Journal of Contemporary Issues in Business and Government Vol. 27, No.5,2021
https://cibg.org.au/

P-ISSN: 2204-1990; E-ISSN: 1323-6903

CRYPTOCURRENCY PERSPECTIVE: THE DRIVERS LEADING FROM AWARENESS TO ADOPTION- A CASE OF PAKISTAN

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ABSTRACT
Purpose: The purpose is to add constructive points in the existing literature by identifying drivers that encompass the journey from creating awareness tothe ultimate adoption of the cryptocurrency payment system.
Methodology: Certain aspects from the TAM Model, Innovation of Diffusion Theory, & AIDA Model are synthesized to form a holistic framework. To test the model, data from 250 digital banking users was collected via survey method and analysed through SEM.
Originality: This study has significance for marketers, traders, digital banking users, and ultimate buyers of cryptocurrency as it would help them identify which areas need to be addressed for tackling early adopters
Findings: Personal level characteristics significantly influence awareness, and adoption of cryptocurrencies. Perceived benefits and risks associated with the use of cryptocurrencies moderates the relationship between crypto-currency awareness and its adoption.
Implications: The multi-perspective framework is believed to synthesize debates and discussions in the existing literature and provide the basis for future research.
Keywords: Cryptocurrency, Adoption, Awareness, Innovation-Diffusion theory, Technology-Acceptance model, AIDA, Digital Banking

INTRODUCTION

The advent of the internet has led to online transactions among individuals located in different geographical locations. The economic exchange has changed various forms. Starting from barter trader, the exchange of currency backed by commodities, fiat-currency, and lately with virtual and online currencies such as crypto-currency. The cryptocurrency payment system is based on a blockchain system proposed and conceptualized by Satoshi Nakamoto in 2008 (Chakrabarti, 2017). Crypto-currencies, facilitated by the growth of the internet and computational power of computers, is the forerunner as the new dominant technology for financial exchanges.

Researcher in the field of cryptocurrencies payment system is underdeveloped (Carrick, 2016; Connolly, 2015; Jozef, 2015) and literature and academic research on the subject has started to emerge (Li, 2017). Despite the economic importance, enthusiasm, and buzz surrounding virtual currency. Cryptocurrencies have failed to develop widespread adoption among users (Moore, 2013). This means that there is a lack of awareness about crypto-currency among masses (Tsanidis et al., 2015). Majority of studies have viewed the rise of crypto-currencies from technical, security, and analytical perspectives (Li & Wang, 2017); however, none have studied this phenomenon from a marketing point of view. As the paradigm of service dominant logic process places the customers at the center of value co-creation, motivation among customers for awareness and adoption should be focused. This approach is also relevant in peer-to-peer networks and researchers must concentrate on customers (Song, 2007). But, very little research work has been done on these digital currencies from the perspective of their users (Ermakova et al., 2017), and research regarding social behaviors, user's attitudes, and adoption of crypto-currencies is in developing stage (Abramova, 2016). This has motivated us to investigate whether crypto-currency is well-recognized among digital banking users? What could be the possible drivers of crypto-currency awareness, and what perceived benefits and risks are associated while adopting the crypto-currency payment system?

Researchers have applied Technology Acceptance Model (Abramova & Bohme, 2016; Li & Wang, 2017) and Diffusion of Innovation Theory (Connolly& Kick, 2015; Kumpajaya & Dhewanto, 2015) to explain

P-ISSN: 2204-1990; E-ISSN: 1323-6903

adoption of digital currencies. Abramova and Bohme (2016) posit that there are very few fundamental frameworks in the literature of crypto-currencies. This study aims to fulfil this gap in literature by applying AIDA Model and combine it with TAM theory and characteristics of early adopters from Diffusion of Innovation Theory to provide a more comprehensive understanding of journey from awareness to adoption of crypto-currencies. Also, we are using the effect of social networks on the adoption process which is neglected in the TAM model. Thus, this study is one of the fewest ones which have attempted to apply different aspects of renowned theories and contribute to still developing literature on digital currencies. Such a multi-perspective framework is believed to synthesize debates and discussion in the existing literature and provide the basis for future research (Connolly& Kick, 2015; Li & Wang, 2017).

The conditions for awareness and adoption of cryptocurrency payment system could be described as a "fire triangle"; where fire needs fuel, oxygen, and heat to exist. Similarly, cryptocurrency payment system needs user acceptance, vendor acceptance, and innovation to flourish. In the absence of any of these three elements, crypto-currency may not become a truly legitimate mainstream payment system (Team, 2016; DeVries, 2016).

The main objectives of this exploration are:

- To identify which adopter characteristics, drive awareness regarding cryptocurrency payment system
- To explore the journey from awareness of cryptocurrency payment system to its adoption
- To analyze the moderating influence of perceived benefits and risks among cryptocurrency payment system awareness and adoption

Literature Review

Just like the traditional coin currency gave way to paper currency, now crypto-currency is emerging as an alternative for economic exchange between buyers. Although the concept of digital currencies was introduced by Chaum (1983), it was Satoshi Nakamoto (pseudonym) who proposed the block chain method in his white paper published in 2008. The basic philosophy behind this idea was the need to establish "an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party" (Nakamoto, 2009; cited in Darlington, 2014). As a result, different crypt-currencies such as Bitcoin, Litecoin, and Ethereum have been developed which are gaining popularity (Li & Wang, 2017). Crypto-currencies are quickly emerging as a potentially disruptive technology for transmission and exchange of money. Backed by online payment protocols, peer-to-peer communication, decentralized system, and public-key cryptography, digital currencies are causing financial revolution (Abramova &Bohme, 2016). These are not backed by government commitment; therefore, these currencies are generated, and their prices are set by an algorithm which is later verified by anonymous parties by an informational transparency system (Jozef, Dana, &Vejacka, 2015; Kristoufek, 2015; Zulhuda & Sayuti, 2017). These currencies are not supervised by a central authority, which means that no one can control, accelerate or slow down the exchange of these virtual currencies (Jozef, Dana, &Vejacka, 2015).

Perceived benefits of cryptocurrency payment system

Individuals and firms have begun to use cryptocurrencies for many reasons. The popularity of digital currencies can be attributed exclusion of financial intermediaries (Levin, 2013; Mullan, 2014; Zulhuda & Sayuti, 2017), very little transaction cost (Abramova& Bohme, 2016; Gibbs &Yordchim, 2014; Kristoufek, 2015; Mullan, 2014), faster and direct transfer (Abramova& Bohme, 2016), anonymity and privacy (DeVries, 2016), potential replacement of traditional banking (Carrick, 2016), security due to peer to peer network (Abramova& Bohme, 2016).

Crypto-currencies are independent of geographical constraints. These currencies can be used to boost global trade between two countries especially under-developed ones (DeVries, 2016). Firms are also realizing the importance of using cryptocurrencies which allows the faster exchange of transactions particularly between international business firms, that too at a low cost. This exchange is very much safe as high computational power is required to generate or duplicate a crypto-currency (Darlington, 2014). Lastly, crypto-currencies are the solution for a large segment of people who don't use conventional banking (DeVries, 2016). It also provides users with anonymity which is preferred by many individuals and firms (Moore, 2013).

Perceived risks of cryptocurrency payment system

But virtual currencies are anything but perfect as there are several risks associated with their use. The proponents of crypto-currencies claim that these instruments provide complete anonymity to the users. Unlike traditional banking systems, crypto-currencies are open to access and its transparency verification system means that each transaction can be viewed by anyone (Connolly& Kick, 2015). This semi-anonymity and privacy issues are undesirable for some adopters, and even active users (DeVries, 2016; Ermakova et al., 2017). Legitimate users want to keep their spending habits secret (Sasson et al., 2014). For this lack of anonymity, people are leaving or planning to leave crypto-currencies. Fabian, Ermakova, and Sander (2016) report that every second Bitcoin users have concerns about the anonymity in the Bitcoin network; while every fifth user is planning to leave Bitcoin due to these issues.

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It was alleged that certain crypto-currencies were manipulated by different means such as generating more blocks through illegal pre-mining, false-positive statements, hoarding, pumping and dumping schemes, etc (Jozef, Dana, & Vejacka, 2015). Such huge variation causes doubt in the mind of adopters (DeVries, 2016) and led to huge debates aboutthe effectiveness of these crypto-currencies as a medium for transaction and exchange (Li & Wang, 2017).

Credibility and trust among users regarding cryptocurrency payment systems

Although crypto-currencies are not backed by any material, such as gold, or government guarantee, it is still being used by individuals and firms similar to fiat currency. This value stems from the trust and willingness that if a person or firm accepts payment in the form of crypto-currency, they could use the same elsewhere for payment purposes (Abramova & Bohme, 2016; Kelly, 2014). The value of such digital currencies is embedded in the acceptance and trust between parties (DeVries, 2016).

The news of hacks and theft of different crypto-currencies also causes credibility issues (Ermakova et al., 2017). Certain measures adopted by these digital currencies make them susceptible to fraudulent practices. For example, in Bitcoin the transactions are irrevocable. A transaction done in the crypto-currencies cannot be undone. This means that if the wallet of the user is corrupted or lost, it cannot be retrieved (Jozef, Dana, &Vejacka, 2015).Tsanidis et al., (2015) have found out that a small fraction of active users of Bitcoin trust its security policies while majority of users took a defensive stance. Similar results are obtained in the study conduted by Presthus and O'Malley (2017) who found that the non-users are raising concerns about value and security of Bitcoin. For this reason, many non-users are waiting for others to adopt the technology.

Social network influence via electronic word-of-mouth

Value of cryptocurrencies is also residing in the ecosystem and networks where it is used (DeVries, 2016). For instance, a study conducted by Garcia et al (2014) shows that word of mouth may be attributed to as price hype and rapid growth of Bitcoin. Song and Walden (2007) believe that the value of a peer-to-peer network depends upon its number of members. Since crypto-currencies are network-based peer to peer system, the higher number of users creates positive externalities and foster adoption process (Li & Wang, 2017). These social factors have a significant influence on whether people will opt to use crypto-currencies or not (Abramova & Bohme, 2016). So, we can conclude that interaction in the social network has a major influence on the adoption-related decisions (Song & Walden, 2007).

Theoretical Model Development

a. Individual factors of adopters affecting awareness of crypto-currencies payment system

As crypto-currencies have emerged as disruptive technology such tends to risk the traditional monetary exchange involving fiat currencies, it is important to study factors that influence awareness and adoption of digital currencies (DeVries, 2016). Different studies such as Henry, Abramova and Bohme (2016), Huynh, and Nicholls (2017), Kumpajaya and Dhewanto (2015), Presthus and O'Malley (2017), Tsanidis et al. (2015), have been conducted which highlights different factors which can encourage or inhibit a person usage of virtual currencies. In their research of Henry, Huynh, and Nicholls (2017) have found that around 64% of Canadians are aware of Bitcoin; however, only 2.7% of people own it. Bohr and Bashir (2014) have found that anonymity, independence, and lack of trust in conventional banking practices motivated people to use Bitcoin. In these studies, the educational background and knowledge of the potential users regarding crypto-currencies have been declared as an important antecedent to its awareness and adoption. Henry, Huynh, and Nicholls (2017), after their research, have inferred that knowledge and awareness about Bitcoin is correlated with its adoption. Also, income level affects the usage of virtual currencies. Henry, Huynh, and Nicholls (2017) have found Canadian people having annual income below 30,000 Canadian dollars have very little awareness about Bitcoin as compared to people of all other income categories. On the other hand, 72% of people having income greater than 100,000 Canadian dollars were aware of Bitcoin.

According to Innovation Diffusion Theory (Rogers, 1962), there are five categories of users. innovators, early adopters, early majority, late majority, and laggards. For this study, we are focusing on early adopters which constitute around 13.5% of the total users. As mentioned earlier, researchers have highlighted certain characteristics of the early adoption of digital currencies. These characteristics include educational background, income level, and familiarity with digital banking, and personal initiatives & characteristics which can have a significant influence on their awareness, which in turn affect the adoption of crypto-currencies.

Hypothesis No.1: Individual characteristics of early adopters (educational background, income level, and familiarity with digital banking, personal initiatives, and characteristics) have a significant influence on awareness of cryptocurrency payment systems.

Hypothesis No.2:Awareness of Cryptocurrency payment system significantly influences the ultimate adoption

b. Moderating Factors affecting the relationship between awareness and adoption of crypto-currencies

Technology Acceptance Model has three main dimensions viz perceived usefulness, perceived ease of use, and perceived risk. "PU is a measure of the individual's subjective assessment of the utility offered by the new IT in a specific task-related context. PEOU is an indicator of the cognitive effort needed to learn and to

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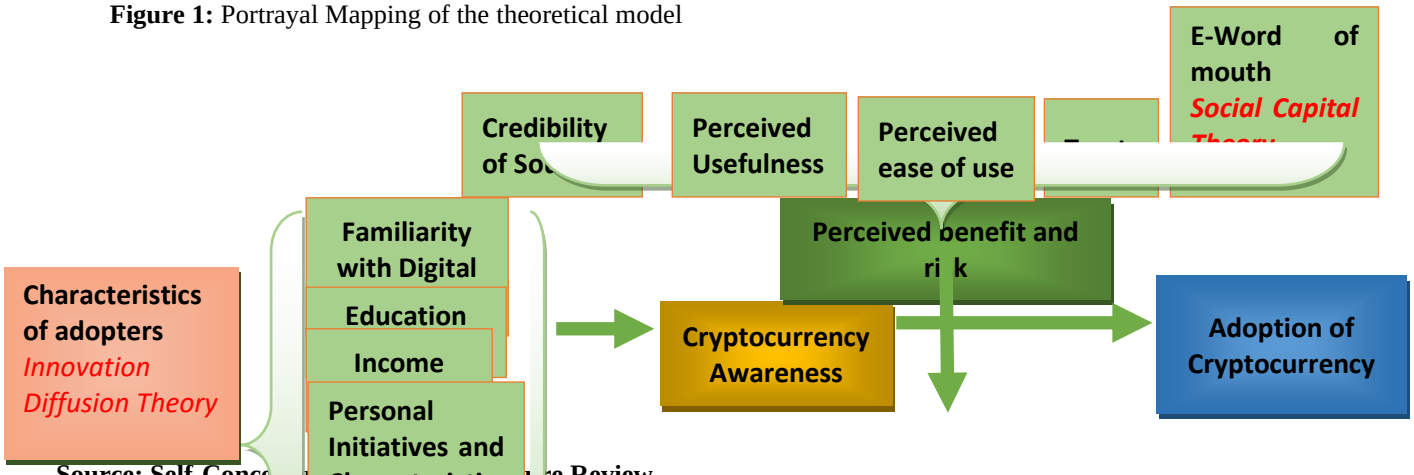
utilize the new IT" (Gefen, Karahanna, & Straub, 2003, p. 54), while the perceived risk is "uncertainty regarding possible negative consequences of using a product or service" (Featherman & Pavlou, 2003, p. 453). Kumpajaya and Dhewanto (2015) perceived usefulness and ease of users positively affect user's intention to use Bitcoin, while the perceived risk is negatively associated with it. Perceived risks may inhibit the adoption of crypto-currencies as people may fear loss due to the impersonal nature of transaction (Abramova & Bohme). For this purpose of this study, perceived risk is measured in terms of credibility and trust issues as according to different authors, trust and willingness of both parties dictate value of crypto-currencies (Abramova & Bohme, 2016; DeVries, 2016; Kelly, 2014).

To gauge the strength of the social network, word of mouth is being used as a suitable measure. Garcia et al (2014) claim that positive word of mouth in the form of tweets and re-tweets can be used as a predictor for the price increase and diffusion of Bitcoin. This shows that the strength of the network plays a vital role in the adoption of crypto-currencies (Connolly& Kick, 2015). Based on the above argument, we offered our third hypothesis

Hypothesis No.3: The journey from awareness of cryptocurrency payment systems to adoption is moderated by perceived benefits and risks associated with crypto-currency.

Figure 1: Portrayal Mapping of the theoretical model



Source: Self-Conce re Review

Methodology

In this study ing positivist standin on epistemological stance, we used deductive approach when we analyse literature, a inductive was used w en we interpreted the results of our survey. A questionnaire survey is used as the prima data collection instru ent of this research. The targeted population for this study is the digital banking user as they better aware f payment systems)**.** We used the convenience sampling method. Our sample size consists of 250 digital banking users (based on regression assumption of Heir et.al (2007), 5 respondents against 1 measured item).

Data analysis and findings

To check the reliability of the scales being used in this study, we run reliability analysis using IBM SPSS Statistics 21 software. Our results show that we have Chronbach alpha value greater than 0.5 which is showing the scale's internal consistency (Heir et al, 2010).

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Table 1: Reliability of the scale

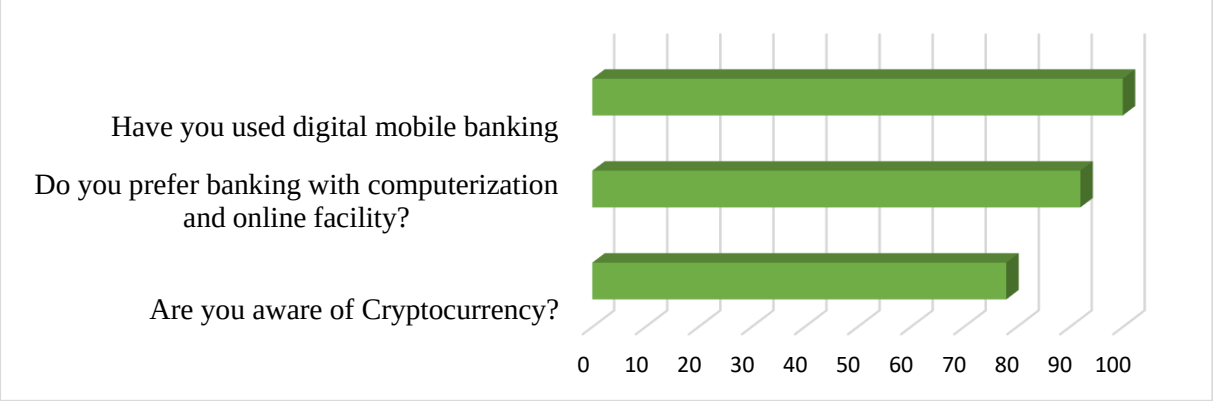
Constructs	Cronbach's Alpha	No.of Items	Scale Adopted/Adapted from
Familiarity with Digital Banking	0.704	4	David Jefen(2000)
Personal Initiatives and Characteristics	0.818	7	Shang Gao (2011)
Cryptocurrency Awareness	0.773	5	BoongheeYoo (1999)
Credibility of Source	0.857	8	Mark Douglas West (1994)
Perceived Usefulness	0.721	4	Shang Gao (2011)
Perceived Ease of Use	0.776	5	Shang Gao (2011)
Trust	0.783	7	David Jefen(2000)
Electronic Word-of-Mouth	0.803	7	Isabelle Goyotte (2010)
Adoption of Cryptocurrency	0.672	3	Shang Gao (2011)

Source: Output of SPSS Software

Respondent's Profile

The first question to proceed for responses was about the use of digital mobile banking and 100% of responses that we selected for analysis were only those who said yes. Additionally, 92% of respondents prefer banking services with computerization/online facilities, and 78% of the respondents have awareness about the word 'cryptocurrency'.

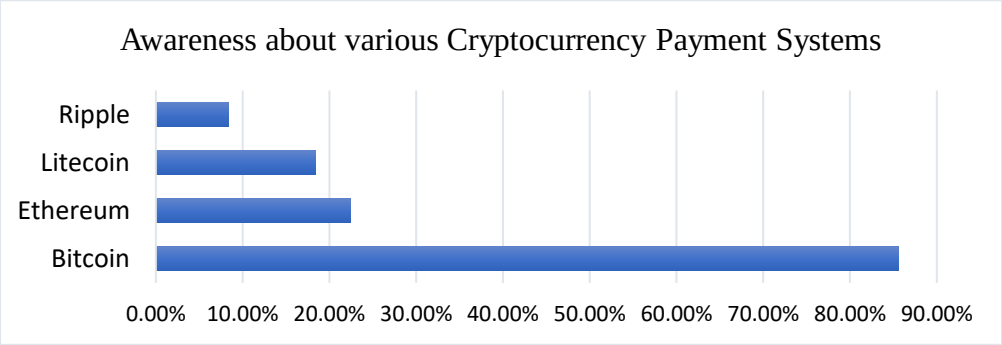
Figure 2: Personal profile of respondents



Source: Output of SPSS Software

Amongst the cryptocurrency payment systems, 88% of the respondents know about Bitcoin, 22% know about Ethereum, 18% about Litecoin, and only 8% know about Ripple.

Figure 3: Awareness about various cryptocurrency payment systems



Source: Output of SPSS Software

Among the digital banking users, the majority of the respondents were having Graduate degrees with an income level of almost reaching equally among 40,000 rupees till 91,000 rupees and above.

Figure 4: Education and Income level of respondents

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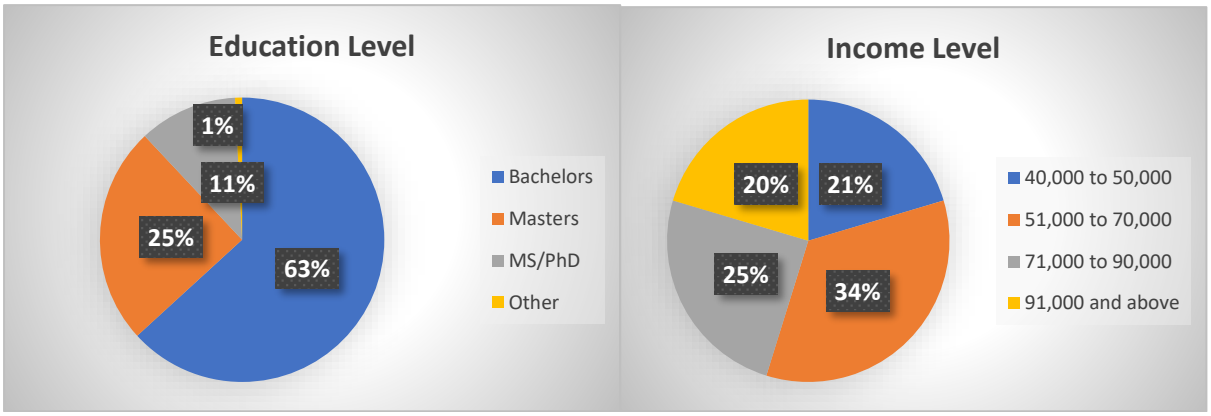

Source: Output of SPSS Software

Hypothesis Testing:

Findings of H1: By running linear regression for identifying drivers (early adopter characteristics) of cryptocurrency payment system' awareness we found that all variables have a significance influence on awareness having p-values < 0.05 (Heir-et al 2010).

Table No. 2: Regression values of Awareness drivers

Model		Unstandardized Coefficients B	Std. Error	t	Sig.
1	(Constant)	.181	.204	4.322	. .000
	Education level	.141	.044	.926	.021
	Income Level	.035	.030	1.168	.031
	Familiarity with Digital Banking	.345	.057	6.082	.000
	Personal Initiatives and Characteristics	.422	.058	7.254	.000

Source: Output of SPSS Software

R square value indicates that 53.6% of the variation in awareness of cryptocurrency payment system is explained by early adopter characteristics used (Table3) and our model is overall a good fit having p-value < 0.05, F=70.729 at df (1,249). Therefore, our H1 is accepted as education level, income level, familiarity with digital banking, and personal initiatives and characteristics have a significant influence on awareness of crypto-currency payment system. These results are consistent with the study of Henry, Huynh, and Nicholls (2017) have found that Canadian people having college or university level education are aware of Bitcoin, and mostly young people having high school level education own it. Similarly, Tsanidis et al., (2015) have found that there is a significant relationship between possession of wallet of Bitcoin and educational level of user.

Table No.3: Model summary of cryptocurrency payment system awareness

Model	R	R Square	F	Sig.
1	.732[a]	.536	70.729	.000[b]

a. Predictors: (Constant), Personal Initiatives and Characteristics, Income Level, Education level, Familiarity with Digital Banking

b. Dependent Variable: Cryptocurrency Awareness

Source: Output of SPSS Software

Findings of H2: To test the H2 we run SEM on IBM Amos 21 and found that cryptocurrency awareness (T.A) has a significant influence on cryptocurrency adoption (T.Adopt) with a beta value of 0.634 (1 unit change in awareness causes 0.634 units to change in adoption) and p-value of 0.000 (p<0.05**)**(Table4). Direct effect 'R square' value is .570 which shows that 57% of the variation in cryptocurrency adoption is explained by cryptocurrency payment system awareness (see model 1 in Table 5)

Figure 5: Awareness-Adoption model (without moderation effects)

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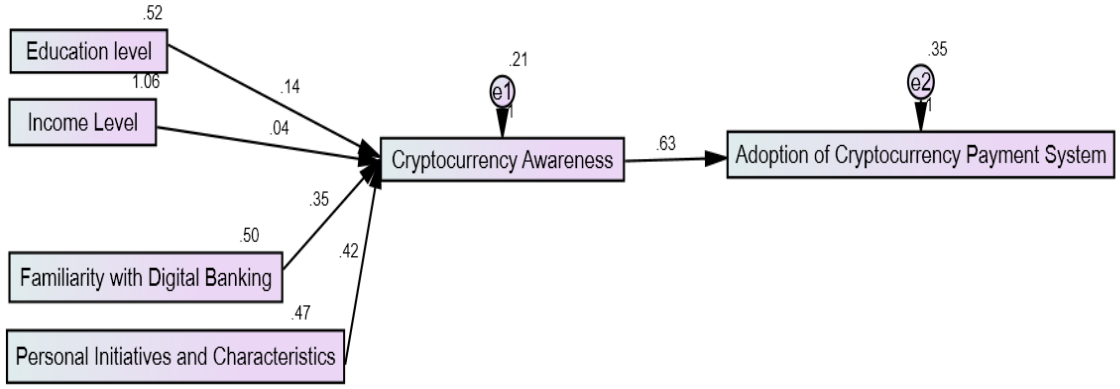

Source: Output of SEM, AMOS Software

Table No.4: Simple awareness-adoption model without moderating variable

			Beta Estimate	S.E.	P-value
T.A	<---	Education	0.141	0.04	0.031
T.A	<---	Income	0.035	0.028	0.021
T.A	<---	T.F	0.345	0.041	0.000
T.A	<---	T.PIC	0.422	0.042	0.000
T.Adopt	<---	T.A	0.634	0.062	0.000

Source: Output of SEM, AMOS Software

Here model 1 indicates awareness-adoption model and model 2 shows awareness-adoption model with moderating influence of perceived benefits and risks (Table5)

Table No.5: Awareness-adoption model summary

Model	R	R Square	Adjusted R Square
1	.755[a]	.570	.567
2	.760[b]	.578	.573

a. Predictors: (Constant), Perceived Benefits and Risk, Cryptocurrency Awareness

b. Predictors: (Constant), Perceived Benefits and Risk, Cryptocurrency Awareness, Awareness*PBR

c. Dependent Variable: Adoption of Cryptocurrency Payment System

Source: Output of SEM, AMOS Software

Findings of H3: To check the moderating influence of perceived benefits and risk (T.PBR, including trust, credibility, perceived usefulness, perceived ease of use, e-word-of-mouth) on the journey from awareness of cryptocurrency payment system to its adoption we run SEM with interaction effect as suggested by Baron Kenny (1986). Firstly, we computed the interaction variable (Awareness*Perceived benefits and risks) and then run SEM with moderation effects.

Our results indicated that the interaction term has a significant influence on the awareness and adoption association thereby, accepting our H3. In Table 5, model 2 explains the interaction model's R square value which is being increased to 57% to 57.8% showing that the moderation effect of perceived benefits and risks has made stronger the relationship of awareness to adoption. In table 6, overall model results have been indicated from awareness(T.A) till adoption(T.Adopt) moderated by perceived benefits and risks(T.PBR). the p-value is less than 0.05 thus, our hypothesis is accepted.

Table No.6: Awareness-adoption model with moderation effects

			Beta Estimate	S.E.	P-value
T.A	<---	Education	0.141	0.04	0.031
T.A	<---	Income	0.035	0.028	0.021
T.A	<---	T.F	0.345	0.041	0.000
T.A	<---	T.PIC	0.422	0.042	0.000
T.Adopt	<---	Awareness*PBR	0.137	0.007	0.000
T.Adopt	<---	T.PBR	0.468	0.055	0.000
T.Adopt	<---	T.A	0.519	0.05	0.000

Source: Output of SEM, AMOS Software

Figure 6: Awareness-Adoption Model with moderation effects

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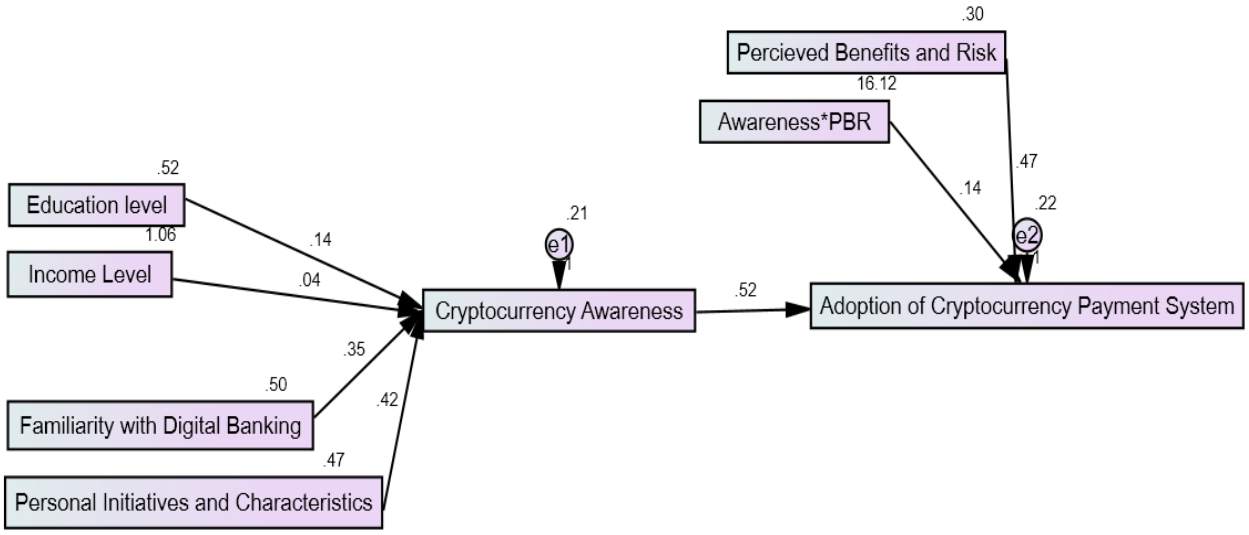

Source: Output of SEM, AMOS Software

Lastly, the model validity is verified by goodness-of-fit measures (Heir-et al 2007) and our model disclosed following values;

Table No.7: Model Validity Standards

1. Absolute indicators	**Model Values**	**Reference Values**
Normed Chi-square (x^2/df)	0.97	> 0.92 Good-fit
GFI	0.92	> 0.80 Good-fit
2. Relative indicators		
Comparative fit index (CFI)	0.96	> 0.92 Good-fit
3. Parsimony indicators		
PCFI (parsimony comparative of fit index)	0.65	> 0.6 Good-fit
PGFI (parsimony goodness of fit index)	0.77	> 0.6 Good-fit
4. Discrepancy per degree of freedom		
RMSEA (root-mean-square error of approximation)	0.072	< 0.08 Good-fit

Source: Output of SEM, AMOS Software as per assumptions of Heir-et al, 2007.

Discussion and Conclusion

By exploring the literature and cryptocurrency payment system-related concepts we tried to add some constructive points in the existing literature by identifying some drivers that encompass from creating a glimpse of awareness till ultimate adoption of the cryptocurrency payment system by digital banking users. Despite the economic importance, enthusiasm, and buzz surrounding cryptocurrency, there is a lack of awareness about cryptocurrency payment systems among the masses. Even the literature on the adoption of cryptocurrency payment systems is in infancy. According to *Innovation Diffusion Theory*, only innovators and early adopters are using this technology, and a large number of customers are still unaware of the existence of cryptocurrency. *Technology Acceptance Model* posits that people are unable to differentiate between the perceived usefulness and risks associated with the use of these non-conventional currencies. Pakistani people can benefit from the relatively cheaper cost of internet and cellular data, and they can stay put with the rest of the world in the usage of virtual currencies as Paperless Pakistan is our future!

Our findings indicated the need for Paperless Pakistan, having more digital currency payment systems than old paper money. Our first hypothesis showed the drivers of cryptocurrency payment system awareness by early adopter characteristics and results supported our argument that all four variables (Income, education, familiarity, personal characteristics) have positive and significant (R square=53.6%, p=0.000) influence on

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awareness. our second hypothesis was about the influence of awareness on adoption, our findings suggested that awareness of cryptocurrency payment systems has a positive significant influence on adoption (R square=57%, p=0.000). Finally, our third hypothesis was also accepted by depicting the strong moderating influence of perceived benefits and risks on awareness to the adoption of the cryptocurrency payment system (R square=57.8%, p=0.000) thereby, showing that digital banking users who are aware of cryptocurrency payment system if find greater credibility of the source, positive word-of-mouth, perceived ease of use, perceived usefulness and trust then they are likely to be the ultimate adopters of cryptocurrency payment systems.

Limitations and future recommendations

We incorporated fewer early adopter characteristics so future studies may incorporate some other dimensions as well. Another limitation could be our unit of analysis as we only considered digital banking users, future studies may add some other users of cryptocurrency for enhancing generalizability. We used the perceived risks and benefits term explaining 6 variables in it, future studies may include anyone of them or all of them separately for testing the moderating influence. Future researchers may incorporate other mediating and moderating variables to fully discover the phenomenon behind the awareness-adoption journey.

Practical Implications

This study has significance for marketers of cryptocurrency payment systems, traders, digital banking users, and ultimate buyers of cryptocurrency as it would help them identify which areas need to be addressed for tackling early adopters, a multi-perspective framework is believed to synthesize debates and discussion in the existing literature and provide the basis for future research.

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