EXAMINING CONSUMER BEHAVIORAL INTENTION TOWARDS CRYPTOCURRENCY ADOPTION READINESS IN PAKISTAN: A RELIGIOUS PERSPECTIVE

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ABSTRACT

Cryptocurrencies have reshaped the global fintech landscape by providing an alternative system of digital payments, investments, trading, and exchange, thereby eliminating the constraints set by the traditional currencies. Likewise, cryptocurrencies offer enormous potential to revolutionize the financial markets of Pakistan. This research was thus aimed at examining the underlying factors that shaped individuals' behavioral intentions to adopt cryptocurrencies under the moderating influence of religion. Using a survey method, the data were collected from 220 professionals who worked in insurance, banking, investment, and trading firms in Pakistan. The data were subsequently processed for multivariate analyses using the smart PLS tool. This research contributes to the theory & research of and policy implications on cryptocurrencies by suggesting novel insights on their potential adoption and promising growth prospects in Pakistan. Notably, the results also reveal the level of influence that religion has on people when it comes to the adoption of these currencies in Pakistan an Islamic state.

Keywords: *Cryptocurrencies; Financial Markets; Fintech; Religiosity; Islamic Countries; Behavioral Intention; Technology Acceptance Model; Theory of Planned Behavior.*

INTRODUCTION

During the past two decades, the ever-increasing opportunities for globalization and digital connectedness have witnessed substantial technological progress at the global landscape. These changes have resulted in improved digital communications and data sharing capabilities, leading to efficient service delivery operations (Rehman et al., 2022).

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However, these positive impacts of globalization are not evenly distributed among all the sectors and industries, especially the benefits are not being realized by the trade and business sector in the developing countries (Almajali et al., 2022). The traditional system of payment transfers and cash-based trading methods are still a norm in many of the developing countries.

Recently, an important development in the areas of fintech is the advent of virtual currencies as a method of digital payments. Cryptocurrencies are currently being used by the developed world as an evolving system of digital payments (Al-Naimi et al., 2021). The cryptocurrency is also known by many other names including token, e-currency, crypto-token, virtual good, cyber money, effective assets etc (Law Library of Congress, U.S, 2021; Aysan et al., 2021). Assisted by the blockchain technologies that allow making payments and recording receipts, the cryptocurrency makes it possible to send money directly without the participation of banks or other third parties (Yeong et al., 2019; Ermakova et al., 2017).

Satoshi Nakamoto, a pseudonym used by the creator(s) of bitcoin, was reportedly the one who introduced bitcoin in the market as the first cryptocurrency in 2008. The first bitcoin commercial transaction was made for 25 USD for two pizzas against 10,000 BTC (Almajali et al., 2022). After that transaction, bitcoin's value grew dramatically, and that was how it was typically utilized for simple bitcoin trading activities. By 2022, cryptocurrency had developed into a sizable instrument for trading and making short-term payments. The value of a single bitcoin was around USD 67,000 in 2021, witnessing a huge increase over the 12-year period. Salvador was the first country to consider cryptocurrency as legal cash, and it is now extensively used in different sectors and retail establishments (National Bureau of Economic Research, 2022; Mohammad et al., 2022). While bitcoin exchange is unique as it takes place on structured exchanges, nevertheless, its prices are still unregulated (Al-Bashayreh et al., 2022).

The first article on cryptocurrencies was published in 2011, and the first research on this topic was published by reputed peer-reviewed journals in 2013 (Baur et al., 2015). Many studies have lately looked at cryptocurrencies and their effects on different businesses. It is pertinent to highlight that these studies mostly focused on the economic impact of the cryptocurrencies or exchanging them for profit purposes. As of 2022, numerous studies have examined the use of cryptocurrencies, and the variables that affected consumer's decision to trade or use them (Ermakova et al., 2017). In this regard, research has been

done to better understand the process of adoption by various business sectors and industries as well as directly by the individual users, especially the bitcoin as the most adopted cryptocurrency (Mohammad et al., 2022).

In Pakistan, the cryptocurrencies have yet not been legalized by the state bank, however considering the increased prospects of its acceptance by the government in near future, it is likely to become a preferred payment, trading, and investment option for many individuals (Express Tribune, 2023; Yeong et al., 2019). Besides, the earlier studies on the use of cryptocurrencies and blockchain technologies have mostly concentrated on developed economies like Europe, UK & USA (Al-Amri et al., 2019). The current research on virtual currencies in Pakistan has not gained much momentum as the prior published research in these areas hardly took into account the underlying factors that could potentially influence their acceptance in Pakistan such as risk, perceived ease of use, government regulations, security aspects etc. More importantly, the current research also clearly lacks a local religious perspective on the adoption of such currencies by the Pakistani consumers. In short, there is currently a dearth of context specific research and general public awareness about cryptocurrency applications for online banking, trading, payment & investment purposes. This calls for new avenues of research governing cryptocurrency adoption in Pakistan. Accordingly, the key question that formulated this research was: *What are the factors that shape Pakistani individuals' behavioral intention towards utilizing cryptocurrencies for financial transactions, investments, and trading purposes?*

The succeeding research sections are ordered as follows: The literature review conducted in Section 2 gives a reasonable account of the research done governing cryptocurrency adoption and use in general and its potential adoption in the context of Pakistan in particular. The literature is backed by the relevant theories and behavioral factors that support the key research question of this study. Later, section 3 discusses the proposed research model consistent with the gaps in the literature along with the underlying hypothesis statements. After that, section 4 presents the methodology chosen for this research. This proceeds to Section 5 on analyses & results that form the basis of discussions in Section 6, leading to the implications & contributions of this research (Section 7), not to mention its limitations (Section 8) that eventually end up in the conclusion (Section-9), summing up the entire research.

LITERATURE REVIEW

Cryptocurrencies

The idea of digital currencies has been around for more than three decades (Hemantha, 2021). The digital money concept was first introduced by David Chaum in 1983. In his research, he discussed different ways of paying for purchased products & services. However, this concept was not formally utilized until the introduction of bitcoin in 2008 (Bashayreh et al., 2022). Nowadays, cryptocurrency has become one of the commonly used digital currencies that employs cryptologic techniques as a medium of exchange and for storing values (Aggarwal et al., 2019). Bitcoin technology is characterized by a digitalized ledger that serves as a computerized database and records as to which coins are owned by whom. Strong cryptographic methods are used to safeguard ledger entries to prevent unauthorized changes (Express Tribune, 2023; Investopedia, 2022). In general, cryptocurrencies fall into one of two groups: i) Centralizing direct regulation and ii) Decentralizing indirect parameters (Al-Bashayreh et al., 2022; Hemantha, 2021).

Cryptocurrencies in Pakistan

The State Bank of Pakistan (SBP) had imposed a complete ban on all types of virtual tokens and assets when the advanced economies began to recognize cryptocurrencies and embraced the revolution in the Financial Technologies (Fintech) domain. Thus, after careful risk-benefit analyses, the SBP declared that bitcoin and other cryptocurrencies would pose greater risks to Pakistan's economic & physical security and as such, the risks of cryptocurrencies would outweigh its potential benefits (Reuters, 2022). The fintech aficionados questioned this decision and even said it was an archaic legislation (Kayani et al., 2021). Yet when considered logically, the SBP's decision to outlaw virtual currencies including the cryptocurrencies appeared to make sense.

Pakistan has made huge efforts by taking Anti-Money-Laundering (AML)/Countering-the-Financing-of-Terrorism (CFT) actions in traditional banking, trading, and financial activities, thus preventing it from being placed on the FATF's blacklist (Express Tribune, 2021; Yeong et al., 2019). In the wake of such measures, the legalization of cryptocurrencies and virtual assets having the ability to facilitate anonymous transactions between the parties in the financial markets of Pakistan would have complicated its stance before FATF (Reuters, 2022; Ullah et al., 2021).

In Pakistan, cryptocurrencies are seen as a breakthrough when it comes to financial crimes like tax evasion, terrorism financing, cybercrime, corruption, abduction for ransom, etc. If any illicit

cryptocurrency exchange operates without any AML/CFT processes in place, Pakistan's economic security would be at a risk. Yet another issue with cryptocurrencies was that these could be used as a tool by the terrorists to not only fund their evil operations in Pakistan but also illegally transfer money overseas that will remain undetected by the government (Kayani et al., 2021). Thus, a situation like this could be concerning for international organizations combating to stop money laundering throughout the world (Ullah et al., 2021; Yeong et al., 2019). Hence, allowing financial transactions via such currencies could put the country's economy at a loss, thereby adding to the financial difficulties of the country. As a result, cryptocurrency was mostly considered a significant threat to Pakistan's AML/CFT initiatives and it is because of this that these currencies are still banned in Pakistan (Kayani et al., 2021).

Technology Acceptance Model (TAM)

To illustrate the use of computers and related devices, Davis (1989) introduced the TAM. Later on, Pavlou & Featherman (2003) and Venkatesh & Davis (2000) made extensions in TAM (Legris et al., 2003). According to TAM, peoples' attitudes toward adopting technologies is substantially affected by their notion of perceived ease of use & perceived utility towards those technologies (Almajali et al., 2022; Davis, 1989). Consumers would be more inclined towards cryptocurrencies if they think doing so would make their financial payments, trading options, and investment portfolios better. The perceived ease of use suggests that the users of cryptocurrencies are more likely to do so if they find it simpler to use (e.g., trading, or investing in cryptocurrencies). TAM was first intended to gauge individuals' viewpoint on accepting new technologies based on their utility & usability as the key determinants, nonetheless, additional factors like the accessibility of resources and social influence should have also been considered in the TAM to get more meaningful insights on how individuals perceive and utilize technology (Almajali et al., 2022; Legris et al., 2003).

Cryptocurrency Adoption Perspective of TAM

The two key aspects that guide an individual's attitude to cryptocurrency are perceived risks & perceived benefits. An individual's perceived benefits reflect their favorable perceptional belief in using cryptocurrencies. On the other hand, perceived risk conveys negative perceptions and skepticism about the use of cryptocurrencies. Numerous research areas (such as crowdsourcing, mobile microfinance, online banking, online retail, etc.,) have employed the TAM. In general, the TAM has been mostly applied in the context of research that involves the adoption of new technologies or technological systems (Almajali et al., 2022). The primary aim behind

contextualizing TAM was to evaluate the factors (especially the technological factors) affecting cryptocurrency adoption in Pakistan.

Theory of Planned Behavior (TPB)

The TPB predicts individuals' rational decision-making behavior (Ajzen, 1991). The main idea was to enhance the predictive accuracy of the 'Theory of Reasoned Action' by incorporating perceived behavioral control as a variable in TPB (Sheppard et al., 1998). The TPB propounds that the behavioral intention of an individual is collectively shaped by three factors: i) subjective norms, ii) attitude, and iii) perceived behavioral control and that the behavioral intention consequently serves as a determinant of human social behavior in various life domains (Downs & Hausenblas, 2005; Sheppard et al., 1998).

Link Between Behavioral Intention Factors & Cryptocurrency Adoption Intention

Cryptocurrency adoption is guided by several factors that influence the behavioral intention of an individual. One important factor driving this behavior is the Perceived Ease of Use which indicates to what extent the people are confident in using new technologies. Prior studies have demonstrated a positive link between behavioral intention factors & cryptocurrency adoption intention. These studies argue that there is a need to reduce technological barriers that hinder the use of cryptocurrencies (Chen & Aklikokou, 2019). Cryptocurrencies such as Bitcoin networks include a range of computing equipment and devices like laptops & smartphones which can be conveniently accessed and utilized (Miau & Yang, 2018). Therefore, technological awareness assists in smoothly adopting cryptocurrencies. This has led to an increased rate of adoption of these currencies especially in the western countries during the past couple of years (Atem, 2023).

Overall, on the basis of the above scholarly discussions, it is evident that most of the research on cryptocurrencies focused on their adoption in the advanced country context, especially the Western economies (Investopedia, 2022; Kayani et al., 2021). Thus, there is a scarcity of research in relation to cryptocurrency adoption in developing countries, particularly in the country like Pakistan. While many people in Pakistan are aware of cryptocurrencies, hardly a few of them utilize these, and as such their adoption has remained at its infancy (Noreen et al., 2021; Walton & Johnston, 2018). Besides, their non-compliance with Islamic sharia laws is yet another issue hindering the cryptocurrency adoption. Being the followers of Muslim faith, the people of Pakistan as such are under a confusion as to whether the trading & investment in cryptocurrencies is haram (unclean) or halal (clean). Thus, this research would perhaps be the

first one to evaluate individuals' adoption intention from the religious perspective, and as such 'Religiosity' would be incorporated as one of the key research variables.

RESEARCH MODEL & HYPOTHESES DEVELOPMENT

Research Model

After conducting an in-depth review of literature, the below research model was developed. In this context, the prior scholarly models such as TAM and TPB were also used as supporting theoretical frameworks while proposing this model. The model incorporates relevant variables such as: Perceived Ease of Use, Perceived Value, Perceived Risk, Technology Awareness & Government Regulations. Also, the variable such as Religiosity was additionally incorporated as moderating variable to examine the behavior of individuals in the wake of religion & its influence on the cryptocurrency adoption by the individuals.

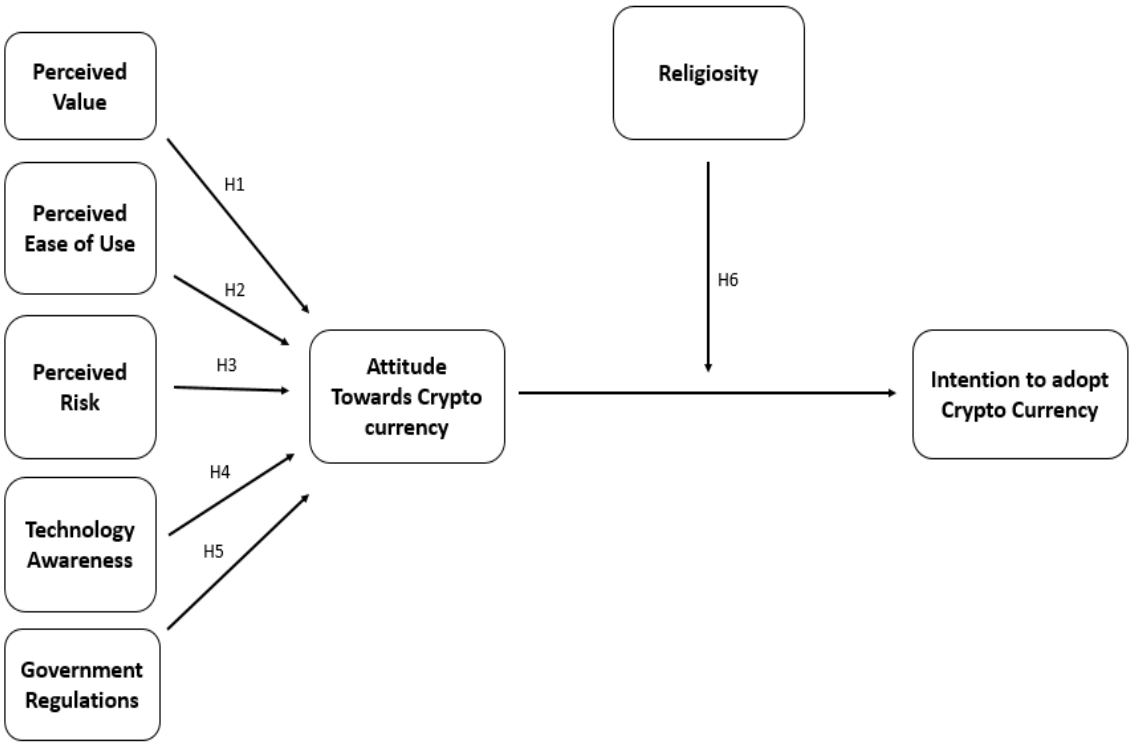

Figure 1. *Theoretical Research Model*

Perceived Value

It refers to an individual's opinion on the loss suffered or benefits derived from consuming a product or service (Gupta et al. 2023; De Medeiros et al., 2016). A customer's perception about a product is guided by specific attributes that help companies effectively understand customer

needs and preferences and accordingly improve performance. This strategy aids managers in precisely understanding their customer needs in order to deliver the value desired by the customer, thereby achieving the goals of customer satisfaction (Walton & Johnston, 2018; Woodruff, 1997).

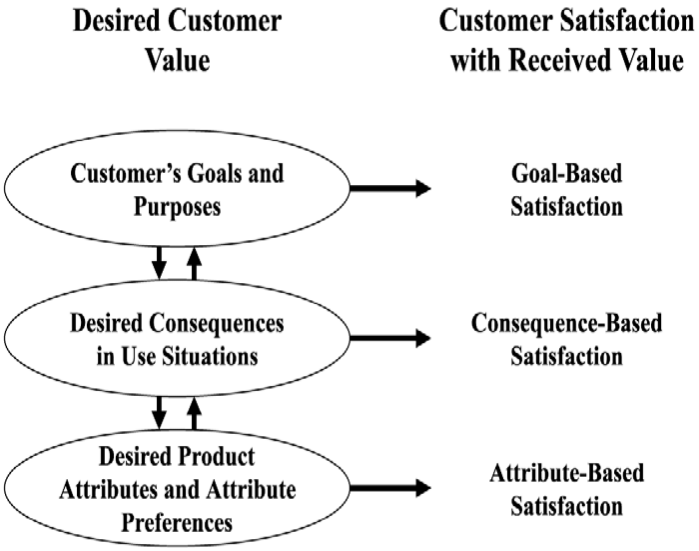

Figure 2. *Hierarchy Model of Value (Woodruff, 1997)*

In this regard, an individual's perceived utility and enjoyment serve as important dimensions when viewed from the perspective of forming his opinion on value perception (De Medeiros et al., 2016). Moreover, when it comes to individuals' motivation towards adopting a technology, it is driven by its perceived usefulness. In the same manner, while cryptocurrencies don't offer any intrinsic value, the expectation of huge returns serves as a key motivation for investors (Featherman & Pavlou, 2003). Likewise, Miau & Yang (2018) propound that the individuals' intention to use cryptocurrencies is mostly shaped by their perception on the benefit of such currencies. Additionally, Chen & Aklikokou (2019) claim that individuals' intention to accept cryptocurrency is substantially motivated by their evaluation of its usability.

H1: Perceived value has a positive effect on the consumers' attitude towards the cryptocurrencies.

Perceived Ease of Use

It measures the degree to which a person is at ease and feels convenient towards utilizing a particular product, technology, or service (Segars & Grover, 1993; Davis, 1989). Individuals possess varying perceptions when it comes to their experience of using digital products or technologies. Being comfortable with and knowing enough about digital products and latest

technologies would boost one's sense of self-worth and minimize the stress related to quickly learning new technologies (Chen & Aklikokou, 2019). This viewpoint, when applied in the context of the cryptocurrencies, implies that the people would be likely to accept cryptocurrency if they believe these are simpler and easier to use (Walton & Johnston, 2018; Venkatesh, 2000).

H2: Perceived Ease of Use has a positive effect on the consumers' attitude towards the cryptocurrencies.

Perceived Risk

An individual's thoughts and observations about the uncertain outcomes is called Perceived Risk. There are a number of risks involved in the cryptocurrency use such as price volatility, technical complexities, theft, exchange rate risk etc. Freatherman & Pavlou (2003) regarded the perceived risk as an uncertainty that a buyer assumes to experience due to potential issues associated with using product or service. The notion of perceived risk in cryptocurrency context is grounded on the fact that an individual, while investing in the cryptocurrencies, has some concerns and uncertainties in mind as the outcome can be unexpected and unfavorable. This shapes the behavior of that individual towards the cryptocurrencies (Lee, 2009).

In a study that examined e-service adoption in an organization, Featherman & Pavlou (2003) evaluated various social & psychological dimensions of Perceived Risk. According to them, consumers form their own perception of the potential risks while doing online transactions. This perception involves the risk of potentially losing finances (financial risk), time (time risk), status (social risk), self-esteem (psychological risk) and personal information (privacy risk).

DIMENSION	DEFINITION
PERFORMANCE RISK	"The possibility of the product malfunctioning and not performing as it was designed and advertised and therefore failing to deliver the desired benefits." (Grewal et al., 1994)
FINANCIAL RISK	''The potential monetary outlay associated with the initial purchase price as well as the subsequent maintenance cost of the product'' (Grewal et al., 1994). The current financial services research context expands this facet to include the recurring potential for financial loss due to fraud.
TIME RISK	Consumers may lose time when making a bad purchasing decision by wasting time researching and making the purchase, learning how to use a product or service only to have to replace it if it does not perform to expectations.
PSYCHOLOGICAL RISK	The risk that the selection or performance of the producer will have a negative effect on the consumer's peace of mind or self-perception (Mitchell, 1992). Potential loss of self-esteem (ego loss) from the frustration of not achieving a buying goal.
SOCIAL RISK	Potential loss of status in one's social group because of adopting a product or service, looking foolish or untrendy.
PRIVACY RISK	Potential loss of control over personal information, such as when information about you is used without your knowledge or permission. The extreme case is where a consumer is ''spoofed'' meaning a criminal uses their identity to perform fraudulent transactions.
OVERALL RISK	A general measure of perceived risk when all criteria are evaluated together.

Table 1. *Perceived Risk Dimensions (Featherman & Pavlou, 2003)*

From the literature gap perspective, the prior research examining the effect of individuals' risk perception towards cryptocurrencies is still insufficient. Therefore, this research investigates Perceived Risk from various viewpoints such as operational risk, instability, technology issues, lack of regulations and security losses.

H3: Perceived Risk has a positive effect on the consumers' attitude towards cryptocurrencies.

Technology Awareness

Attitude has a big impact on how quickly people accept new technologies. The individuals' willingness to adopt e-learning environment is significantly influenced by their attitude toward use of computers and digital tools (Hughes et al., 2019). While a positive attitude directly affects the uptake of technology, the adoption of technologies is hindered by the lack of IT literacy in the developing countries. Moreover, the individuals' willingness to accept technological advancements is based on whether the technological change is congruent with their traditions and values or otherwise (Alaeddin & Altounjy, 2018). Additionally, individuals' willingness to know about and learn technologies is guided by their own interest

and assessment of using those technologies coupled with their own sense of self-efficacy. Accordingly, we hypothesize that:

H4: Technology Awareness has a positive effect on consumers' attitude towards cryptocurrencies.

Government Regulations

The term refers to a regulatory framework that has been enforced by the government on the businesses to follow as a legal requirement while offering their products & services. These governmental regulations that mainly monitor commercial, technical, environmental, legal and social aspects of a business are aimed at upholding the interest of all the stakeholders (Kayani et al., 2022). These regulations also ensure that the businesses that utilize technologies should demonstrate ethical and responsible behavior in delivering services and solutions to the customers (Ullah et al., 2021).

From the cryptocurrency perspective, the businesses and individuals dealing with such currencies must follow regulations imposed by their government (Express Tribune, 2021; Kayani et al., 2021). The tight regulatory and financial oversights by the government will also boost public trust in adopting and utilizing new financial platforms that are meant for trading, investment and making payments, especially in the developing countries (Reuters, 2022; Albayati et al., 2020). However, due to week government regulatory framework and monitory mechanism, the growth of cryptocurrencies encountered several issues. Therefore, without having in place a formal regulatory framework for cryptocurrencies and developing an awareness these currencies including the types of contracts, rights, risks and investment implications, it would be difficult to effectively regulate cryptocurrencies in Pakistan in near future. Moreover, given their potential misuse for various illegal purposes, all forms of digital currencies are still banned in Pakistan (Reuters, 2022; Ullah et al., 2021; Yeong et al., 2019). We thus hypothesize:

H5: Government Regulations have a positive effect on the consumers' attitude towards the cryptocurrencies.

Attitude Towards Cryptocurrency

The individuals' attitude (negative or positive) towards something is usually driven by their prior understanding & assessment of using a product, service, or platform, or experiencing an event, situation or consequence (Madanchian, 2023; Walton & Johnston, 2018). In this regard, the personal value system and beliefs of the individuals greatly influence them in shaping their

attitude (Lee, 2009). In the given context, the individuals' attitude towards the adoption of cryptocurrencies is guided by their thinking and perception about these currencies, and it is necessarily an individual's attitude that serves as a key element driving their adoption needs, thereby prompting them to develop a trust in cryptocurrencies in terms of their use and investment (Chen et al., 2022). From the viewpoint of the Islamic countries, there are still insufficient studies that have explored the attitude of individuals toward the cryptocurrencies. Keeping this in mind, this research addressed this gap in the theoretical literature.

Religiosity

The term religiosity indicates the commitment of the individuals towards their religion and teachings they follow which are reflected in their thoughts and actions (Abou-Youssef et al., 2015). Additionally, it refers to what extent individuals respect or obey their religion (Nasse et al., 2019). In Islamic countries, the teachings of Islam shape religious beliefs of the people and as such serve as guidelines for leading life. It is the responsibility of a Muslim to follow the obligations of Islam (such as Prayers, Fasting, Almsgiving etc.,) and avoid all such acts that are declared as sins under the Islamic laws (Rahim et al., 2016; Souiden & Rani, 2015).

Intention to Adopt Cryptocurrencies Under the Moderating Influence of Religiosity

Several studies have evaluated the influence of religion on consumer purchase intensions & decisions. When viewed from the lens of religiosity, there are four categories of individuals: most-religious, moderate, less-religious and non-religious (Rahim et al., 2016; Souiden & Rani, 2015).

In Islamic countries, religion in general has a considerable influence on the overall lifestyle of the individuals. In particular, the consumption patterns, purchase habits and financial decisions of the individuals are mainly influenced by their religious values. Depending on their level of religiosity, the individuals' way of living varies accordingly. However, in the case of individuals who are not religious, their choices and decisions are least or not affected at all. (Koeswandana & Sugino, 2023; Abou-Youssef et al., 2015).

It is not always expected from an individual who is a Muslim by birth that he will necessarily follow the teachings of Islam as some Muslims still consume alcoholic products and the foods that are not halal and also draw interest-based profits & loans using the traditional banking services (Nasse et al., 2019; Souiden & Rani, 2015). The ones who go against their religious teachings do acknowledge this and seek forgiveness for their actions. There are also some Muslims who express no regret on their actions even though they understand that their actions are against the Islamic laws. Thus, it is primarily the views & perceptions of the Muslims that

form their attitude towards the Islamic laws and accordingly determine the level of inconsistency that exists between their beliefs & actions (Koeswandana & Sugino, 2023; Rahim et al., 2016; Abou-Youssef et al., 2015).

Therefore, it can be assumed that the behavioral intention of the Muslim consumers toward cryptocurrencies can overwhelmingly vary depending on how religious they are. Overall, the review of extant literature makes it evident that while there are considerable number of studies on technology adoption, there are in fact very studies that have evaluated the effect of religiosity on cryptocurrencies, especially in the context of Islamic countries. We thus hypothesize:

H6: Religiosity has a moderating effect on the consumers' behavioral intention towards cryptocurrency adoption.

RESEARCH METHODOLOGY

Research Design

A quantitative research method is appropriate for evaluating the relationship between the variables of a research model through hypotheses testing and validation (Venkatesh, 2021; Creswell, 2017). Therefore, this research utilized a survey questionnaire for gathering data and testing the relationship between the factors that influenced cryptocurrency adoption in Pakistan.

Population and Sampling Technique

When it comes to trading & investment in cryptocurrencies, the sample population was chosen with an understanding that the target participants have a basic knowledge of investment and financial technologies. Thus, keeping in view the nature of research problem and to ensure appropriate participants for the research, the purposive sampling technique was utilized (Creswell & Creswell, 2018). The sample population involved working professional of banks, stock exchanges, brokerage firms, investment firm, trading companies etc., operating in various areas of Pakistan. This was done owing to the better understanding of such professionals about the trading markets and financial technologies.

Research Measures

Except for the newly introduced Religiosity construct, the items for all other constructs of the research were adapted from the prior studies on cryptocurrency adoption after minor changes. The items for 'Religiosity' were developed keeping in view the unique context of this research. In this regard, the literature studies such as Koeswandana & Sugino (2023) and Rahim et al.

(2016) that utilized Religiosity in a different context were also reviewed with a view to enhancing our understanding about this construct.

For measuring 'Perceived Value', the items were adapted with some changes from Gupta et al. (2023) and Walton & Johnston (2018). For measuring 'Perceived Risk', the items were drawn from Featherman & Pavlou (2003) and Lee (2009). Regarding 'Perceived Ease of Use', the items were drawn from Walton & Johnston (2018), Venkatesh (2000) and Davis (1989). The measures for 'Technology Awareness' were adapted from Alaeddin & Altounjy (2018). Hughes et al. (2019). Moreover, to measure 'Government Regulation', the measures were adapted with minor changes from Albayati et al. (2020). In the case of 'Attitude Towards Cryptocurrency', the items were taken from Walton & Johnston (2018) and Lee (2009). Lastly, the items for 'Intention to Use Cryptocurrency' were drawn from Chen et al. (2022), Kumar et al. (2007), and Liu et al. (2014).

Table 2. Research Measures

Constructs	Number of Items	Adapted From / Developed Using
Perceived Value	4	Gupta et al. (2023) Walton & Johnston (2018)
Perceived Ease of Use	4	Walton & Johnston (2018) Venkatesh (2000); Davis (1989)
Perceived Risk	4	Lee (2009) Featherman & Pavlou (2003)
Technology Awareness	4	Alaeddin & Altounjy (2018) Hughes et al. (2019)
Government Regulations	4	Albayati et al. (2020)
Attitude Towards Cryptocurrency	4	Walton & Johnston (2018) Lee (2009)
Religiosity	4	Koeswandana & Sugino (2023) Rahim et al. (2016)
Intention to Adopt Cryptocurrency	4	Chen et al. (2022) Liu et al. (2014) Kumar et al. (2007)

Data Collection

The sample size recommendations for this research were adopted from the work of Hair et al. (2019) and Goodboy & Kline (2017). Besides, the prior similar studies on cryptocurrency adoption were also followed in identifying the appropriate sample size. The survey questionnaire was designed using the Google forms. The questionnaire was emailed to the executives of 20 financial firms which particularly included stock markets, banks, trading & investment firms. They were requested to share with at least 20 employees of their firms who possessed basic knowledge of cryptocurrencies, online trading, and financial technologies. In

response to the questionnaire that was reportedly circulated to 400 respondents, 220 responses were received after the end of the data collection period (55% response rate). Of the total received responses, 18 were discarded due to their being incomplete or the fact that they lacked consistency. This resulted in using the remaining 202 responses in the final data analyses.

Ethical Consideration

In all aspects of this research, the researcher followed the ethical guidelines of the university. While administering the data collection process, the information relating to this research was shared along with seeking the consent of the participants. Also, due care was made in ensuring anonymity and privacy of the participants including the responsible use of the research data.

ANALYSES AND RESULTS

Descriptive Data Analyses

Of the total respondents, 60.4% were in the age range between 21-30 and roughly one-third (i.e., 32.2%) represented the age bracket of 31-40. The remaining 7.4% of respondents were aged between 41-50. In terms of the type of organization, 83.1% belonged to private firms, whereas 16.9% of the respondents were from different government organizations. Moreover, from the gender viewpoint, about 71.5% of the survey population represented males and remaining 28.5% were females. Educationally speaking, more than half of the total sample population possessed a master's degree (54.5%), whereas the 23% possessed a bachelor's degree. About 12.5% identified themselves as PhDs and the rest of the respondents (9.5%) had intermediate level qualifications. These demographic indicators are presented in figure 3 below. Other descriptive data statistics are given in table 2.

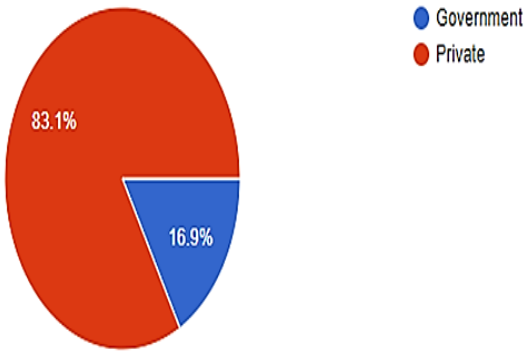

Figure 3 (i): Organization Type

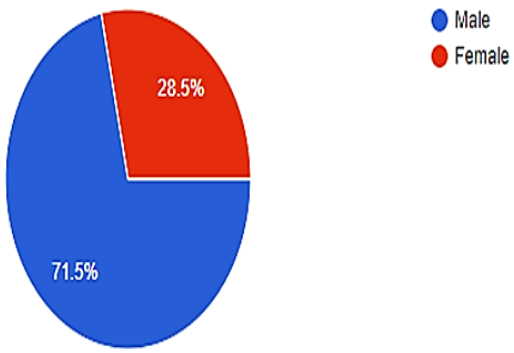

Figure 3 (ii): Respondents' Gender

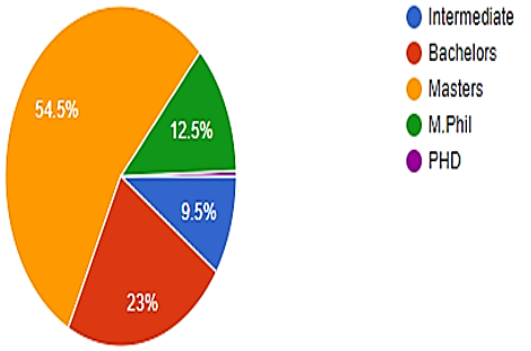

Figure 3 (iii): Respondents' Education

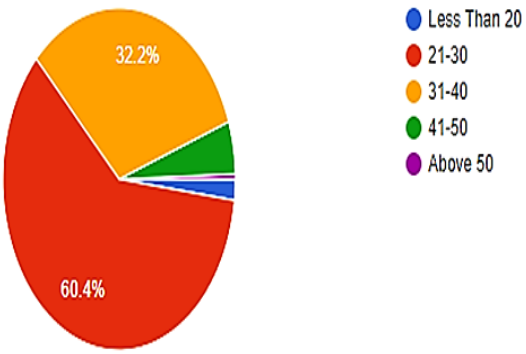

Figure 3 (iv): Respondents' Ages

Table 3. Descriptive Data Analysis

Demographics	Mean	Median	Standard Deviation	Excess kurtosis	Skewness
Gender	1.285	1	0.451	-1.09	0.96
Age	2.41	2	0.642	1.058	0.97
Education Level	2.715	3	0.821	0.032	-0.411
PV1	3.555	4	0.963	-0.107	-0.598
PV2	3.735	4	0.951	0.635	-0.851
PV3	3.715	4	0.868	-0.185	-0.427
PV4	3.615	4	0.983	0.485	-0.754
PEU1	3.74	4	0.879	1.408	-1.158
PEU2	3.815	4	0.911	0.402	-0.742
PEU3	3.79	4	0.887	0.61	-0.789
PEU4	3.82	4	0.853	1.012	-0.862
PR1	3.69	4	0.897	0.544	-0.772
PR2	3.69	4	0.961	0.208	-0.705
PR3	3.675	4	0.922	0.622	-0.698
PR4	3.725	4	0.883	0.103	-0.573
TA1	3.625	4	0.956	0.104	-0.673
TA2	3.64	4	0.995	0.34	-0.791
TA3	3.8	4	0.954	-0.052	-0.599
TA4	3.925	4	0.905	0.72	-0.87
GR1	3.89	4	0.72	1.01	-0.562
GR2	4.015	4	0.803	1.271	-0.845
GR3	3.95	4	0.669	1.454	-0.75
GR4	3.91	4	0.722	1.413	-0.744
ATC1	3.715	4	0.827	0.202	-0.601
ATC2	3.715	4	0.945	0.402	-0.76
ATC3	3.905	4	0.875	0.777	-0.896
ATC4	3.835	4	0.888	1.057	-0.923
IAC1	3.425	4	1.056	-0.308	-0.585
IAC2	3.475	4	1.029	-0.309	-0.445
IAC3	3.58	4	1.026	-0.345	-0.455

IAC4	3.565	4	1.061	-0.324	-0.551
R1	3.78	4	0.849	1.55	-0.942
R2	3.97	4	0.83	1.293	-0.842
R3	3.82	4	0.876	0.892	-0.764
R4	4.035	4	0.94	1.508	-1.125

Measurement Model

Internal Consistency

To evaluate the measurement model's internal consistency, statistical indicators such as Cronbach's alpha & composite reliability are employed. In order for the measurement model to have sufficient internal consistency, the Cronbach's alpha & composite reliability of each construct should be greater than 0.70 (Hair et al., 2019). As indicated in Table 3, the composite reliability ranges from 0.804-0.910, whereas the values for Cronbach's alpha (ranging from 0.718-0.872) were found to be higher than the suggested threshold of 0.70. If we compare the composite reliability values with the Cronbach's alpha, the table 4 reveals that the composite reliability was in fact a more effective criterion for gauging the internal consistency. Thus, the items utilized to measure their constructs exhibited good internal consistency.

Convergent Validity

The Average Variance Extracted (AVE) is determined to evaluate the convergent validity (Fornell & Larcker, 1981). The results reveal that the AVE ranging from 0.516-0.716 was above the standardized threshold of AVE>0.5 for all the constructs, thus confirming the sufficient convergent validity of the measurement model.

Table 4. Reliability and Validity Assessments

Construct Reliability and Validity	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
ATC	0.775	0.855	0.597
GR	0.765	0.804	0.516
IAC	0.729	0.830	0.550
PEU	0.835	0.883	0.656
PR	0.872	0.910	0.716
PV	0.760	0.845	0.577
R	0.718	0.813	0.524
TA	0.750	0.838	0.573

Factor Loadings

Hair et al. (2009) specified that all the standardized factor-loadings should at least have a minimum value of 0.5 and in an ideal scenario, it should be 0.7. The table 4 indicates each item's factor loadings where all values appeared to be greater than 0.7 except for: GR1 <- GR 0.627, GR2 <- GR 0.568, GR3 <- GR 0.675, IAC 3< IAC 0.662, R1 <- R 0.655 and R2 <- R 0.640, highlighting that these items averagely measured their respective constructs.

Table 5. Factor Loadings

	Original Sample	Sample Mean	Standard Deviation	T-statistics	P-values
ATC1 <- ATC	0.731	0.730	0.045	16.352	0.000
ATC2 <- ATC	0.824	0.822	0.026	32.182	0.000
ATC3 <- ATC	0.776	0.775	0.038	20.184	0.000
ATC4 <- ATC	0.756	0.750	0.050	15.207	0.000
GR1 <- GR	0.627	0.549	0.247	2.543	0.011
GR2 <- GR	0.568	0.511	0.254	2.235	0.025
GR3 <- GR	0.675	0.582	0.239	2.822	0.005
GR4 <- GR	0.946	0.760	0.337	2.809	0.005
IAC1 <- IAC	0.778	0.776	0.040	19.560	0.000
IAC2 <- IAC	0.750	0.749	0.051	14.834	0.000
IAC3 <- IAC	0.662	0.657	0.069	9.559	0.000
IAC4 <- IAC	0.772	0.768	0.044	17.445	0.000
PEU1 <- PEU	0.795	0.770	0.099	8.007	0.000
PEU2 <- PEU	0.702	0.668	0.136	5.146	0.000
PEU3 <- PEU	0.887	0.880	0.074	11.986	0.000
PEU4 <- PEU	0.843	0.831	0.069	12.203	0.000
PR1 <- PR	0.825	0.779	0.166	4.972	0.000
PR2 <- PR	0.789	0.734	0.190	4.157	0.000
PR3 <- PR	0.885	0.843	0.165	5.369	0.000
PR4 <- PR	0.882	0.836	0.157	5.608	0.000
PV1 <- PV	0.747	0.734	0.072	10.333	0.000
PV2 <- PV	0.725	0.719	0.062	11.749	0.000
PV3 <- PV	0.765	0.764	0.052	14.717	0.000
PV4 <- PV	0.800	0.795	0.040	19.841	0.000
R1 <- R	0.655	0.635	0.120	5.466	0.000
R2 <- R	0.640	0.610	0.141	4.530	0.000
R3 <- R	0.761	0.751	0.070	10.894	0.000
R4 <- R	0.825	0.819	0.058	14.254	0.000
TA1 <- TA	0.850	0.848	0.036	23.722	0.000
TA2 <- TA	0.826	0.819	0.049	16.966	0.000
TA3 <- TA	0.799	0.783	0.065	12.359	0.000
TA4 <- TA	0.501	0.484	0.125	3.995	0.000
R x ATC -> R x ATC	1.000	1.000	0.000	n/a	n/a

Discriminant Validity

A measurement model illustrates how the latent variables are assessed through their related indicators (Hult et al., 2018). The items average correlation within the constructs was determined using the HTMT criterion. According to Hensler et al. (2015), a discriminant validity level of 0.90 is considered adequate. As shown in the table below, all values are less than 0.90 which demonstrates a sufficient discriminant validity.

Table 6. HTMT Ratio

HTMT	ATC	GR	IAC	PEU	PR	PV	R	TA
ATC								
GR	0.137							
IAC	0.615	0.284						
PEU	0.303	0.112	0.399					
PR	0.152	0.061	0.117	0.072				
PV	0.484	0.164	0.736	0.609	0.060			
R	0.202	0.303	0.462	0.206	0.103	0.409		
TA	0.337	0.175	0.276	0.144	0.180	0.188	0.243	
R x ATC	0.256	0.102	0.154	0.142	0.054	0.122	0.260	0.031

Discriminant Validity (Indicator Level)

We additionally assessed the discriminant validity at the indicator level. In this regard, a loading value of 0.7 or above for achieving the measurement model reliability at the indicator level is suggested (Hult et al., 2018). As shown in figure 4, the measurement model includes indicators that assessed the latent variables, path coefficients and the R-square values. All the latent variables appeared to be reliable measured by their related indicators other than TA4, GR1, GR2, GR3, R1, R2 and IAC3 whose values were below 0.70, highlighting that these items didn't significantly represent their variables.

Correlation Matrix

Table 5 below shows that there are few negative correlations between the variables but most of the variables are positively correlated. Perceived Risk has negative correlation with Attitude Towards Cryptocurrency, Government Regulations, and Intention to Adopt Cryptocurrency, whereas Perceived Value has negative correlation with Perceived Risk.

Table 7. Correlation Matrix

Correlations	ATC	GR	IAC	PEU	PR	PV	R	TA	RxATC
ATC	1.000								

GR	0.139	1.000							
IAC	0.473	0.246	1.000						
PEU	0.280	0.123	0.357	1.000					
PR	-0.133	-0.013	-0.029	0.045	1.000				
PV	0.389	0.175	0.550	0.522	-0.004	1.000			
R	0.157	0.229	0.372	0.196	0.058	0.343	1.000		
TA	0.270	0.067	0.222	0.121	0.126	0.125	0.103	1.000	
RxATC	-0.231	0.047	-0.135	-0.144	0.033	-0.120	-0.063	-0.004	1.000

Structural Model

As shown in figure 4, the structural model was tested using the path coefficient assessments involving t-statistics, mean values along with their associated p-values.

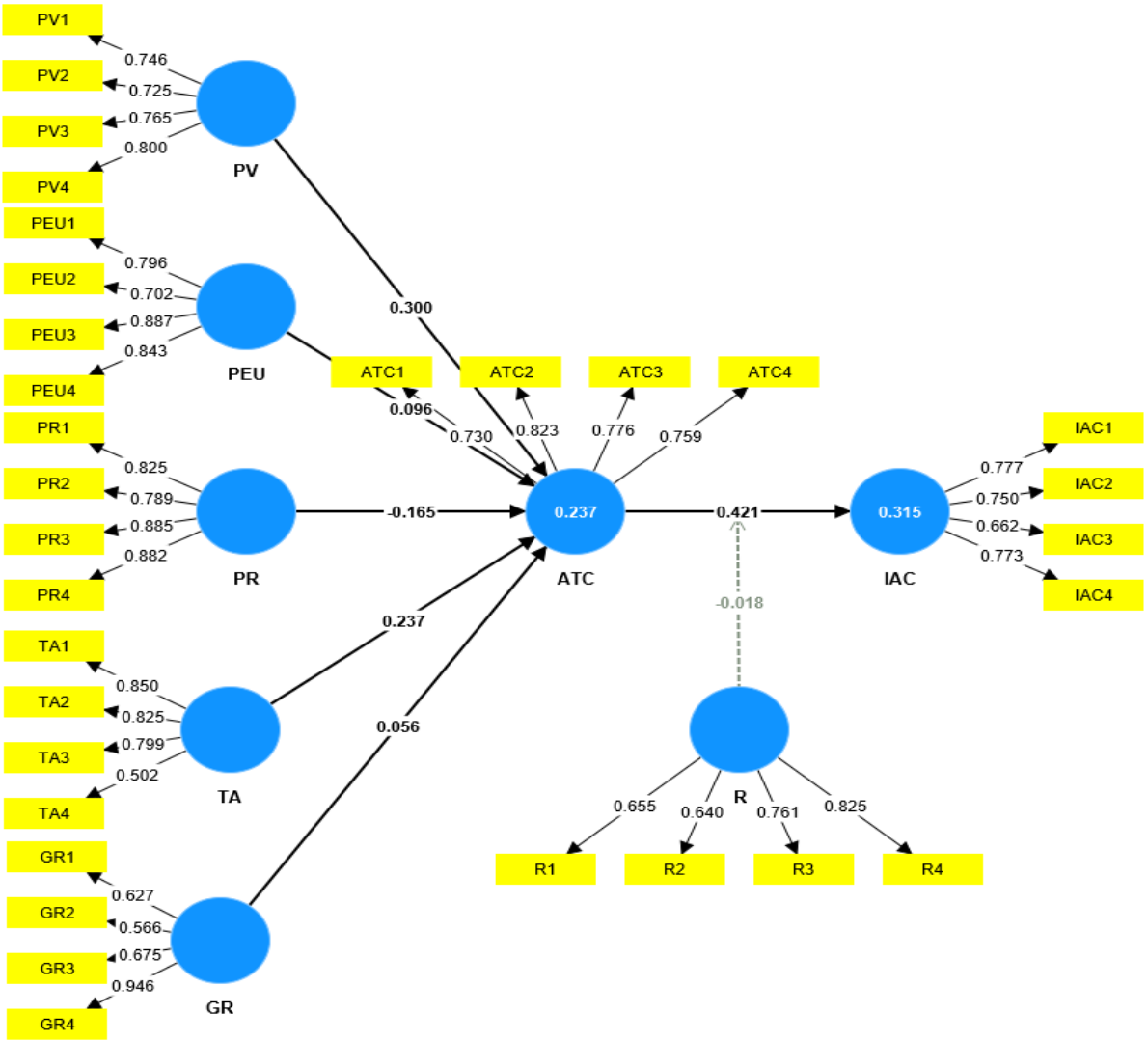

Figure 4. *Structural Model*

The table below highlights a strong relationship between the Perceived Value & Attitude Towards Cryptocurrency (B=0.299, T=3.607, P=0.000). However, an insignificant relationship was observed to be between Perceived Ease of Use & Attitude Towards Cryptocurrency (B=0.095, T=1.153, P=0.249). In terms of a potential linkage between Perceived Risk and Attitude Towards Cryptocurrency (B=-0.165, T=2.344, P=0.019), this relationship appeared to be significant. In the same manner, the relationship between Technology Awareness and Attitude Towards Cryptocurrency (B=0.238, T=3.668, P=0.000) also appeared to be strong. Moreover, the relationship between Government Regulations and Attitude Towards Cryptocurrency emerged as insignificant (B=0.056, T=0.681, P=0.496). Also, an insignificant moderating impact of religiosity between attitude towards cryptocurrency and cryptocurrency adoption intention. (B= -0.019, T=0.228, P=0.820).

Table 8. Hypotheses Testing

	Hypotheses	Sample Mean	Standard Deviation (SD)	T-statistics	P-values	Whether Accepted?
H1	GR -> ATC	0.056	0.083	0.681	0.496	No
H2	PEU -> ATC	0.095	0.082	1.153	0.249	No
H3	PR -> ATC	-0.165	0.07	2.344	0.019	Yes
H4	PV -> ATC	0.299	0.083	3.607	0.00	Yes
H5	TA -> ATC	0.238	0.065	3.668	0.00	Yes
H6	R x ATC -> IAC	-0.019	0.082	0.228	0.82	No

DISCUSSION

The research uncovered the key drivers that led to the adoption of cryptocurrencies in Pakistan. By evaluating from the lens of TAM and TPB theoretical frameworks, it was examined as to how these variables influenced the behavioral intention of the individuals including their relative significance towards inducing a cryptocurrency adoption behavior. In specific terms, the results demonstrated that the Perceived Value, Perceived Risk & Technological Awareness substantially influenced the adoption of cryptocurrencies, whereas a little effect of Government Regulations & Perceived Ease of Use was observed on individuals' adoption of cryptocurrencies. In addition to the unique insights for the Islamic countries, especially the country like Pakistan, our findings support the prior studies that were mostly conducted in the non-religious context of cryptocurrency adoption such as Almajali et al. (2022), Kayani et al. (2021), Hemantha (2021), Arias-Oliva et al. (2019), Vejačka & Paľová (2019), Alaeddin & Altounjy (2018), Abou-Youssef et al. (2015) etc.

In general, the prior research on cryptocurrency adoption has mostly focused on the financial or economic aspects of cryptocurrency adoption (Kayani et al., 2021), however, this research is unique in a sense that it was conducted in Pakistan and being a Muslim-majority country, the religiosity was purposely operationalized as a moderating-variable with a view to determining the effect of religion as a deciding-factor towards the adoption of the cryptocurrencies, especially when these are still declared haram (unclean) in Pakistan under the Islamic laws. Surprisingly, the results showed a little influence of religion as a discouraging-factor towards the adoption of these currencies in Pakistan.

Pakistan is an Islamic country where trading and investment decisions are influenced by the Islamic laws that decide haram (unclean) or halal (clean) status of an investment. In case of truly-practicing Muslims, if any act or investment option is against the Islamic laws or declared haram (unclean) by the religious scholars, they would avoid that option or refrain from committing such acts irrespective of the benefits offered as they value religious teachings above anything else. Nevertheless, there is yet another segment of population that would still like to financially transact or invest in the options that are prohibited in the religion of Islam. One such example is the adoption and use of conventional banking system by the people of Pakistan. The current banking system of Pakistan is based on both conventional banking as well as the Islamic banking. Even though, there is an option of Islamic banking, a large segment of population still utilizes the conventional banking system, drawing interest-based banking services such as term deposits (profits), interest-based loan facilities, life insurance etc. This is because of the higher administrative charges or lesser advantages offered by the Islamic banking system when compared to the conventional banking system.

While cryptocurrency markets are yet to undergo a formal development and growth process, it is interesting to note that there is an underpinning desire and an overall readiness in general towards adopting the cryptocurrencies in Pakistan. The results also imply that the deterrent effect of adoption desire owing to legal restrictions imposed by the government of Pakistan outweighs the deterrent effect of its forbiddance in the religion of Islam.

IMPLICATIONS & CONTRIBUTION

This research offers the following theoretical, research and practical implications for the key stakeholders on cryptocurrency adoption in Pakistan.

Implications for Theory & Research

- This research lays the foundation of cryptocurrency trading and investment practices in the Muslim communities by evaluating individuals' trading & investment preferences from the

lens of religion. While a considerable number of studies on identifying cryptocurrency adoption factors have been conducted in the advanced countries wherein, they mostly disregarded the influence of religion, as a vast majority of the people living in the non-Muslim countries are mostly concerned about the advantages of a financial product, service or investment option, disregarding the religious guidelines or teachings governing use of or investment in that product or option. Keeping this gap in mind, this study was perhaps conducted as the first or one of very few studies that empirically examined the moderating-influence of religion on the behavioral intention of the individuals for adopting cryptocurrencies. Thus, by operationalizing 'Religiosity' as a moderating variable, this research has filled the gap in the cryptocurrency literature and accordingly presents a unique research model.

- From the viewpoint of the contribution of this research for Muslim-majority countries like Pakistan, there is yet a dearth of context specific research on the adoption of cryptocurrencies. Thus, the results will be especially benefitting the religion-practicing individuals of Pakistan whose financial decisions are greatly influenced by the religious teachings but potentially like to become investors, traders and financers of the cryptocurrencies in Pakistan. Similarly, the results will also be applicable to a greater extent for other Islamic countries in the South Asian, Middle Eastern, Central Asian and North African regions, including the countries having large Muslim population that is subject to strong religious influence.

Implications for Policy and Practice

Implications for State Bank, Finance Ministry and Government

The adoption and use of cryptocurrencies is yet at its infancy stage in Pakistan. The individuals still use their debit/credit cards to perform online or card-based transactions. While the government of Pakistan has yet not declared these currencies as legal and acceptable mode of payment, it is the crucial time for the State Bank of Pakistan to develop policies on virtual currencies and accordingly develop a regulatory framework. As a first step, the state bank of Pakistan in consultation with ministry of finance should devise strategies for minimizing risks and enhancing user data security & privacy, thereby driving socio-economic growth of Pakistan in general and maximizing benefits for the stock markets, banking institutions, trading & investment firms, chambers of commerce, government organizations and end-users in particular. It should then legalize cryptocurrencies for financial payment, trading and investment purposes. As a next step, in order to ensure its wider adoption at national level, the

State Bank should encourage individuals to utilize cryptocurrencies as a cost-effective and secure platform for making financial transactions. Subsequently, the State Bank should continue to advocate and create public awareness about the responsible use of such currencies for legal and halal (clean) purposes in line with its regulatory framework.

Implications for Trading, Investment, Banking and Financial Institutions

- The advent of cryptocurrencies and associated blockchain technologies will innovate and transform the financial sector of the country. In particular, the investment in the cryptocurrencies will stimulate the growth of stock markets, investment firms and banking institutions in addition to the launch of novel startups in the areas of fintech and blockchain technologies. While the underlying technologies that govern cryptocurrency payments (such as cryptography, blockchain etc.) are usually secure, the technical complexities involving their use can potentially create hurdles for the new users.
- Secondly, in the wake of the research results that proved insignificant effect of religious obligations when it came to the adoption of these currencies, the Pakistani banks should accordingly redesign and optimize their existing financial services, loan facilities and investment options, thereby effectively meeting the modern banking needs of their customers.

Implications for E-commerce Service Providers and Freelancers

The post-COVID job market witnessed a substantial growth of e-commerce sector in Pakistan. Also, given the significant devaluation of Pakistani currency in the recent past, the Pakistani freelancers started exploring international markets for offering their freelancing services. Thus, the legalization of cryptocurrencies would enable increased access to international markets in terms of offering e-commerce and other freelancing services for such individuals and subsequent receipt of payments from the international clients in a fast, secure and efficient manner without involving any bank, intermediary or third party.

Implications for Individual Consumers and End Users

The research results demonstrated a promising adoption potential of cryptocurrencies by individual consumers and end-users. This was also evident from the fact that the individuals having formal qualification, prior computer literacy and knowledge of present-day financial technologies, trading platforms & investment tools were mostly found to have developed an interest in adopting and utilizing the cryptocurrencies. However, this interest appeared to be hampered by the fact that these virtual currencies were not legalized and owned by the

government of Pakistan, resulting in non-utilization of these currencies for investment and payment purposes by the individuals.

LIMITATIONS & FUTURE RECOMMENDATIONS

- The first limitation is in terms of a small sample used in this research. Although, the individuals working in financial & trading firms were chosen as the targeted participants as they were assumed to possess reasonable knowledge of cryptocurrencies. While the purposive sampling strategy did help in ensuring the quality of the chosen participants, a sample size of 202 might be small to fully generalize the findings of this study in the countries that are subject to similar culture and religious norms. Therefore, the future researchers should use a larger sample size, thereby also ensuring the selection of relevant participants having prior knowledge of cryptocurrencies.
- Another limitation is owing to an imbalance between the participating genders. While the sample population involved both males and females, there were more men than women. This demographic imbalance might have slightly added to the limitations of this research. Nevertheless, similar studies conducted in the past, such as the one by Al-Shehhi et al. (2014) where 95% of the respondents were men, also demonstrated that the men in general took more interest when it came to cryptocurrencies. Another research by Vejačka & Paľová (2019) that looked at how gender difference varied the cryptocurrency adoption behaviour of Slovak individuals where the total sample population, females (69%) outnumbered the male population (31%). It has generally been observed that the male respondents are more knowledgeable about cryptocurrencies and are more likely to take up the cryptocurrencies as compared to women. On the other hand, women are under-represented in the cryptocurrency market and have often been found little interested in such financial initiatives. This gives rise to the fact that males generally have more positive attitudes towards cryptocurrencies than women.
- Third, as this research was done in Pakistan, a Muslim country, the findings cannot be fully applied in the non-Muslim countries, especially the ones that are under little or no religious influence.
- Yet another limitation is inherent in the cross-sectional nature of this research. Thus, the potential changes in the behavioral intentions & attitudes of the participants towards cryptocurrency adoption could not be examined which might have occurred over a period of time. Thus, the future scholars should also consider a longitudinal approach for determining potential behavioral changes towards cryptocurrency adoption & use.

- The fifth limitation lies in the use of a single research method (quantitative surveys). Future researchers should consider employing mixed-method approaches involving a combination of suitable qualitative & quantitative methods in order to achieve comprehensive analyses and draw insights from the enriched data.
- Lastly, the geography of the data collected also adds to the limitation of this research. The research was conducted in one country, Pakistan. Hence, the findings can't be completely generalized. Future researchers should therefore cover multiple countries or cultures and perform comparative analysis to ascertain similarities & differences, thereby enhancing the generalizability of the findings at the same time.

CONCLUSION

The cryptocurrencies are increasingly being adopted at the global landscape, particularly in the developed world, however, their applications are still not widespread in the developing countries, not to mention the Islamic countries. This research was thus aimed at identifying the factors influencing the uptake of cryptocurrencies in Pakistan. While most of the factors operationalized to examine individuals' attitude towards cryptocurrencies were found to positively influence their behavioral intentions, the results highlighted an insignificant influence of religion as a moderator towards cryptocurrency adoption in Pakistan. Overall, the results reveal that there is a considerable adoption potential, and it is highly likely that the people will adopt cryptocurrencies in near future if these currencies are legalized by the state bank of Pakistan. The results also imply that the likelihood of adoption will further increase if the investment & trading in cryptocurrencies are perceived by Pakistanis as secure, risk-free and beneficial. By and large, this research hint us at anticipating new trading interests and emerging investment trends, thereby indicating an overall readiness to adopt cryptocurrencies in Pakistan in the days to come.

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