. This research uses this term to refer to the users' perspectives on the benefit they can get by using the DPAs. Previous literature regarding information systems adoption has often used Perceived compatibility as an indicator of the students' behavioural intention to use (Venkatesh, Morris, Davis, & Davis, 2003). It has been found that perceived compatibility had a positive relation only with perceived usefulness as reported by Chang and Tung (2008).

Other researchers such as Wu and Wang (2005), Chang, and Tung (2008) reported the significant relationship between behavioral intention and perceived usefulness. The behavioural intention to use, perceived usefulness, and perceived ease of use were also strongly affected by perceived compatibility (Lee, Hsieh, and Hsu, 2011; Hardgrave, Davis, & Riemenschneider, 2003). Agarwal and Prasad (1999) indicated that there is a positive relationship between similar technologies and prior experience with ease of use of technology innovation. This leads to the hypothesis

H2: Perceived compatibility will significantly influence the users' DPAs behavioural intentions on decision process stages adoption.

2.2.3. Perceived Complexity

Based on previous studies, innovation, which has high-level degree of complexity, requires higher technical skills and greater operational efforts in the implementation phase to obtain greater adoption opportunities (Cooper and Zmud 1990; Dickerson and Gentry 1983). As the DPAs is very user friendly with its "point and click" interface, it is likely that potential customers may feel that DPAs are less complex to use, and hence would be likely to use such applications. Therefore, Complexity is defined as the level of difficulty in understanding innovations and their ease of use that is perceived by the end-user. Based on this definition, the current study uses these terms to refer to extent of difficulty viewed by the user that affects his/her using DPAs performance.

Depend on previous research, end users has been concluded that, the complexity of the system used, such as the educational system, leads to lower intent to use it (Tobbin, 2010). Moreover, Hardgrave et al. (2003) revealed that complexity has a negative relationship with the perceived usefulness. Other empirical studies such as the ones by Lee (2007) and Hardgrave, Davis, and Riemenschneider, (2003) highlighted the behavioural intention to use is negatively influenced by the complexity of E-Learning system. On Other hand, other studied indicated that, Complexity positively affects the intention of adopting mobile marketing in Malaysia (Musa, Li, Abas, and Mohamad, 2016).

Similarly, organization adoption literature supports the argument for example, Chong and Chan (2012) find that perceived losses like complexity and cost of RFID effect on post-adoption is stronger than pre-adoption stages. Other empirical studies such as the ones by Tobbin, (2010), and Shih (2007) highlighted the behavioural intention to use is negatively influenced by the complexity of E-Learning system. This indicate to that, when firm's promise to reduce perceived learning difficulty, time, and cost of using an innovation is effective during actual use rather than early stages where it only creates unrealistic expectations (Wood & Moreau, 2006). Similarly, organization adoption literature supports the argument for example, Chong and Chan (2012) find that perceived losses like complexity and cost of RFID effect on post-adoption is stronger than pre-adoption stages. This leads to the hypothesis:

H3: Perceived Complexity will significantly influence the users' DPAs behavioural intentions on decision process stages adoption.

2.2.4 Perceived Trialability

Testability refers to consumers needing to obtain trial versions of software, samples of a product, or check on the quality of service provided before deciding whether to adopt it or not. The trialable innovation tends to have less uncertainty perceived by individuals who consider adopting it and those individuals tend to use through this experience. Rogers (2003) comments that potential adopters who have the opportunity to experience an innovation will feel more comfortable, thus recognize its advantages and disadvantages, and then eliminate the problem of the so-called fear of the unknown. In addition, when customers find the possibility of modifying errors, this increases the chance of predicting the results of this innovation.

As for the current study, this concept refers to how a user views his/her use DPAs having a significant impact on their adopting process performance. It has been found by research done on different populations, using methodologies, that the users' attitude towards using the system and their intentions intention to do so is highly influenced by observability (Lee, 2007). That will enables him to see how it works within a limited time, and helps him to analyze the required degree of change in existing behaviour in order to switch to new behaviour. Perceived trialability increases an individual's readiness to accept the change in such a way that he understands his role and feels confident to use a new innovation Meuter, Bitner, Ostrom, & Brown, (2005). Hence, it is most relevant for overt behaviour stages (Arts, Frambach, Bijmolt, 2011) which is closely associated with knowledge, persuasion and implementation. Based on this argument, the study hypothesizes that:

H4: Perceived Trialability will significantly influence the users' DPAs behavioural intentions on decision process stages adoption.

2.2.5 Perceived Observability

Observability is defined as the level in which the outcome of the innovation is noticeable by others. It is assumed that friends and neighbours of an adopter frequently ask him/her of a feedback. Therefore, it refers to the degree of visibility of the new technology results (Tan, Chong, Lin, & Eze, 2009). Visibility is seen as a factor that stimulates peer discussion of new ideas. Based on these points, the acceptability viewed by users of the use of DPAs that has an impact on their expectations.

There are a measure of observability of technology which include: positive results of using ICT, benefit of ICT usage, customer satisfaction, profit, productivity, product quality, and abreast with competition (Golding, Donaldson, Tennant, & Black, 2008; Soh, & Chew, 1997; Moghavvemi, Hakimian, & Feissal, 2012), A technology products which studied by Vishwanath and Goldhaber, (2003) found observability significantly impacted intention. Arts et al (2011) in their meta-analysis on drivers of intention and behaviour, showed a

partial support to the notion that observability will have a stronger effect at the intention stage. In order to receive more clarity on the effect of this attribute, it has been posited hypothesis as:

H5: Perceived Observability will significantly influence the users' DPAs behavioural intentions on decision process stages adoption

2.3 The influence of Characteristics of innovation on Behaviour intention

Apart from the aforementioned five attributes, the effect of behavioural intention on adoption was also included to be measured. Gumussoy and Calisir (2009) cite Ajzen and Fishbein (1980) to define behavioural intention as a measure of the likelihood of a person getting involved in a given behaviour. They point at behavioural intention to be an immediate determinant of actual use. Stronger the intention, greater will be the probability of use. In addition to that, there are other studies supported that attribute have a positive influence on the actual use (Chen, Gillenson, Sherrell, 2002; Ajjan and Hartshorne, 2008; Gumussoy and Calisir, 2009). Ajzen (1991) concluding that behavioural intention acts as the most important determinant of the adoption decision.

Accordingly, the intention is expressed in the readiness of the user to use the product/service (Venkatesh et al., 2003). When researching the intention of using electronic payment, the content focused on the scale including the intention to use, plan to use and predict system usage (Venkatesh et al., 2003). As indicated by previous studies, consumers' attitude strongly influences purchasing intentions. In addition, Kim, Won (2020) found the same finding that consumer attitude towards product, and service has a statistically significant effect on purchase intent. In addition, the intent to use the technology has a significant relationship with user behavior (Fishbein & Ajzen, 1975).

H1A Behavioural Intention positively influences the adoption of DPAs behaviour on decision process stages adoption.

III. METHODOLOGY

3.1 Survey Instrument

The instrument used for data collection was a questionnaire comprising of 41 questions, out of which, five were demographic by nature - focused on age, gender, experience, education, and income of the respondent; the other five questions were multiple choice, respondent types of digital payments tools. Innovation Characteristics (Relative advantage, Compatibility, Complexity, Trialability, and Observability) measured by using five point Likert scale in 10 questions. By the same way ten questions were designed to cover the five adoption process of decision Digital payments: adoption intention (knowledge, persuasion, and Decision), and adoption behaviour (implementation and confirmation) by using five point Likert scale also.

Therefore, Items of Innovation Characteristics were adapted from previous studies: Trialability, Relative advantage, and compatibility (Moore and Benbasat, 1991); complexity (Moore and Benbasat, 1991; Shih and Fang, 2004; Yang, Lay, Tsai, 2006; Richardson, 2009); and In order to develop the last part of the process of adoption digital payment applications scale, a detailed review of literature was conducted within the scope of Rogers' (2003) Diffusion of Innovations Theory and the theory of planned behavior (TPB) by Ajzen (1991), both. The draft form was reviewed by three expert academicians in the field of instructional technology and two expert academicians in the field of curriculum development. In accordance with the feedback and suggestions received concerning the comprehensibility of the items, complexity of the statements and their compliance with the Diffusion of Innovations Theory, the items in the scale were revised and rewritten. 18 items that were approved by at least.

3.2 Pilot Study

The questionnaire was tested against a small sample size to improve upon the instrument design prior to the full scale roll-out of this study. The pilot study was done on a sample of 30 respondents. It was ensured that the population for this study included respondents from all age groups to ensure their understandability of the questionnaire. The respondents' feedback revealed that although the questionnaire was clear and simple by understanding, it appeared to be repetitive. Minor suggestions that were made were addressed and the questionnaire was amended suitably.

3.3 Data Collection

All-India data was to be accumulated and therefore it was decided to collect equal number of responses from all of the five – Central (Riyadh), northern (Tabuk City), eastern (Dammam City), western (Jeddah City) and southern (Najran City) regions of Saudi Arabia. 230 respondents participated in this survey. Upon the receipt of the questionnaires, it was found that seven questionnaires were incomplete. In the interest of data accuracy and reliability, these seven questionnaires were discarded, and 223 questionnaires were subjected to further analyses. The SPSS data analysis software was used to produce results on the gathered data, the findings

of which are made available in section 4. The findings section will provide for results from the (a) frequency tests on the demographic characteristics (b) reliability test showing the internal consistencies of the construct items (c) descriptive test generating the means and standard deviations for all of the seven constructs (d) regression analyses, both linear and logistic, in order to test the stated hypotheses, and (e) multicollinearity test to check for the correlation amongst the predictor variables.

IV. FINDINGS

4.1 Demographics

Table 1 is descriptive of the demographic characteristics for this study's respondent-profile. Clearly, the 40-49 age group, the male respondents (84.75 %), the 11-15 experience years, the Doctorate (30 %), and the 6000-6999 salary Saudi riyals formed the largest proportion groups for our dataset.

Table 1: Demographic Characteristics

Variable	Group	Frequency	Percentage
Age	<20	11	4.9
	20-29	28	12.56
	30-39	55	24.66
	40-49	62	27.80
	50-59	35	15.69
	> 59	32	14.35
	Total	223	100
Gender	Male	189	84.75
	Female	34	15.25
	Total	223	100.0
Experience	< 5 years	10	4.48
	6-10	42	18.83
	11-15	72	32.29
	16-20	32	14.35
	21-25	29	13.00
	>25	38	17.40
	Total	223	100
Educational Level	Intermediate school	11	4.93
	secondary school	32	14.35
	technical college	27	12.11
	Bachelor	41	18.39
	Master	22	9.86
	Doctorate	68	30.49
	Other	22	9.87
Total	223	100	
Salary	< 1000	35	15.69
	1000 - 1999	18	8.07
	3000-3999	40	17.94
	4000-4999	13	5.83
	5000-5999	18	8.07
	6000-6999	91	40.81
	> 7000	8	3.59
	Total	223	100.0

Source: IBM SPSS version 27 output.

Table 2 discloses the demographics specific to use digital payments types, and shows that out of the 223 respondents, there were 38 use Debit and credit card payments, while twice 65 and 52 frequently appears in using Automated Teller Machine (ATM) transactions and Electronic mobile Wallet (Mobile Payments) by 29.15% and 23.32% in both. Finally Net banking only used by 22 user, which appears 9.86%.

Table 2: digital payments types

Type	Frequency	Percentage
Debit and credit card payments	84	37.67
Automated Teller Machine (ATM) transactions	65	29.15
Electronic mobile Wallet (Mobile Payments)	52	23.32
Net Banking	22	9.86
Total	223	100.0

Source: IBM SPSS version 27 output.

4.2 Reliability Test

A reliability test was carried out to learn the internal consistencies of the individual items forming each of the utilized constructs (Table 3). There were four constructs for which one item each was deleted in order to arrive at better values.

Hinton et al. (2004) illustrated that as a representative of reliability, the Cronbach's alpha could be read across four different reliability types: 0.90 - excellent; 0.70-0.90 - high; 0.50-0.70 - moderate; and. 0.50 - low. Out of the seven constructs, there were six constructs with high, and once with moderate reliabilities. Higher the Cronbach's alpha values, greater is the consistency amongst the individual items making up a given construct.

Table 3: Reliability Test

Construct	construct	Sample size	Number of items	Cronbach's alpha	Reliability type
Relative advantage	Relative advantage	223	4	.891	High
Compatibility	compatibility	223	4	.935	High
Complexity	complexity	223	4	.780	High
Trail ability	trial ability	223	4	.802	High
Observation	observability	223	4	0.730	High
Adoption intension to use	Intension to adopt	223	6	.602	Moderate
Adoption behaviour	adoption behavior	223	4	.919	High

Source: IBM SPSS version 27 output.

4.3 Descriptive Statistics

Table 4 provides for the results from the descriptive test. The statistics were extracted in the ascending order of the mean values.

Table 4: Descriptive Statistics: Importance of various innovation-attributes

Construct	N	Mean	Std. Deviation
Relative advantage	223	4.5600	.53857
Compatibility	223	4.2050	.85566
Complexity	223	2.6300	1.01351
Trail ability	223	4.2400	.58632
Observation	223	3.2250	.48380
Adoption intension to use	223	4.0900	.52833
Adoption behaviour	223	4.2400	.78892

Source: IBM SPSS version 27 output.

4.4 Regression analysis

Regression analysis is a statistical technique that predicts the values of one dependent variable using the values of one or more other independent variables (Allen, 2004). This study underwent two types of regression analysis – (a) Linear regression (b) Logistic Regression, which were performed on a total of 250 cases too.

4.5 Linear Regression

Worster, Fan, Ismailia, (2007) stated that linear regression assumes a linear relationship between the dependent and independent variable(s). A linear regression was performed taking Behavioural Intention as the dependent variable, and the Rogers' five attributes as the independent variables (Table 5). The resultant model significantly predicted the behavioural intention of the target population towards adoption behaviour of using digital payments ($F(174.365) = .413, p=0.000$). The model explains 52 % of the variance. While Compatibility and Trail ability were found to have appositve significant, Relative advantage, Complexity and observability have negative significant effect on the behavioural intention.

Table 5: Linear Regression

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		hypotheses support	
		B	Std. Error	Beta	t	Sig.	Tolerance		VIF
1	(Constant)	4.714	.355		13.287	.000			
	Relative advantage	-.259-	.057	-.264-	-4.525-	.000	.580	1.723	H1: NO
	Compatibility	.278	.040	.450	6.946	.000	.469	2.133	H2: YES
	Complexity	-.120-	.032	-.230-	-3.722-	.000	.514	1.944	H3: NO
	Trail ability	.152	.055	.169	2.758	.006	.526	1.900	H4: Yes
	observability	-.292-	.051	-.268-	-5.742-	.000	.907	1.103	H5: NO

Table 5: Linear Regression

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		hypotheses support	
		B	Std. Error	Beta	t	Sig.	Tolerance		VIF
1	(Constant)	4.714	.355		13.287	.000			
	Relative advantage	-.259	.057	-.264	-4.525	.000	.580	1.723	H1: NO
	Compatibility	.278	.040	.450	6.946	.000	.469	2.133	H2: YES
	Complexity	-.120	.032	-.230	-3.722	.000	.514	1.944	H3: NO
	Trail ability	.152	.055	.169	2.758	.006	.526	1.900	H4: Yes
	observability	-.292	.051	-.268	-5.742	.000	.907	1.103	H5: NO

Dependent Variable: Mean adoption intension to use
 Model details : R square .519, F= 52.719, significance: .000

Source: IBM SPSS version 27 output

4.6 Multicollinearity Test

According to Brace et al. (2003), multicollinearity is a situation where a high correlation is detected between two or more predictor variables, which cause problems in drawing inferences about the relative contribution of each predictor variable to the success of the model. The VIF values for this regression analysis vary between 1.456 and 1.904 (Table 9). Obviously, these values are significantly below the maximum value of 10 (Irani, Dwivedi, Williams, 2009). Thus, the independent variables for this study are free from the multicollinearity problem. The likelihood of the reported variance explained by these independent variables to be close to the real situation is therefore very high.

Table 6 : Variables in the equation

Model		Unstandardized Coefficients		Standardized Coefficients		95% Confidence Interval for B		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.316	.300		1.054	.293	-.274	.906		
	Mean adoption intension to use	.959	.073	.643	13.205	.000	.816	1.103	1.000	1.000

Dependent Variable: Mean adoption behaviour
 Model details : R square .41, F= 174, significance: .000

Source: IBM SPSS version 27 output

V. DISCUSSION

5.1 Hypotheses Testing

Five hypotheses were developed and statistical tests were conducted to find out the effect of innovation characteristics on behavioural intentions. The results of the analysis support the results of the second and fourth hypotheses (hypothesis 2 and 4), which indicate that compatibility and trialability have positive and significant effects on the intentions of consumers using digital payment applications. Electronic card and electronic mobile wallet can be seen as the predecessors the digital payments in the Saudi Arabia context. In terms of compatibility, electronic card is much faster to perform the payments than Transfer Money payment.

From the data results, clearly, the users Both Debit credit card payments, and ATM transactions provide consumers with quicker access to their bank accounts, and offers greater flexibility in terms of the type of payment they need to make. Along with its 24/7 availability. On the other hand, the Electronic mobile Wallet (Mobile Payments) feature of the DPAs application surpasses Net Banking. Mobile Payments allows access to the consumers from anywhere, anytime, via their mobile networks, without having the need to connect through routers/modems to gain internet/Wi-Fi access. From the data results, clearly, the users perceive DPAs to be an easy to use Debit and credit card payments and ATM transactions.

Slyke et al. (2002) used IDT in studying groupware applications and found that relative advantage, complexity and compatibility significantly influenced intention. Chen et al. (2002) applied IDT to study the consumer attitudes towards virtual stores and found compatibility to be strong determinant of consumer intentions. This research finding is in line with Sugandini, Sudiarto, Surjanti, Maro'ah, Muafi (2018) which found that perceived relative advantage also has negative an effect toward high intention to delay. They added that reason for this finding because consumers are not convinced about the relative advantage of digital payments types, so they still feel hesitate to adopt it. This hesitation directs consumer behaviour to delay. Furtherly, Rogers (2003), and; Muafi, (2017) showed that relative advantage affect one's decision to adopt or not Intention to adoption. : The Context of Technology Adoption Based on adoption digital payments. Consumers'

perceived complexity for using digital payments tools is relatively high. This means that consumers feel that learning using digital payments types' application is difficult and it is uneasy for them to make purchasing by technology and understand how this technology works. This high complexity affects consumer's attitudes to intending adoption of this technology. Consequently, the consumers' intention to adoption of technology becomes high.

Hsu, Lu, Hsu (2007) studied the adoption of MMS using IDT, and concluded for relative advantage and compatibility to significantly influence the user intentions. Lee and Kozar (2008) combined IDT, TPB, IT ethics, and morality in an empirical investigation on the anti-spyware software adoption, and found that relative advantage and compatibility showed significant effect on adoption intention. Trialability also succeeded in successfully explaining the consumer's adoption intention (hypothesis 4). Meuter et al. (2005) concluded that trialability serves in clarifying the role of potential adopters by helping evaluating their ability to use that innovation, and thus enhancing the consumer readiness towards the given innovation. Digital payments types is an application, which comes with no installation charge or usage clause, i.e. it is a service available for the consumers to use if and when required. In other words, DPAs comes with an unlimited trial period. One way or another, DPAs have an unlimited number of trial periods. The consumers can opt to use this applications once, or any number of times without any trial obligations, and return to using it again if the service is appealing to them, or simply quit using it, otherwise.

Hypothesis 5 for this study was not supported by the data, in which observability failed to make apposite impact on the consumer intention to adopt using digital payments types. A recent study on consumer innovations adoption also found that observability was not significantly related to intention (Arts et al, 2011). According to Meuter et al. (2005), observability may assist in showing positive outputs, which in turn may motivate the adopters to receive that innovation's rewards.

Digital payments types is purely an electronic application. The visibility of this innovation is not that apparent. To illustrate in more detail – a study on e-book reader (Jung et al., 2011) found that observability had a significant relationship with consumers' intention to use. This is because an e-reader is a whole instrument in itself which is visible when carried around, and whose outcomes can be observed at visibility, thereby significantly affecting the potential consumers' intentions. The case of DPAs, here, is a complete opposite. The use of these applications by an active user will not be evidently visible to the eyes of the others until done discussion the method of use DPAs and its consequences in a clear and detail manner with active users. This effectively makes DPAs less observable in comparison to other innovative products like tablets, e-readers, smart phones etc.

Similarly, with behavioural intention, the past studies have been in accordance with our findings – Taylor and Todd (1997), while studying the determinants of consumer composing behaviour found that behaviour was significantly influenced by behavioural intention. Shin (2010), in studying the policy implications of mobile virtual network adopter diffusion also found for behavioural intention to have a significant effect on the actual behavior. Hartshorne and Ajjan (2009), Sheppard, Hartwick, and Warshaw, (1988), and Ajzen (1991) to support that the previous literature also finds a strong association between actual behavior and the behavioral intention, which has also been confirmed in the DPAs context, in our study.

VI. CONCLUSION AND FUTURE WORK

6.1 Research Contributions and Practical Implications

This piece of work is a contribution to the existing literature on the diffusion of innovation attributes, as Rogers' five attributes were studied and tested in a new context with this study: DPAs in the Saudi Arabia context. According to the authors' best knowledge, the DPAs technology is very new in the Indian context, and there have been little research publications made on this technology yet. Hence, the findings from this study should succeed in providing the first insights into how Rogers' attributes, alongside cost, behave with behavioural intention and adoption aspects of the DPAs. Both, adoption and intention have been studied in parallel to augment the existing research paradigm with more constructive and broader results.

The findings from this study showed that observability of DPAs was poor, because of which this construct made no impact in building positive intentions of the consumers towards the DPAs. This result from our study thus indicates that it is important for the Shopping stores to rethink strategies on educating the target mass and making them aware of the positives of DPAs, to promote this application in the interest of improvising and attaining the desired type of financial transaction system in Saudi Arabia .

6.2 Conclusions

This study affirms the many established innovation adoption and diffusion notions established by former studies by extending them in the DPAs context. Using Rogers' innovation attributes, behavioural intention, we develop an integrative model to study the influence of these attributes on the adoption of the DPAs in the Saudi Arabia context. The results from this study yielded key insights concerning the determinants of

DPA's adoption from the proposed conceptual model. The model confirmed that a consumers' usage of DPAs could be predicted from their intentions. It also revealed that compatibility, and trialability were found to be the positive determinants of the consumers' intention to use the DPAs. The model also rendered relative advantage, lower complexity, and observability, as a negative determinant of the consumer's intention to DPAs.

6.3 Limitations and Future Research Directions

Although, the current research aims to study the diffusion of DPAs. In Saudi Arabia context, the data collected was limited to only four states representing each of the north, east, west, and south regions of Saudi Arabia. The other cities of the country may bear certain cultural differences that may facilitate or impinge the adoption of DPAs. The future researchers may focus on the cultural factors, and more importantly focus on gathering the data from more number of cities in the country to bring to light the differences in state-wise adoption of this application, if any. Also, future researchers may want to investigate issues such as social influences using qualitative data, which may also fairly impact the adoption of such payment innovations system based on the client's iris recognition, voice, silhouette, facial features, and typing style.

This study restricted its focus to only five of Rogers' innovation attributes, decision stage adoption process of DPAs as behaviour intention and adoption behaviour of study. However, there are other innovation attributes apart from Rogers' five attributes that have been used and reviewed in the past, but not as much as Rogers' attributes. One study that has remarkably reviewed and listed more of such innovation attributes is the meta-analysis presented by Tornatzky and Klein from 1982. They recognized 25 other attributes as innovation attributes, in addition to Rogers' five attributes. Another significant contribution in this field has been a study by Moore and Benbasat from 1991, wherein they developed an instrument to measure individual perceptions taking a total of eight attributes into consideration. It would be interesting to get an insight into how the adoption of DPAs is affected by these other innovation attributes. Therefore, the future research may shift focus towards studying these other innovation attributes in the DPAS context to attain a deeper understanding of its diffusion process.

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