A STUDY ON THE IMPETUSES AND CONTESTS IN THE ESPOUSAL OF CRYPTOCURRENCY AS A MEDIUM OF EXCHANGE IN INDIA

By

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DECLARATION

I hereby declare that the thesis entitled **" A STUDY ON THE IMPETUSES AND CONTESTS IN THE ESPOUSAL OF CRYPTOCURRENCY AS A MEDIUM OF EXCHANGE IN INDIA"** submitted to SSBM, Geneva for the award of degree of Doctor of Business Administration, is my original research work. This thesis or any part thereof has not been submitted partially or fully for the fulfilment of any degree of discipline in any other University/Institution.

(K. R. Ramprakash)

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ABSTRACT

A STUDY ON THE IMPETUSES AND CONTESTS IN THE ESPOUSAL OF CRYPTOCURRENCY AS A MEDIUM OF EXCHANGE IN INDIA

Purpose

The deciding factor in the emergence of cryptocurrency as a global currency depends on the level of acceptance it gains in society. While cryptocurrency is gaining significant acceptance in developed economies like the US, the adoption rate in emerging economies like India has not been studied. Cryptocurrency must be adopted in countries like India to become an actual global currency. Hence, the study aims to determine the factors affecting the adoption of cryptocurrency as a medium of exchange in India.

Design /Methodology

The study is based on primary data collected from a targeted sample of 750 respondents. A theoretical model based on UTAUT and TTAT was developed. A purposive sampling technique was adopted for the study, and the required data were collected using a well-structured and pre-tested questionnaire. PLS-SEM analysis has been used to assess the theoretical model of the study.

Findings

The study established that perceived threat, attitude, and social influence are the significant factors affecting the adoption of cryptocurrency in India. Effort expectancy and performance expectancy have a considerable impact on the intention to use via attitude. In contrast, perceived severity and perceived susceptibility significantly affect the intention to use via

perceived threat. Financial literacy and facilitating conditions don't seem to impact the intention to use cryptocurrency as a medium of exchange in India.

Research Limitations

The study is limited to respondents in the major cities of India, and only people who are cryptocurrency investors were purposively selected for the study. Thus, future studies could examine the perception of people who are not cryptocurrency investors. Furthermore, future studies can also investigate other factors that affect the intention to use cryptocurrency, such as social media influence.

Originality

This might be the first study that combined UTAUT and TTAT models to assess the factors affecting the adoption of cryptocurrency. Further, this study attempted to capture the perception of Indian cryptocurrency investors, and thus, the results will be helpful for policy and decision-makers while adopting regulatory measures.

KEYWORDS

Cryptocurrency, Bitcoin, Medium of Exchange, Digital Payments, UTAUT, TTAT, Attitude, Social Influence, Perceived Threat, Intention to Use, PLS-SEM.

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Chapter 1: Introduction

1.1. Introduction

We humans have been using the currency for a long time - 40000 years. From Barter System, we moved to Cowry shells some 5000 years ago, and from shells, we moved to metal coins in 600 BCE; during the late 1600s, we traded using IOUs; from 1944 to 1971, we followed the gold standard; and since 1971, we are following Fiat money system. Whenever society finds a better medium of exchange, it never hesitates to adopt the better one.

The Fiat money system is mainly based on people's faith in the strength of an economy. Most countries in the world had accepted the US as a superpower and pegged their currencies against the US dollar, making the US dollar the global reserve currency ***(Taskinsoy, 2019)***. This system has a significant flaw, first identified by Robert Triffin ***(Triffin, 1960)***. He hypothesised that for the US dollar to survive as the global reserve money, it must run on mounting deficits infinitely. Because of the supply of USD to match the global need, there will be ever-growing inflation in the country. Erosion of the value of USD will be a natural consequence when the country is always high on inflation. Let me explain this with a simple example. If the US inflation is five per cent per annum, USD will lose nearly 40% of its value after ten years. That is, what USD can purchase this year, only 60% of it USD can buy ten years later. If this continues, the currency will surely lose its value one day. ***McCabe (1989)*** postulates that "as the fiat money will be worthless after some period, people will stop accepting fiat currency after they get the knowledge that fiat money will be valueless after a point of time in the future." ***Stiglitz (2011)*** states that because of the problems in the existing fiat money system, it is better for the world to move to a better and more radical solution of creating a "global currency as proposed by JM Keynes". Today, many individuals are

beginning to believe that cryptocurrency is the solution to the problems of fiat currency and the trust issues it has created.

Bitcoin is the first blockchain-based cryptocurrency introduced into this world. It was introduced by an unknown person(s) who called himself/themselves using the pseudo name Satoshi Nakamoto. On 3rd January 2009, Satoshi Nakamoto mined the first bitcoin. Some call Bitcoin a currency created by the paranoids for the paranoids. This quote is not without substance, as the code embedded in the coinbase of the first minted Bitcoin reads, "The Times Jan/03/2009 Chancellor on the brink of second bailout for banks". ***Pagliery (2014)*** stated the code showed Nakamoto's distrust in the current fiat currency system. Interestingly, many started to believe there was sound reasoning behind this distrust.

The Commodity Exchange Act (CEA) has defined cryptocurrency like Bitcoin as a commodity. ***Kiyotaki & Wright (1989)***, in their famous study "On money as a medium of exchange," postulated a model to prove when societies will endogenously start using a commodity as money. They grounded their arguments based on Nash equilibrium. They proposed three properties on the basis of the "intrinsic properties" of a commodity and the "extrinsic beliefs" of the society to utilize it as currency. The properties are lower cost of storage, higher liquidity and a reasonable level of social acceptance.

Many of us may have a doubt. If fiat money has to be abolished and the world has to use a commodity as money, then we already have gold, haven't we? Why can't we use gold – it has lower storage cost, higher marketability and very high social acceptance – it has hundreds of years of history as the most accepted currency in the world. Why someone like Satoshi Nakamoto has to go to the extent of creating Bitcoin?

The answer lies in the portability issue. The speed of portability is an important consideration of liquidity ***(Fekete, 2003)***. ***Kunal et al. (2021)*** states that "Gold, being a physical

commodity, has only a moderate level of portability. Cryptocurrency, a virtual commodity, can be transferred from one end of the world to another within minutes." It could be noted that "the annual exports from the United States are far lesser than the value of money traded in the financial markets of the world before lunchtime in a day" ***(Kurtzman, 1993)***. With such frequent markets, portability will be a major issue, which is also why we moved to IOUs in the 16th century. Thus, we can't go back in time. That will be regression and not good for globalization. From the perspective of the enormous volume of financial transactions and the frequency with which they are happening in this world, cryptocurrency seems a better alternative than gold.

When we analyse cryptocurrency in light of these three traits, we can conclude whether cryptocurrency has the potential to be the global currency or not. The first point of analysis is the storage cost of the cryptocurrency. Cryptocurrencies must be protected as they are gone if we lose them ***(Alterman, 2010)***. But the cost of storing cryptocurrency is somewhere in the range of $40 to $100 only (the cost of cryptocurrency storage wallets). Thus, we can see the storage cost of cryptocurrency is very low as we can store billions worth of cryptocurrency in a $40 wallet.

The second trait of analysis is the commodity's liquidity or marketability. Liquidity means the salability of the commodity. The liquidity of a commodity is said to be high when it has a greater number of willing buyers. Thus, at any given moment at a given price point, if we can dispose of a commodity for sure, then that commodity is considered to be highly liquid and saleable ***(Meneger, 1892)***. It is interesting to see that, at present, there are three hundred and ninety-three centralised crypto exchanges in the world. It is also worth noting that the volume of cryptocurrency transactions has been rising at an enormous phase since 2017. In July 2017, the total volume of cryptocurrency transactions per day was only $4.51 billion. But it grew to

an astonishing $183 billion in January 2020. This reflects the heightened salability and liquidity of cryptocurrency throughout the world.

The third and the most important trait is the level of social acceptance of a commodity. ***Rogers (2010)*** states that as a new invention, the potential of cryptocurrency to get accepted by societies can be measured by examining its degree of adoption. It is not possible to get data relating to all the "market-traded cryptocurrency." Nevertheless, ***Bouri, Shahzad & Roubaud (2019)*** state that Bitcoin accounts for nearly forty-four per cent of the total cryptocurrency market. Hence, the degree of adoption can be measured by analyzing the growth in the users of Bitcoin. The number of Bitcoin wallets has increased from fifteen million to seventy-five million within a short span of five years ***(source: Statista)***. Further, there were studies which estimate the total number of cryptocurrency users in the world has been more than 200 million, with an average annual growth of ***15% (Kaul, 2021)***. Global Crypto Adoption estimates have shown that nearly four per cent of the global population have adopted cryptocurrency and some eighteen thousand businesses around the world are accepting cryptocurrency as a medium of exchange ***(Global Crypto Adoption, n.d.)***. ***Rogers (2010)*** states in the famous "diffusion of innovation theory" that 'when an invention is adopted by more than 2.5 per cent of its potential consumers, it has passed the innovators and moved on to early adopters." Thus, we can say that innovators have effectively espoused the use of cryptocurrency, and now, early adopters are started using it.

1.2 Research Problem

So far, we have seen the flaws of the fiat money, the difficulty of going back to gold and the potential of "blockchain-based cryptocurrencies" as a global currency. However, a lot of things are yet to happen to make this proposition a reality. First and foremost is the regulatory framework for cryptocurrency. Many Governments have started to put regulations on the

usage of cryptocurrency, and we see it as a good sign. With proper regulations, cryptocurrency will become less volatile and safe for common people to use. However, whether cryptocurrency becomes a future medium of exchange purely depends to a larger extent on the ease with which people accept the usage of cryptocurrency. Many studies have been done in the last decade on cryptocurrency, but most of these studies were focused on the financial asset nature of cryptocurrency, and only a very few studies had been focused on its medium of exchange function. Further, there is a need to explore the level of acceptance of cryptocurrency for digital payments in emerging economies like India.

1.3 Purpose of the Study

This research aims to understand the impetuses and contests in the espousal of cryptocurrency as a medium of exchange in India. To satisfy the study's purpose, the following objectives were framed:

1. To understand the factors motivating the adoption of cryptocurrency for digital payments in India,
2. To find out the challenges in the espousal of cryptocurrency as means of payment in India, and
3. To analyse the impact of the various motivating factors and the challenges on using cryptocurrency as money.

1.4 Significance of the study

Kiyotaki & Wright (1989) postulate that "for a commodity to become a medium of exchange, it must have three properties, viz. low storage cost, high marketability and social acceptance." The storage cost of cryptocurrency is lower than any other commodity, and it has very high marketability because of its liquidity, salability and portability. However, the social acceptance of cryptocurrency is still in its infancy. In developed economies like the US,

cryptocurrency adoption is very rapid. The interest displayed in cryptocurrencies by international leaders such as Bill Gates, Mike Tyson, Lionel Messi, and others demonstrates this. The news of "$1.5 billion investment in bitcoin made by Elon Musk and acceptance of cryptocurrency payments by Tesla" has raised a significant interest towards cryptocurrency in society. PayPal integrated bitcoin into their wallets in April 2021, and it appears that Facebook, Visa and Master Card seem to have similar plans.

The deciding factor in the emergence of cryptocurrency as a means of payment depends on the level of acceptance it gains in society. While cryptocurrency is gaining significant acceptance in developed economies like the US, the rate of adoption in emerging economies like India is not studied so far. It is essential for cryptocurrency to be adopted in countries like India to become a truly global currency. Hence, the study aims to find out the impetuses and contests in the espousal of cryptocurrency in India.

1.5 Research Questions

The study's aim to understand the impetuses and contests in the espousal of cryptocurrency as a medium of exchange in India. To fulfil the study's objective, the following research questions were framed:

1. What are the impetuses in the espousal of cryptocurrency for digital payments in India?
2. What are the contests in the espousal of cryptocurrency as a medium of exchange in India?
3. What are the impacts of these variables on the intention to use cryptocurrency as money in India?

1.6 Chapter Scheme

The entire study has been divided into six chapters:

- ***Chapter - 1*** deals with the introduction, statement of the problem, objectives of the study and purpose of the research
- ***Chapter - 2*** reviews the existing literature
- ***Chapter - 3*** states the theoretical model and methodology adopted for the study
- ***Chapter - 4*** analyses the results
- ***Chapter - 5*** discusses the findings
- ***Chapter - 6*** concludes the study with a summary, implications and recommendations

Chapter 2: Literature Review

2.1. Medium of Exchange

2.1.1 Properties of a Medium of Exchange

(Meneger, 1892)

The author argues that "the law has not produced money; it is a social, not a state-run institution, at its core. The idea of being sanctioned by the state is foreign to it. This social institution of money, on the other hand, has been refined and fitted to the many and diverse needs of an evolving trade by official recognition and regulation, just as customary rights have been perfected and modified by statute law. Originally treated by weight, like other commodities, precious metals have gradually evolved into coins by shape, resulting in a significant increase in their innately high saleability." Further, the author postulates, "the establishment and maintenance of coined pieces in order to win public confidence and, to the extent possible, to avoid risk concerning their genuineness, weight, and fineness, and, above all, to ensure their circulation in general, have been widely acknowledged as important functions of state administration. The difficulties that any country faces in its commerce and modes of payment as a result of the competing actions of the various commodities that serve as currency, as well as the fact that concurrent standards cause a great deal of insecurity in trade and necessitate various conversions of the circulating media, have led to the legal recognition of certain commodities as money (to legal standards). Where more than one commodity has been accepted as a lawful form of payment, law or some system of valuation has established a predetermined value ratio among them. All of these efforts, however, did not create money out of the prior metals but rather improved their function as money."

(Sargent and Wallace, 1983)

The study analysed a set of models to address the efficiency of the system of commodity money. In addition, it explored the circumstances in which a commodity naturally emerges as money. The findings showed that "the commodity that is getting cheaper to produce over time is not produced or stored because it is dominated in the rate of return by the commodity that is not getting cheaper to produce." Further, the authors postulate that for a commodity to act as money, it must have lower rates of depreciation.

(Kiyotaki, 1989)

The study assessed the essential features of commodity money and demonstrated how a commodity would emerge as currency in an economy based on its extrinsic beliefs and intrinsic properties. The author defined commodity money as "when a commodity is accepted in trade not to be consumed or used in production, but to be used to facilitate further trade, it becomes a medium of exchange and is called commodity money." They assumed that different commodities have different properties, which make them a potential candidate for the role of commodity money. They further postulated that apart from the intrinsic properties, a major determinant for a commodity to become money is whether or not the society believes in its ability to act as means of payment. Thus, the usage of commodity money includes both intrinsic properties and significant acceptance from society. The study demonstrated that storage cost and liquidity are the intrinsic properties essential for a commodity to become money, along with the extrinsic belief of the society that it is suitable for the role of money.

(Marimon, McGrattan and Sargent, 1990)

The study analysed the economies of exchange postulated by Kiyotaki & Wright (1989) in that agents have to use either commodity or fiat money as a means of payment if trade must happen. The study assumed "artificially intelligent agents and modelled using classifier

systems for decision making". The study found that "for most of the simulated economies, trading and consumption patterns converge to a stationary Nash equilibrium even if agents start with random rules and in case of economies with multiple equilibriums the only equilibrium that emerges in our simulations is the one in which goods with low storage costs play the role of medium of exchange."

(Kiyotaki and Wright, 1991)

The authors argue that "the double coincidence problem with pure barter is highlighted by a model with search friction and multiple goods, which gives a suitable context within which to think about money as a medium of exchange." Further they state, "in our model, both pure barter and monetary equilibria exist, and the role of money in terms of liquidity is described. It also proved that these monetary equilibria are stable. Fiat money can continue to circulate and play a function in promoting commerce and improving welfare even if it has features that make it a less than perfect asset or medium of exchange. Naturally, if fiat money's intrinsic qualities grow too unfavourable, it will no longer circulate in equilibrium."

The model presented here is obviously special, and there is room for much future research. The key assumptions underlying the results are the following: "First, the transaction cost was critical in reducing the nonmonetary economy to a pure barter economy; with transaction cost equal to zero, all trades would be acceptable, so all goods might serve as a medium of exchange. Second, symmetry in the set of goods and the set of agents led us to focus on equilibria with no commodity money. Third, the indivisibility of real commodities combined with the restriction on storage (implying inventories always consist of one unit of one thing) kept the model tractable but precluded a potentially interesting analysis of the distribution of prices. The concept provided here is clearly unique, and there is plenty of space for more investigation in the future."

The authors postulated the following as the essential assumptions that underpin the findings. "First, transaction costs were crucial in reducing the nonmonetary economy to a pure barter economy; if transaction costs were zero, all deals would be accepted, and all items could be used as a medium of exchange. Second, we focused on equilibria without commodity money due to symmetry in the set of items and the set of agents. Third, the indivisibility of real commodities, along with the storage restriction (implying that inventories always contain one unit of one thing), maintained the model tractable but prevented a potentially fascinating investigation of the price distribution."

(Aiyagari and Wallace, 1992)

The study analysed Kiyotaki and Wright's (1989) model of fiat money and found that it is necessary that fiat monies should have a low cost of storage to enable trade and specialization; that there are indeterminate steady states of valued fiat money; that nontrivial steady states consisting of fiat money for all trades and goods do not exist; that even if fiat money is doesn't have the lowest storage cost, it can be valued; and it is possible that two fiat monies with different cost to store can have value. The authors stated that "some of the answers we find are reassuring in that they are consistent with what we seem to observe, at least in a loose sense. There are economies in which the use of a low storage-cost fiat object gives rise to equilibrium with specialization and trade and in which not using it implies autarky. Also, a fiat object can play a role in exchange even if there is another object – a commodity which is less costly to store. We did however, find that there is no positive consumption study state in which goods never trade for goods."

(Hoppe, 1994)

The study looked at the subject of how fiat currency is possible. The author argues, "is it possible to introduce fiat money without violating either justice or economic efficiency

principles, or does it have to evolve naturally as a result of interactions between self-interested people? Based on constructive and methodical reasons, the study proposed that no fiat money can ever evolve innocently or immaculately." In addition, "the study refuted a slew of counter-arguments along the road. Monetarists like Irving Fisher and Milton Friedman, as well as some Austrian free bankers such as Lawrence White and George Selgin, argued for total or fractional fiat money, although their ideas were contested."

(Ritter, 1995)

This study answers, "how did it become possible to trade seemingly worthless slips of paper for tangible goods? by presents an equilibrium analysis of the transition from barter to fiat money." The author states that "the explanation is based on the intervention of a self-interested government that must be able to convincingly claim that money will be limited. To gain confidence, the government must balance the benefits of seigniorage by internalising some of the macroeconomic externalities caused by the creation of fiat money. The patience of the government and the level of its economic involvement are major indicators of whether the transition can be completed."

(Dubey, Geanakoplos & Shubik, 2003)

The study compared gold and tobacco to find out which one would be the better commodity money. The authors postulated that "the difference between the gold and tobacco is that gold yields utility, on account of its beauty, without diminishing its quantity, but tobacco yields utility when it is consumed. If this was the only difference between the two, then the authors argued that gold is the inefficient money as it is desired on two counts to save and enjoy. Typically, those who most desire to save do not also get the most aesthetic enjoyment out of looking at gold. But in the absence of a rental market, they cannot decouple their savings of gold from their consumption of gold. If there is enough tobacco like money at the beginning,

then the equilibrium is efficient, even if all transactions and savings must be via the one money."

(Lagos and Rocheteau, 2008)

The authors constructed a model in which capital (real assets) and fiat money compete with one another as an efficient medium of exchange. They established that more than capital, fiat money is the most valued and beneficial to society. They based their argument on Friedman's Rule, that "fiat money provides just enough liquidity so that the incentives to invest in the capital are purely technological, and agents choose to accumulate the same capital stock a social planner would implement". Further, they stated that valued fiat money increases the welfare of the society due to the fact that it permits agents to discharge capital from the role of money and allows it to be used as a productive asset.

(Wallace, 2010)

Three needed physical characteristics of a medium of exchange are divisibility, recognizability and divisibility. Fiat monies of the world have zero intrinsic value, and the implicit assumption of using fiat money is that "money is a poor store of value". Because of these two properties money should not be treated as an ordinary asset. The author states that the role of fiat money is to provide evidence for transactions which would otherwise not be known.

(Muhammad-Bashir et al., 2015)

The authors state that "to analyse the determinants of gold dinar acceptability in Kelantan, Malaysia, researchers employed an enlarged adoption model that comprises seven factors: relative benefit, trialability, outcome visibility, result demonstrability, anxiety, enabling circumstances, and trust. Using survey data from gold dinar adopters in Kelantan, the

components of gold dinar adoption and their drivers were discovered." The SEM approach was utilised to see if the hypothesised model suited the data. The results show that "all of the indicators in this study had good loading on their variables, indicating that they accurately measured what they were supposed to measure. With the exception of "trust," all of the criteria are determined to have an impact on the gold dinar's acceptability. As a result, rather than customers' faith in issuing authorities, gold dinar acceptance would be based on its inherent benefits, religious ties, and the removal of constraints linked with it."

(Lee, Yan and Wang, 2021)

"Using China's CBDC as an example, this article examines two-tier or multi-tier ledger designs and offers ten enablers for mass adoption and successful deployment. Instead of shouldering the full burden or risking over-centralization, this proposed design allows central banks to regulate process flow by focusing on monitoring and control. This paper discusses the essential principles of CBDC design to balance benefits and risks, as well as best practices in CBDC design from a global perspective. CBDC will be a crucial instrument in the future digital economy, according to the report, and countries that are familiar with the technology will have a competitive advantage. Furthermore, successful implementation necessitates learning from the process, re-examining existing regulations on a regular basis, and inventing whenever global dynamics shift the scene."

2.1.2 Problems with the Existing Fiat Money System

(McCabe, 1989)

They studied the value of fiat money in the time path using an experimental market. In the experiment, players traded goods, at nominal prices, for money, and the finite time limit makes the money value wobbly as players learn not to hold money near the time limit. The study investigated, "will people hold money when they have the knowledge that fiat money

will become valueless after a period of time." On the basis of Nash equilibrium, they argued that non-cooperative, self-interested individuals would not use fiat money as a society will refuse fiat money in the last period.

(Cohen, 2000)

This paper explored the influence of three key elements on the future of leading currencies such as the euro, dollar and yen: the logic of market competition, national governments' strategic choices, and future technological breakthroughs. According to the study, "the dominance of today's main currencies is under no imminent threat, but market competition and policy rivalry among issuing authorities could dramatically alter relative standing. The euro will considerably challenge the dollar's supremacy; on the other hand, the yen's position is projected to erode over time, comparable to the sterling's long decline in a previous era. However, technological advancements may eventually lead to the creation of entirely new rivals to today's top currencies: various innovative forms of money based on digital data, collectively known as electronic money, which will eventually begin to replace bank notes and checking accounts as standard means of payment in some way. Some of these emerging electronic currencies may one day outsell any of today's most popular international currencies."

(Lucas, 2000)

The study explores the welfare cost of monetary inflation and found a negative relationship between inflation and welfare. The study proposed to reduce the interest rate from 14 per cent to 3 per cent and argues that this can be achieved only when the US Government adopts an economic policy of zero inflation. The study suggested that welfare can be increased by reducing interest rate and inflation, but the interest rate has to be positive and not be zero or negative otherwise, deflation will happen in the economy.

(Ricardo and Wright, 2005)

The study measured the welfare cost of inflation and estimated that a moderate level of inflation (3 to 5 per cent) is beneficial to the US economy, and inflation beyond this level will be counter-productive. Their study is based on a new monetary model without extreme restrictions and with explicit micro-foundations.

(Ledoit and Lotz, 2011)

The study surveyed the existing literature in financial and monetary economics to answer some of the essential economic queries raised by the subprime crisis and the resultant monetary turmoil. The authors postulate the following: "Legislative and constitutional reforms aimed at making a certain commodity, like gold, similar to money, raise several important questions that we have answered. First, commodity money can coexist alongside fiat money, as long as the central bank managing fiat money maintains a commitment to ward off the threat of hyper-inflation, and the multiplicity of circulating currencies may enhance social welfare. Second, the combination of modern financial systems and modern minting technology should be able to prevent the periodic shortages of small, which historically handicapped commodity money. Third, in the specific case of Switzerland, an additional advantage is that monetizing gold would make it more attractive as a safe haven currency, thereby reducing the recurrent problems caused by the excessive appreciation of the Swiss Franc when there is a financial crisis. In summary, economic theory can support the introduction of commodity money simultaneously with fiat money".

(Fund and Halaburda, 2016)

This article presents a methodology for evaluating why a central bank might consider creating a digital currency and how to deploy it to improve the retail payment system's efficiency. With respect to user experience and system design: level of anonymity, limits of

accounts, fees, interface, access device, and distribution channels were the major attributes; and with respect to technological issues: verification system, speed of settlement and reversibility, and ecosystem management were the major attributes addressed in the framework for the adoption of Central Bank Digital Currency.

(Taskinsoy, 2019)

There existed barter trade before the advent of money (coin, paper, or digital), which was a type of transaction that did not need the use of a monetary medium. Money has progressed in lockstep with the evolution of humans. Money was not formed only for transactional purposes; it was created to quantify wealth (i.e., bureaucrats' bookkeeping of resources) and to serve as a symbol of power (i.e., aristocrats used it in social contracts between royals and servants). Money has always been a crucial link (social tie) between lenders and borrowers, contractors and workers throughout human history. From barter to bimetallism (silver and gold), monometallism (gold), and paper (fiat) to gold as the basis of currencies, facilitating exchange has evolved. Even though Adam Smith (1776) classified barter trade as primitive in his key book named in short "The Wealth of Nations," the emergency of fiat money was not to replace it. Further, "in the late nineteenth century, the classical gold standard emerged as a truly global standard, but it only lasted roughly three decades before collapsing due to the exceptional shocks of World War I. The short-lived interwar gold exchange standard, known as the Triffin problem, had comparable faults." The gold standard and Bretton Woods' intrinsic weaknesses left the US more vulnerable to the eventual convertibility crisis; as a result, US policies intensified inflation, which led to the system's demise. The existing international monetary system, which is in dire straits, will face the same fate.

(Smith, 2021)

This study takes a larger "Political Economy" approach to build a universal theoretical model of macroeconomics that explains the justifications for "monetary plurality" in a provincial framework. In this study, "cross-disciplinary literature is used to establish a conceptual ordering of themes to guide the modelling. An analysis of current economic methodology reveals that its Formalist, Positivist perspective is inappropriate for addressing important difficulties, meaning that the research topic is intrinsically tied to methodological concerns." An alternative methodology, it is suggested, is more in line with the required "Critical Realist stance and algorithmic reasoning." Further, "a modelling framework is created in System Dynamics post-Keynesian Stock-Flow Consistent models that integrate lessons from early Mercantilist economists and Classical Behavioural Economics. A lexicographic consumption model is designed to enable a core monetary model." The author states that "three currencies viz., Convertible Local Currency, Mutual Credit Clearing, and Local Government Currency. which are complementary to each other has been used to enhance this concept by "secondary monetary circuits." The "Cantillon Effects" are proven by creating and simulating models based on fictitious data. Furthermore, "complementary currencies can be utilised as useful coordinating mechanisms in situations where there is no universal money, according to the models. The introduction of secondary monies, on the other hand, is very context-dependent, requiring consideration of a variety of institutionally determined factors. The need for sufficient institutional arrangements justifies the government's participation in authorising and promoting alternative currency programmes."

2.2. Raison D'etre of Blockchain Based Cryptocurrency

(Evans, 2014)

Since Satoshi Nakamoto, the creator of Bitcoin, first proposed the blockchain concept in 2008, a swarm of "online digital currency platforms" built on decentralised public ledgers has popped up. The author states, "a governance structure for the platform, as well as an incentive mechanism that elicits efforts from a dispersed global workforce to verify and record transactions on the public ledger, are critical components of these public ledger systems. The economic effectiveness and feasibility of a public ledger platform will ultimately be determined by the design of these incentive and governance mechanisms. Even if a shared distributed ledger were a more effective technology for conducting financial transactions and providing a platform for distributed innovation, problems in its incentive and governance structures could make it inferior to present systems. Current claims that public ledger platforms may better conduct financial transactions ignore inadequacies in incentives and regulatory systems, as well as the potential costs of governing these platforms and ancillary service providers such as vaults, wallets, and exchanges. It's possible that underlying blockchain platforms are more efficient than other platforms at facilitating financial transactions, but the reasoning is mainly focused on apples-to-oranges analogies and speculation. The Competition will strengthen incentive and governance mechanisms for public ledger platforms."

(Kazan, Tan and Lim, 2015)

The authors developed a unified framework to recognize and evaluate in what way cryptocurrency organisations construct value through "digital business models" by synthesising information systems and strategic management literature. This approach is then used to investigate the business models of the "bitcoin network enterprises" through a series of case studies. The study found that "value-chain and value-network driven business models

commercialise their products and services for each value unit transfer, whereas value-shop driven business models commercialise through revenue-generating organisations subsidising direct customers."

(Pel, 2015)

This study aims to disprove the concept that bitcoin has no distinct or significant geography, as it lives in the hazy domain of online, and presents the first comprehensive geographical examination of bitcoin. Further, it explored bitcoin mining, bitcoin user procurement, and bitcoin-related start-up enterprises using empirical evidence. Each of these qualities has been found to have different relationships to geographical location as well as physical concentration patterns. According to this study, "bitcoin is far more governed and regulated than commentators in the fields of law, economics, and computer science previously suggested. The concentration of market dominance by a limited group of firms, the concentration of market activity in key locations such as financial centres, and the clear territorial aspects of bitcoin make the currency far more governed and regulated than commentators in the fields of law, economics, and computer science previously suggested".

(Roos, 2015)

The goal of this study was to give a model for SMEs to investigate the bitcoin craze. The characteristics that promote cryptocurrency adoption in SMEs were investigated by means of the UTAUT2 model. The study discovered, "performance expectations, price value, and habit are the most important factors influencing the decision to use Bitcoin". The study also found that trust is an important factor in deciding whether or not to use Bitcoin. The authors state that the study's findings may be used by businesses as a starting point for constructive discourse on the megatrend of cryptocurrencies and its potential effects and prospects.

(Eriksson, 2016)

This study examined recent Bitcoin research to explore the present state of email-based Bitcoin services and to determine if email as a tool is a viable medium for usage with Bitcoin. This research is carried out by doing a systematic evaluation of recent studies, followed by a study of former and present Bitcoin enterprises that have used email as part of their service. Finally, the results revealed that due to email's low security and the apparent lack of services that would benefit from an email-based Bitcoin service, such a service would be difficult to establish today and not very beneficial to the general public.

(Peters, Chapelle and Panayi, 2016)

The study proposed a risk analysis structure that stated virtual and crypto currency exposures and vulnerabilities are the key drivers of operational risks and challenges for these new forms of exchange. The study identified that "decentralised governance, anonymity, peer-to-peer verification, handling of sensitive information, transaction irreversibility, international regulatory risk and price instability are the key vulnerabilities and multiplicity of jurisdictions, micropayments, hardware and software reliance are the key exposure of cryptocurrencies to operational risk".

(Yli-Huumo et al., 2016)

This study, through systematic review, "presented a comprehensive mapping analysis with the goal of compiling all relevant Blockchain technology literature. The study's purpose is to get a technical grasp of current research topics, challenges, and future possibilities in Blockchain technology." The authors state that "blockchain is a decentralised transaction and data management technology that was first designed for the cryptocurrency Bitcoin. Since the concept was first proposed in 2008, there has been a surge in interest in Blockchain technology. The core qualities of blockchain that provide confidentiality, anonymity, and data

integrity without a third-party organisation in charge of the transactions are driving interest in the technology, which opens up new research fields, particularly in terms of technological hurdles and constraints." From scientific databases, 41 primary papers were collected and systematically analysed. According to the data, "over 80% of the articles are about the Bitcoin system, with less than 20% concerned with other blockchain applications like smart contracts and licencing."

(Alvseike and Iversen, 2017)

The study aims to see how Bitcoin and its underlying technology (blockchain) will affect the monetary and financial system. It used two primary themes introduced with this new technology after conducting 20 in-depth interviews with a diverse variety of stakeholders and performing literature research in this new area of interest. First, "to know how cryptocurrencies and central bank issued digital currency could affect the future of money (CBDC)." The former is known to have a variety of specialised designs, ranging from basic monetary transactions to complicated platforms that enable the development of a decentralised economy. Although the CBDC is not required to embrace blockchain technology, the use of digital currencies and blockchains opens up new monetary and fiscal policy alternatives. However, before CBDC can be used as a supplement or substitute for real currency, a number of complex problems must be answered. Second, to look at how blockchain technology and the crypto economy will impact the future of finance. Banks may face more competition from new entrants, who may use blockchain technology to save costs in regulatory compliance, transaction and settlement efficiency, and reconciliation.

(Conley, 2017)

The author states that "the independent verifiability of transactions and the anonymity that blockchain-based cryptocurrencies provide are two of the most significant benefits. In

addition, blockchains can handle transactions at a fraction of the cost of banks and credit card firms. Cryptocurrency prices, on the other hand, are extremely erratic. Furthermore, the crypto-ecosystem is tough to reach for many less technologically competent users, and making financial ties to the outside world is particularly problematic. Cryptocurrencies' utility as a store of wealth and a means of exchange is limited by these characteristics." The author proposed the introduction of CryptoBucks; a cryptocurrency backed entirely by dollars. He states that depending on how the system is implemented, CryptoBucks alleviate the problem of volatility while also providing varying levels of privacy and anonymity.

(Eigbe, 2018)

The study looks at the levels of Bitcoin knowledge and its acceptance in Nigeria. This study used a descriptive survey approach, with data collected from 304 respondents in the Ibadan metropolis (response rate of 79.1 per cent of the total sample size) and analysed using descriptive frequency statistics. According to the survey, Bitcoin has a low degree of awareness, which leads to a low level of acceptance. It was also discovered that most of the persons who claim to be informed lack a thorough comprehension of Bitcoin's functions. More information and education for potential users, along with new limits to ensure secure transactions, are among the study's recommendations.

(Johnson, 2018)

This article looked at the present and future possibilities of cryptocurrencies, with an emphasis on Bitcoin, the most popular and most valuable of them all. It specifically discussed the ways in which Bitcoin can be utilized as a means of payment and also as part of an investment plan, as well as whether doing so now and in the future makes financial sense. Furthermore, it examined Bitcoin's previous behaviour, how the system works, how it serves as money, how it can be used as an asset for investment, and why this first cryptocurrency

will be utilised as such in the future. The findings demonstrated that utilising cryptocurrencies as a way of transaction and keeping them as part of an investment plan has the potential to grow in popularity and boost the value of cryptocurrencies in the future.

(Agustina, 2019)

"The goal of the study was to determine how trialability and complexity affected current TAM components, as well as to assess measurement invariance on the link between the latent constructs used in this expanded form of TAM (ETAM). Users of the Cryptocurrency mobile application were emailed a survey form, and 41 people responded. The research model was evaluated using the SEM-PLS approach. The validity and reliability of the structural model were then tested. The invariance test was done on the measurement model first and then on the structural model using SmartPLS 3.0. ETAM's predictor factors were able to explain 44.9% of the variation in actual cryptocurrency mobile app usage."

(Arias-Oliva, Pelegrín-Borondo and Matías-Clavero, 2019)

From the perspective of end consumers, "this article discusses the critical requirements for a cryptocurrency's successful growth. The research was conducted in Spain among college-educated individuals with a basic comprehension of the internet. It uses a technology acceptance theoretical framework to test a model that can explain roughly 85% of the desire to use cryptocurrencies." According to the data, "the most important factor in a cryptocurrency's survival is its performance expectation. Furthermore, though the majority of participants believed working with bitcoin was dangerous, the risk was not a prominent issue for cryptocurrency adoption; the lack of variability in their responses on perceived risk could indicate a lack of explanatory power. Willingness to deal with bitcoin uncertainty, on the other hand, could be a big factor in cryptocurrency adoption."

(Manimuthu et al., 2019)

The study looked at scholarly literature to report on bitcoin's influence and to better comprehend its position in our daily lives. This paper sought to present a normative stance on bitcoin based on the review. The research looked into how the need for bitcoin arose, as well as the prerequisites for bitcoin's operation and its consequences and obstacles. Various characteristics of bitcoin have been described in the literature to answer the research question. "The study also sought to provide a normative viewpoint on bitcoin. The study postulates that bitcoin's major flaw is that it is susceptible to quantum computing. Quantum computers and graphene processors, on the other hand, are not yet available and will likely take some time to develop." Cryptocurrencies, on the other hand, would be in grave danger once quantum computing is achieved. As a result, developers and Bitcoin users must evaluate bitcoin adoption in terms of business operations. Conservative economists are already opposed to cryptocurrencies, claiming that terrorist and criminal organisations mine and exploit the currency. According to the findings, bitcoin provides a plethora of options, which researchers can investigate further and design a strategy for bitcoin use in areas such as healthcare, educational institutions, international travel and tourism, and global logistics.

(Vincent and Evans, 2019)

Using "FM-OLS and causality analysis", this study explores the link between "cryptocurrencies, the internet, mobile phones, financial inclusion, and financial sector development in South Africa, India, Nigeria and China from 2009 to 2017." The empirical findings show "a significant positive relationship between cryptocurrency, internet usage, and mobile subscriptions and financial inclusion and financial sector development, implying that countries with higher levels of cryptocurrency, internet usage, and mobile subscriptions have higher levels of financial inclusion and financial sector development". A causality analysis

supports this conclusion, revealing that "bitcoin, internet use, and mobile subscriptions all contribute to financial inclusion and financial sector development in the four countries studied."

(Gil-Cordero, Cabrera-Sánchez and Arrás-Cortés, 2020)

The aim of this study is to look at many aspects that influence the purpose of using cryptocurrencies by creating a new theoretical model and evaluating it with the PLS technique. The findings show that "trust, rather than performance expectancy, has the largest impact on customer behavioural intention". Furthermore, it has been discovered that electronic WOM is the construct which has more impact on influencing a higher level of trust. The report recommends that cryptocurrency middlemen and inventors examine the relevance of customer pleasure in order to boost trust.

(Marella, Uperti and Merikivi, 2020)

The study aims to analyse the underlying characteristics of the technologies that enable cryptocurrency trust to remain little understood. It employed a "corpus of 1.97 million discussion posts about bitcoin, the oldest and most widely used cryptocurrency," to find these characteristics. It picked "functionality, reliability, and helpfulness as the primary constructs with which to measure users' confidence in technology based on previous research and uncovered 11 different traits connected to three important technical aspects that are essential in establishing and maintaining consumer trust in bitcoin." Trust is semantically related to transfers, immutability, and openness among these 11 traits, with immutability and openness being unique to cryptocurrencies based on blockchain technology. Other semantically related properties to trust include "ledger immutability and openness, with the former ensuring safe, secure and fair transactions and the latter part making transaction information public." Immutability refers to the fact that the bitcoin ledger's transaction history cannot be changed,

amended, or deleted by anyone. The term openness refers to "the data on the bitcoin blockchain being accessible to anyone, making the system entirely transparent." Transparency is achieved through openness, whereas accountability is achieved through immutability.

(Guo and Donev, 2020)

The review paper examined the existing cryptocurrency literature for comprehending the current state of the area and its prospective research future. Bibliometrics and network analysis methodologies have been used in the study to give a systematic review of the cryptocurrency literature. From January 2008 to June 2018, 833 publications from the Scopus and Web of Science were collected. To identify players with substantial influence in cryptocurrency field, the study looked at descriptive data, country contributions, reference co-citation, cooperation and author collaboration networks. Based on the findings, the authors postulate that "while cryptocurrency research is growing at a breakneck pace, scientific cooperation between countries and authors is still insufficient. The early-year literature that provides fundamental understandings of cryptocurrencies and bridges different academic domains provides the intellectual foundations of the cryptocurrency domain. According to the findings, the current research focus is on cryptocurrency market analysis, which includes market behaviours and trading characteristics."

(Xu and Huang, 2020)

The study investigated a model for blockchain sharing in the financial space, which will provide an "active relationship between the value of bitcoin and compute resources, as well as market and labour behaviour". Based on those behaviours, the model may modify "the price of resources and the pay for maintaining a system." The study bases the "value of cryptocurrency" on the number of computing resources involved and defines cryptocurrency

as the worldwide trade of computation resources. Finally, it offers a functioning example that governs the behaviour of anonymous participants using financial regularities and dynamically incentivizes/discourages involvement.

(Amsyar et al., 2020)

The study systematically reviewed the existing literature on cryptocurrency. Based on the existing literature, the study concludes: "cryptocurrency is digital money that has no physical existence yet has value. The usage of blockchain technology can help to improve the security of user data. Cryptocurrency's value cannot be calculated. This cryptocurrency is digital money that is decentralised. That is, in a transaction process, there are no third parties who operate as intermediates. To protect its security, this coin makes use of Blockchain technology. Because there is no middleman, it may be simpler for users to conduct transactions fast when they utilise cryptocurrency. Cryptocurrency data is permanently saved on the blockchain network, making it impossible to modify."

(Baur and Dimpfl, 2021)

The study showed that Bitcoin price volatility is extraordinary, about "ten times higher than the volatility of major exchange rates (US dollar against the euro and the yen)". The heightened volatility has hurt its potential importance in portfolios. The authors argue, "according to the findings bitcoin cannot be used as a means of exchange and has very limited utility as a risk-diversifier." Despite this, the research used Bitcoin's deflating feature as a theoretical framework to demonstrate that it has a store of value qualities over long time horizons.

(Nolasco Braaten and Vaughn, 2021)

This article looks at cryptocurrency cases from the United States District and Circuit Courts to see if "Gottschalk's convenience theory of white-collar crime" can be applied to the case of

cryptocurrency. In addition, "the study wants to see if the situations in which cryptocurrency offences occurred really support the convenience theory or not. The convenience hypothesis of white-collar crime appears to be supported by a review of case law from the United States circuit courts and federal districts involving crimes and fraud related to cryptocurrency: financial gain, either for the firm or for personal use, motivated the defendants in various schemes." Based on the findings, the authors postulate that "the defendants' position in the companies gave them access to resources that helped them commit fraud through the following mechanisms: operation of front companies; relationship building by defendants; overstating profits that investors would receive from purchases of virtual currencies, representing tokens as safe and reliable investments when they were not, and overestimating abilities and capacities to provide services promised to investors in securities fraud; Breaching their fiduciary duty to their customers and company investors by misappropriating profits for personal gain; and using the dark web to maintain anonymity".

2.3. Cryptocurrency as a Financial Asset

(Baek and Elbeck, 2015)

The study used detrended ratios to assess the relative volatility by using daily return data from "Bitcoin and the S&P 500 Index." The drivers of Bitcoin market returns are then studied by modelling "Bitcoin market returns" with specified economic variables. The findings offer substantial evidence that "Bitcoin volatility is driven by internal (buyer and seller) factors, leading to the conclusion that the Bitcoin market is now highly speculative".

(Brière, Oosterlinck and Szafarz, 2015)

The study examined "Bitcoin as an investment from the perspective of an investor in the US with a diverse portfolio (includes both traditional as well as alternative investments), using weekly data from 2010 to 2013." The authors state that "during the time period under review,

Bitcoin investment exhibited a number of distinguishing characteristics, including an extremely high average return and low volatility; it had a very poor correlation with other assets." Bitcoin investing offers large diversification benefits, according to spanning testing. The study showed that "even a modest percentage of Bitcoins in a well-diversified portfolio may significantly enhance the risk-return trade-off". However, the authors suggest that "the findings should be interpreted with caution since they may indicate early-stage behaviour that may not endure in the medium or long term".

(Eisl, Gasser and Weinmayer, 2015)

The study examined "the effect of Bitcoin investment in a well-diversified portfolio." Due to the "non-normal nature of Bitcoin returns", it suggested a "Conditional Value-at-Risk paradigm" instead of the traditional mean-variance method, which does not require regular distribution of returns on assets. According to the findings, "Bitcoin should be incorporated in ideal portfolios. Even while investing in Bitcoin raises a portfolio's risk, the higher returns outweigh the added risk, resulting in superior risk-return ratios".

(Dyhrberg, 2016 a)

The study aims to investigate bitcoin's hedging possibilities using the same asymmetric GARCH technique that was used to investigate gold. The findings demonstrated that "bitcoin may be used to hedge against equities in the Financial Times Stock Exchange Index. In the near run, bitcoin may also be used as a hedge against the US currency". The author concludes that "Bitcoin has some of the same hedging capabilities as gold, and it may be used by market analysts to hedge market risk using a number of instruments".

(Dyhrberg, 2016 b)

The study used GARCH models to investigate bitcoin's financial asset potential. The early concept resembled gold and the dollar in various ways, implying hedging possibilities and

advantages as a currency. The findings based on the "asymmetric GARCH model" revealed that "bitcoin could be effective in risk management and appropriate for risk-averse investors anticipating market downturns". Overall, "bitcoin plays a significant role in financial markets and investment management since it falls midway between gold and the US dollar on a scale spanning from 100% currency to 100% "store of value" benefits."

(Hayes, 2017)

The study determined the most likely factors of cryptocurrency value development, including bitcoin. At the moment, "the total value of all bitcoins in existence is estimated to be around $7 billion, with more than $60 million in notional value changing hands every day; the level of competition in the network of manufacturers, the rate of a unit of production, and the complexity of the algorithm used to mine for the cryptocurrency were found to be the three main drivers of cryptocurrency value in a regression model based on cross-sectional empirical evidence on 66 of the most widely used cryptocurrencies." Further, "these are minor discrepancies in the cost of generating one digital currency compared to another, demonstrating differences in relative production costs – power goes in, and cryptocurrency comes out. As a starting point, a no-arbitrage scenario for Bitcoin-like coins is created, followed by the general framework of a cost of production model to determine a bitcoin's fair value."

(Hong, 2017)

The momentum of bitcoin time-series returns has been documented in this research paper. The findings show that "returns persist for one to eight weeks before partially reversing over longer time horizons, supporting sentiment theories of initial under-reaction and delayed over-reaction". Bitcoin returns have similar time-series momentum to traditional asset returns, despite the fact that the time duration is substantially shorter. The study hypothesised that this could be due to bitcoin investors' considerably faster nature and short-term memory.

The study also found that "for given levels of portfolio return volatility, a combined portfolio comprising S&P 500 and Bitcoin momentum approach offers improved expected return, skewness, kurtosis, and Value at Risk".

(Osterrieder and Lorenz, 2017)

The study presented an "extreme value analysis" of returns from Bitcoin investment. It focused more on the tail risk features and did a "comprehensive univariate extreme value analysis." The return characteristics were then compared with the exchange value of G10 country currencies against the US dollar. The study found that "bitcoin return distribution not only has more volatility than traditional G10 currencies but also has stronger non-normal features and larger tails".

(Baur, Hong and Lee, 2018)

The study analysed how Bitcoin is used at present whether as a means of payment or an investment, and also the way it will be utilized in future. The authors defined Bitcoin as "digital money within a decentralized peer-to-peer payment network, and it is a hybrid between fiat money and commodity money without intrinsic value and independent of any government or monetary authority". The authors state that "the study analysed the statistical properties of Bitcoin with other investment assets and found that the properties of Bitcoin are uncorrelated with other investment assets." It has been found in the study by analysing the transaction date of Bitcoin that they are mainly used as a speculative asset rather than as a substitute to fiat money.

(Borri, 2018)

The study utilised CoVaR "to estimate conditional tail-risk in the markets for bitcoin, ripple, ether, and litecoin" and found that "these cryptocurrencies are substantially susceptible to tail-risk within crypto-markets, but not with regard to other global assets like the US equities

market or gold." Notwithstanding the fact that returns from cryptocurrency are strongly linked, the study demonstrated that "idiosyncratic risk may be significantly minimised and that cryptocurrency portfolios provide greater risk-adjusted and conditional returns than individual cryptocurrencies". These findings suggest that including cryptocurrency portfolios in an investor's portfolio might provide attractive returns and hedging qualities.

(Henriques and Sadorsky, 2018)

The ramifications of substituting bitcoin ("digital gold") in the place of gold in an investment portfolio were examined in this study. To estimate the lowest variance equity portfolios, the study applied "a variety of multivariate GARCH models (dynamic conditional correlation (DCC), asymmetric conditional correlation (ADCC), and generalised orthogonal GARCH (GO-GARCH)". Long and short portfolios were both taken into account. The findings of the study showed that "Risk-averse investors will be prepared to pay a high-performance fee to convert from a gold-based portfolio to a bitcoin-based portfolio".

(Jiang and Liang, 2018)

A model-less convolutional neural network with past prices of a collection of financial assets as input was described in this article, which produced portfolio weights for the set. A bitcoin exchange provided 0.7 years of pricing data to train the network. The training was done in a reinforcement manner, with the goal of maximising the accumulative return, which is the network's reward function. In the same market, back-test trading trials using a 30-minute trading time yielded 10-fold profits in 1.8-month intervals.

(Klabbers, 2018)

This research looks into "whether bitcoin as an investment asset may provide diversification advantages, specifically whether it can act as a hedge or a safe haven". The mean-variance framework, which may uniquely integrate policy restrictions, is combined with Monte Carlo

Simulation in this study to handle the estimate risk issue, which is a critical component for a highly volatile asset like bitcoin. When looking at bitcoin's performance from the viewpoint of worldwide investment, it takes on a whole new meaning. The findings are unswerving, signifying, "bitcoin is a good diversifier with a weight allocation of 0% to 5% on average. For a worldwide market portfolio, Bitcoin has no hedging or safe haven features. Even though bitcoin has shown to be a fairly reliable investment, there are certain risks associated with it due to its properties and usage".

(Lee, Guo and Wang, 2018)

The study looked into the advantages and disadvantages of utilizing cryptocurrencies as an alternative investment, on the basis of their performance. The "static and dynamic conditional correlations" between traditional investment assets and cryptocurrencies were compared. The study found, "because the correlations between cryptocurrencies and traditional assets are constantly low and the average daily return of most cryptocurrencies is higher than that of traditional investments, the CRIX (Crypto Index) and cryptocurrencies can be a suitable alternative to help diversify portfolio risks".

(Li et al., 2018)

The study used a GARCH-type model to calculate the return risk of Virtual Financial Assets (VFAs) through the case of Bitcoin. It investigated "the asymmetric impacts of speculation, investor attentiveness, and market interoperability on return risks under different risk regimes of VFAs using a Markov regime-switching Regression (MSR) Model". The findings revealed that "speculation and investor attention has a large beneficial impact on VFA risks in all regimes, although market interoperability only has a favourable impact on risk in the high-risk regime. In various regimes, these three elements have an unequal influence on risks. According to the findings, risk regime-switching is likewise asymmetric, although the

medium risk regime is more stable than the others. As a result, some restrictions, such as limiting the number of transactions or limiting the trading amount under a high-risk regime, are used to manage investor and arbitrageur operations. If investors are encouraged to access when return risk is minimal, it will revert to a middle level".

(Alfieri, Burlacu and Enjolras, 2019)

The purpose of this article is to raise the question of Bitcoin's real nature and to investigate its performance experimentally. After debating the currency's origins and defending its asset status, this study used established models like "the CAPM and the Fama-French 3-Factors" to experimentally examine Bitcoin's performance. It looked at daily data from August 2010 to June 2016 and found that including Bitcoin in a portfolio not only enhances diversification but also produces positive and large risk-adjusted returns in the World, Europe, and Asia-Pacific.

(Baur, 2019)

This article examined whether Bitcoin improves investment portfolios in terms of both financial returns and reduced carbon emissions. It showed that "adding Bitcoin to a diversified equities portfolio improves the portfolio's risk-return relationship but not its long-term sustainability through lowering carbon emissions". More particular, current Bitcoin network carbon footprint estimates drastically reduce portfolio sustainability, even for tiny Bitcoin allocations, because Bitcoin mining is a tremendous energy- and carbon-intensive activity. Further, the study investigated the link between Bitcoin pricing and energy prices further, given Bitcoin's high energy use. Based on the findings, the authors state, "Bitcoin's energy use has an impact on energy business values, which in turn has an impact on Bitcoin pricing". Overall, the data supported the notion that Bitcoin investments are unsustainable in terms of carbon emissions. However, the authors suggest that "if Bitcoin miners use more

renewable energy sources in the future, such as hydrogen or solar power, the Bitcoin network might grow cleaner, potentially turning Bitcoin into a carbon diversifier."

(Corbet et al., 2019)

The study has provided a comprehensive overview of the existing empirical literature based on the primary areas connected to cryptocurrency markets since 2009 when Bitcoin has come into existence as a financial asset. The authors postulate that "despite their phenomenal price rises in recent years, cryptocurrencies have been accused of pricing bubbles. This is due to the trilemma that exists between regulatory oversight, the potential for illicit use due to anonymity within a young, underdeveloped exchange system, and infrastructure breaches influenced by the rise of cyber-criminality. Each has an impact on people's perceptions of cryptocurrencies as a viable financial asset class and store of wealth".

(Canh et al., 2019)

The "structural fractures and volatility spillover" of the seven most popular cryptocurrencies – "Bitcoin, Bytecoin, Litecoin, Steller, Ripple, Monero, and Dash" - are examined in this paper. The study postulates that "the structural breaks are universally present in these popular cryptocurrencies, according to the cumulative sum test for parameter stability, Granger Causality test, LM test for ARCH, and Dynamic conditional correlation MGARCH model; and (2) the shifts spread from smaller cryptocurrencies (in market capitalization) to larger ones". Notably, there are "volatility spillovers between cryptocurrencies with high positive correlations." The findings asserted that "diversification benefits have limitations within the bitcoin industry." Further, the authors note that "even though bitcoin and other cryptocurrencies are interdependent through price, the study fails to prove the hypothesis that those cryptocurrencies which have a similar price formation mechanism to Bitcoin holds a stronger price relationship with Bitcoin."

(Hatemi-J, Hajji, Bouri, and Gupta, 2019)

This study looks into the possibility of diversifying a portfolio with Bitcoin, bonds, shares, and the US dollar. In order to build the portfolio, the study employed two methods. The first is the traditional minimal variance technique, whereas the second is focused on mixing risk and return while constructing the portfolio. It has been observed that "when compared to the same figure for the best single asset, in this case, Bitcoin, the portfolio based on the lowest variance technique does not result in an increase in return per unit risk". In the optimal solution, the portfolio constructed by merging risk and return displays a yield per unit risk that has been higher than the comparable amount for each of the four assets. The findings showed that "in terms of return per unit risk, the portfolio diversification benefit with regard to these four assets occurs only if the portfolio is created using the new technique".

(Hrytsiuk, Babych and Bachyshyna, 2019)

The daily average returns of the major cryptocurrencies were examined in this paper: "Bitcoin, Bitcoin Cash, Litecoin, XRP, Ethereum, and NEM". The study established that "bitcoin returns do not follow a normal distribution but rather follow a Cauchy distribution." It created analytical formulations for VaR risk measures using the Cauchy distribution function and performed calculations of cryptocurrency risk assessment using the approach VaR. The sets of ideal cryptocurrency portfolios were created as a consequence of optimization. Bitcoin's supremacy in the cryptocurrency portfolio is predetermined by its high return and minimal risk.

(Inci and Lagasse, 2019)

This research looks at "the impact of cryptocurrencies in increasing the performance of traditional investment portfolio assets." The authors state that "the study attempts to give a more comprehensive analysis of the dynamic character of cryptocurrency as individual

investment options and as elements of optimal portfolios utilising a large sample period that includes both big value increases and dramatic value drops in the first half of 2018." The study used "Merton's (1990) mean-variance optimization technique to develop the "risk and return characteristics of the efficient portfolios", as well as the optimal ratio of each individual asset in the portfolio." The authors show that "Ripple is the best cryptocurrency for a single investment, followed by Bitcoin and Litecoin. In addition to the original goals for which they were created, cryptocurrencies can be useful in portfolio development and investment. Bitcoin is the perfect cryptocurrency for increasing the features of an ideal portfolio. As single cryptocurrencies, Ripple and Litecoin rank second and third, respectively, in terms of their usefulness in an ideal portfolio. The most optimal outcomes are obtained by including all of these cryptocurrencies in a portfolio". Cryptocurrency contributions to the ideal portfolio change over time. As a result, the study's findings and conclusions cannot be guaranteed to be repeated in exactly the same way in the future. However, the authors postulated that cryptocurrencies' growing popularity and distinct traits would aid their future inclusion in investing portfolios.

(Jang et al., 2019)

The causal link among "Bitcoin and other financial assets" was investigated in this article. It first tested the "Granger causality" and then obtained "transfer entropy as an information-theoretic approach". Transfer entropy, contrasting the "Granger causality test", clearly demonstrates "underlying mutuality between Bitcoin and other investment assets, such as gold, US dollar and equities." The authors state that "the dynamic rise–fall pattern in return series, on the other hand, illustrates an asymmetric information flow from other assets to Bitcoin for symbolic transfer entropy". The findings suggest that "the Bitcoin market interacts actively with other asset markets, and that its long-term equilibrium synchronises with that of other investment assets".

(Liu, Tsyvinski and Wu, 2019)

In this study, "the cross-sectional expected bitcoin returns were captured by three factors: cryptocurrency market, size, and momentum". It created cryptocurrency equivalents using an inclusive list of stock market pricing, in addition to the characteristics related to the market. The combination of nine cryptocurrency elements resulted in effective long and short-term strategies and tactics with a large and statistically significant excess rate of returns. The study showed that "the bitcoin three-factor model can account for all of these strategies".

(Nawapong et al., 2019)

This study used "VaR" to quantify the market risk of an extensive portfolio of assets; and equities of India, Japan, US, and Vietnam countries along with cryptocurrencies like Bitcoin and Ripple. "The historical simulation strategy, the delta normal approach, and the Monte Carlo simulation approach" were employed in this work to calculate VaR. The dependency structure and the reliance measurements are not tiny and mainly positive, revealing a clear pattern. The study used a copula function to allow for dependence across distinct assets. The portfolio VaR was computed in the setting of "Gaussian copula and Student's t-copula". The results reveal that, at a 99 per cent probability level, copula models always beat the classic VaR model for sample portfolios. The findings suggest that most VaR backtesting procedures accept null hypotheses at a 95% confidence level. This study implies that for assessing portfolio copula-based VaR, both Student's t copula and Gaussian copula properly applied to capture the dependence are more acceptable. This is because they have the capacity to adjust not just the amount of dependency but also the tail strength and total dependence over time.

(Ram, 2019)

By building on previous research, this study tries to evaluate whether bitcoin typifies a new class of asset. The past literature on asset classes is thoroughly examined before being applied to bitcoin. Profile of Politico-economic condition, investability, correlation of return, and the profile of the risk and reward are the four important asset class factors considered. It has to be noted that "the conclusions have been based on statistical approaches for the third and fourth criteria." According to this study, "bitcoin is a separate alternative investment and asset class, and there are numerous investing prospects. The decentralised and consensus-based bitcoin has a politico-economic character that is distinct from that of other asset classes. Other asset types have little or no association with bitcoin. Using Sharpe Ratios, it is demonstrated that bitcoin outperforms most asset classes in terms of risk-adjusted returns."

(Stensås et al., 2019)

The study used the "GARCH Dynamic Conditional Correlation (DCC) model" to examine the potential of Bitcoin to be used as a "hedge or safe haven or a diversifier" by the investors in developed as well as emerging markets. The study sample frame consists of ten commodity series, five regional indices, 7 advanced and 6 emerging economies. According to the findings, "Bitcoin operates as a hedge for investors in most developing countries, such as Brazil, Russia, India, and South Korea, but only as a diversifier for investors in developed countries and commodities. Further, Bitcoin serves as a diversifier for all ten commodities examined and served as a safe haven asset for both US and non-US investors throughout the US election in 2016, the Brexit vote in 2016, and the bust of the Chinese market bubble in 2015".

(Symitsi and Chalvatzis, 2019)

The study used "four alternative approaches to determine the economic advantages net of transaction costs, looking at Bitcoin's out-of-sample performance in a wide range of investment vehicles and a well-diversified portfolio." The findings suggest that "including Bitcoin provides statistically significant diversification benefits, which are especially evident for commodities. Most notably, the low correlation of Bitcoin with other assets reduces total portfolio risk, although this is compensated by its extreme volatility. Nevertheless, when investors accommodate a battery of economic instruments, the incorporation of Bitcoin pays off little". Further, the findings of the study showed that "non-bubble situations, which aren't characterised by skyrocketing cryptocurrency values, have significantly reduced benefits."

(Wang et al., 2019)

Using a "multivariate quantile model" and the "Granger causality risk test", the study looked at "the risk spillover impact from Economic Policy Uncertainty (EPU) to Bitcoin". As substitutes for EPU, it employed the "US EPU index, equities market uncertainty index, and VIX". The analysis found that in most cases, "the risk of spillover from EPU to Bitcoin is insignificant". Furthermore, the study gives helpful information on asset portfolio construction for investors who have Bitcoin investing ideas since it can operate as a "safe haven or diversifier" during economic uncertainties.

(Weinmayer, Gasser and Eisl, 2019)

The study answers, "how does the addition of Bitcoin influence the asset allocation of portfolios that are already well-diversified? Is the weight of Bitcoin in an already well-diversified portfolio resilient in terms of the optimization process utilised, and does a backtesting approach imply that Bitcoin would be able to improve the risk-return profile of an already well-diversified portfolio?" The study found that "improvements led to Bitcoin being

included in efficient portfolios even in existing well-diversified portfolios". In addition, the Bitcoin price's features may give a diversification advantage. Furthermore, under the various optimization frameworks, including Bitcoin in the relevant portfolios has intriguing implications for the weights of government bonds.

(Wheatley et al., 2019)

By analysing the synchronicity (or lack thereof) of fundamental and technical data, the study established a robust diagnostic for Bitcoin booms and collapses. A basic value is measured and demonstrated to be severely surpassed, in at least four instances, by bubbles that develop and burst, by means of a generalised "Metcalfe's Law" grounded on network features. The analysis shows "a uniform super-exponential unsustainable expansion in these bubbles. The Log-Periodic Power Law Singularity (LPPLS) model, which parsimoniously captures numerous positive feedback processes, including herding and imitation, is used to simulate this universal pattern. Although the precise time and trigger (which straw breaks the camel's back) are exogenous and unpredictable, the LPPLS model is shown to provide an ex-ante warning of market instabilities, quantifying a high crash hazard and a probabilistic bracket of the crash time consistent with actual corrections". The authors postulated, "looking ahead, our research reveals a significant but not unprecedented overvaluation in the price of Bitcoin, implying several months of erratic sideways Bitcoin prices."

(Vogel, 2019)

This research investigates how cryptocurrencies gain value by examining historical events and how they affected the price of cryptocurrencies. This had been accomplished by first classifying comparable cryptocurrencies using a classification system, as cryptocurrencies with similar characteristics should perform similarly in terms of price development. The causes of the price fluctuations of the grouped cryptocurrencies were next investigated.

Finally, the project gave an overview of events that impact the price of cryptocurrencies, assisting in the identification of cryptocurrency value generation. The findings show that "cryptocurrencies with identical features have similar price behaviour. Cryptocurrencies with non-matching features function differently because their value is influenced by unconnected causes." The majority of price changes in the first two categories, on the other hand, have been recognised, implying that cryptocurrencies with comparable characteristics react similarly in terms of price development. As many price changes in the first two categories can be explained, this experiment implies that the qualities of cryptocurrencies have an impact on their value.

(Akhtaruzzaman, Sensoy and Corbet, 2020)

The study used a "VARMA DCC-GARCH model" to look for investment diversification in "global industrial portfolios and bond indexes" using Bitcoin. The study found "decreased dynamic conditional correlations between Bitcoin and industry portfolios and bond indexes, allowing investors to hedge against industry portfolios and bonds by investing in Bitcoin. Further, the result showed shorting the utilities sector is the most effective hedge in a Bitcoin/industry (bond) portfolio. Furthermore, during downturns, dynamic correlations are observed to be significantly diminished, and investment in Bitcoin is proved to be an effective hedging mechanism for a wide range of industrial sectors and bonds, with results that are robust when using a cryptocurrency index and US industry portfolios". Instead of using worldwide industry portfolios and Bitcoin, "the results are solid when using investment portfolios based on the US industry and on a cryptocurrency index." The findings of the study can assist investors in making informed investment decisions.

(Ahmed, 2020)

The study, "using high-frequency data, investigated the relationship between volatility and return on investments in Bitcoin at both the concurrent and intertemporal levels." The author state, "four independent metrics of intraday price variability are used to estimate it: realised variance, jump variation, downward realised semi-variance, and negative signed jump variation. All realised volatility proxies have a significant and negative contemporaneous relationship with Bitcoin returns, according to the empirical investigation. However, there is little evidence of a negative intertemporal relationship between returns and realised variance, jump variation, or downside realised semi-variance. As a result, it appears that the presence of a favourable risk-reward trade-off in Bitcoin markets is unfounded. Even after controlling for a number of important factors of the Bitcoin price development process, the conclusions hold up."

(Bedi and Nashier, 2020)

The study analysed the diversification efficiency of using Bitcoin for a global investment portfolio that has been distributed across six classes of assets. This study has been done from "the perspective of an investor dealing with five of the major currencies in the world, the British Pound, Japanese Yen, Euro, and Chinese Yuan." It used "modified conditional value-at-risk and standard deviation as risk metrics to optimise portfolios across 3 asset allocation techniques, taking into account the extended decrease in Bitcoin's value during 2018." The results demonstrated that "portfolios denominated in Japanese Yen, Chinese Yuan, and US Dollar account for a larger share of optimal Bitcoin investment and have higher risk-adjusted returns as a result of Bitcoin investment. The study also conducted a complete risk-adjusted analysis of portfolios with and without Bitcoin to highlight the dramatic differences in the degree of Bitcoin's cross-currency diversification benefits. From a portfolio theory

perspective, the findings reveal a significant discrepancy in Bitcoin trading volumes between national currencies."

(Bhullar and Bhatnagar, 2020)

The study analysed the association between Bitcoin price changes and stock market movements in India and China. 1133 daily observations were gathered and examined between January 1, 2015, and November 29, 2019, using the statistical tool E-views. To achieve the paper's goal, statistical approaches such as Granger Causality, Johnsen Co-integration, and VECM were used. The paper's empirical findings show that "Bitcoin and Indian and Chinese stock markets have a long-term link; in particular, Sensex has the unidirectional causality with Bitcoin. The significant t-statistics indicate that Sensex has a considerable influence on Bitcoin price fluctuation. The findings also show that there is no indication of a causal link between Bitcoin and the Chinese Stock Exchange, implying that global investors and policymakers can benefit from a better risk-return mechanism."

(Koutmos, 2020)

The author hypothesized that "despite their seemingly appealing autonomous behaviour relative to economic determinants, Bitcoin prices may still be subject to the same sorts of market risks that affect the performance of traditional financial assets". This study proves that, "while returns on the aggregate market portfolio cannot explain Bitcoin returns, other asset pricing risk factors, such as interest rates and implied stock market and foreign exchange market volatilities, are important determinants of Bitcoin returns, using a Markov regime-switching model to distinguish between regimes of high and low Bitcoin price volatility. Differentiating between times of high and low Bitcoin price volatility demonstrates variation in market risk variables' explanatory power; in particular, Bitcoin returns are more difficult to explain during periods of high volatility than during periods of low volatility".

This discovery may help to explain why existing research, which fails to discriminate between different Bitcoin exchange rate regimes, has trouble relating Bitcoin prices to economic fundamentals.

(Lindland, 2020)

The study aims to delve into Bitcoin's technological and financial qualities, as well as how they connect to the Bitcoin market and other areas of the financial world. The research questions that the study tried to answer are: how does the bitcoin market work? And what does the future look like for Bitcoin? The thesis uses a variety of quantitative analyses in conjunction with current economic theory, models, and ideas to address the research questions. Cost of production analysis of Bitcoin, a series of regression analyses, and portfolio analysis are the tools used in the study. The supply side of Bitcoin is set, and the demand side is ultimately an essential component driving the Bitcoin market, according to its technological and financial qualities. The results of the cost of production research show that there is a considerable link between the Bitcoin spot price and the underlying basic cost of production and that Bitcoin, like other commodities, tends to drift towards the production cost. The results of the regression studies show that the Bitcoin spot price and the underlying basic cost of production have a substantial link. Finally, the portfolio analysis reveals Bitcoin to be an excellent diversifier with little connection to a variety of other assets and indexes. The study concludes that demand in the Bitcoin market is projected to rise, given that regulation is in place, Bitcoin's qualities are allegedly equivalent to gold, and there is now uncertainty in the financial markets.

(Platanakis and Urquhart, 2020)

This article investigates the advantages of integrating Bitcoin investments into a standard stock and bond benchmark portfolio. The study examined "the potential out-of-sample

portfolio advantages of integrating Bitcoin in a stock-bond portfolio for a variety of eight prominent asset allocation techniques using data up to June 2018." The research demonstrates that "the benefits of Bitcoin are enormous, with significantly greater risk-adjusted returns, across all asset allocation methods and risk aversions. Rolling estimate windows, transaction fees, a commodities portfolio, different indices, short-selling, and two more optimization strategies such as higher moments with (and without) variance-based restrictions all had little effect on our results (VBCs)." The study concludes that investors have to consider including Bitcoin in their investment portfolio because it delivers much greater returns (risk-adjusted).

(Sakemoto, 2020)

This paper presented an approach for enhancing forecast-based cryptocurrency portfolios. The research anticipated "the returns on four liquid cryptocurrencies: Bitcoin, Litecoin, Ripple, and Dash" and used a dynamic allocation approach to establish the weights of the coins. The performance fee metric was used to evaluate portfolio performance. The suggested portfolios beat the benchmark portfolio using the traditional risk aversion component, according to the findings. An investor's weekly profit is equal to 12% of his or her initial investment. In contrast to studies of currency rates, the economic benefit is sensitive to a change in the risk aversion parameter, which is attributable to the significant volatility of cryptocurrencies. The study predictors are price momentum effects-related, and they outperform commonly utilised network components.

(Shanaev et al., 2020)

The effect of fifty-one per cent attacks on "proof-of-work cryptocurrency values" is examined using an event studies approach in this article. The research is based on a comprehensive sample of 14 separate assaults on 13 different cryptocurrencies. The majority of assaults on blockchains have been demonstrated to quickly lower related coin prices by 12

to 15% across several event studies approaches. In various event frames, a significantly negative price reaction is robust. The study observed, "one week after the attack, coin values have not recovered to pre-attack levels. Prior to the 51 per cent attack, there was evidence of pump-and-dump schemes, but the market shows excellent efficiency following the attacks. 51 per cent assaults, which are most common in tiny proof-of-work currencies with low hash rates, are seen to be a major risk factor for cryptocurrency investments".

(White et al., 2020)

The study attempts to classify Bitcoin through exploratory analyses. The authors state that "bitcoin and other cryptocurrencies have piqued the interest of both engineers and investors. They've grown in popularity, with over 2,000 Bitcoin-like cryptocurrencies in circulation. Cryptocurrencies are not regulated in the majority of jurisdictions. If we classify cryptocurrencies as currencies, securities, or derivatives, or a money services (transfer) vehicle, we can determine whether existing restrictions apply to them." The study compared "the features of Bitcoin behaviour to currencies, asset classes like derivatives, technology-based products and potential technology-based products like Ether and the security SPY, and speculative financial bubbles using a number of methodologies." The findings of the study asserted that "Bitcoin's behaviour is more akin to that of a technology-based product, an emergent asset class, or a bubble event than that of a currency or a security, and that existing currency and security rules should not apply to cryptocurrencies."

(Naeem et al., 2020)

The study analysed "the hedging, safe-haven, and diversification possibilities of Bitcoin and gold for various US industry portfolios and investment styles." The study found, "gold is a weak hedge for the style and industry portfolios, except for utilities, energy, and telecom and for large-cap portfolios, gold has a stronger hedging potential than bitcoin, which has a

negligible hedging potential. Bitcoin, on the other hand, has hedging potential in noncyclical businesses". Despite the fact that gold requires a larger investment to protect against downside risk, it is still a better hedging asset than bitcoin. Finally, a conditional diversification study reveals that "gold is a superior and reliable diversifier for style and industry portfolios. Overall, the data show that gold is a better safe-haven and hedging asset than bitcoin".

(Xi, O'Brien and Irannezhad, 2020)

This study examines "the socio-demographics of cryptocurrency investors and the variables that affect their investment choices across a range of Initial Coin Offerings (ICOs); utilizing a web-based revealed preference survey of Australian and Chinese blockchain and cryptocurrency enthusiasts, a Multinomial Logit model was used to analyse the characteristics of cryptocurrency investors and the determinants of the choice of investment between cryptocurrency coins and other types of ICO tokens." The findings suggest that "the determinant of these two choices differs across Australian and Chinese bitcoin users. Age, gender, education, employment, and investing experience are all key determinants in these two options, and they correlate well with the behavioural literature. Furthermore, there is a variation in how Chinese and Australian investors value deterrent factors and investing techniques, in addition to disparities in how they rank ICO features".

(Burggraf, 2021)

The study provides evidence for the effectiveness of using HRP as a risk management tool for crypto investments. The author postulated that "It's been recognised for a long time that estimating large empirical covariance matrices can result in very unstable solutions, with estimation errors more than cancelling out the benefits of diversity. We use the Hierarchical Risk Parity technique in this work, which uses state-of-the-art mathematics to a huge

portfolio of cryptocurrencies, combining graph theory and unsupervised machine learning." The findings show, "in an out-of-sample comparison with traditional risk-minimization approaches, Hierarchical Risk Parity outperforms in terms of tail risk-adjusted return, indicating that it might be used as a risk management tool to help cryptocurrency investors better control their portfolio risk. Further, different rebalancing intervals, covariance estimation windows, and techniques had no effect on the results".

(Ganesan, Venkata and Harika, 2021)

On the basis of the existing literature, this study presents a thorough assessment of risk estimate approaches for cryptocurrencies. In comparison to stocks and gold, cryptocurrency markets are more volatile, according to volatility studies. VaR (Value-at-Risk) metrics have a wide range of distributions. VaR and quantile regression were extensively used to calculate tail risk assessments. The purpose of portfolio optimization strategies included ratio-based estimations. The Omega and Sharpe ratios were used in single-objective and multi-objective optimizations, respectively. This study aids in the evaluation of several empirical, statistical, and sophisticated risk estimate methods for cryptocurrency marketplaces. It also gives an overview of quantitative risk estimation and the use of risk assessment in optimizing investment portfolios.

(Li et al., 2021)

By focusing on optimization of investment portfolio, the study assessed "how the financial industry may use Bitcoin to improve the efficiency and wealth of society." The author states that "the fourth industrial revolution has seen a steady increase in the use of technology in all aspects of life, including banking and investment. In the midst of all of this, Bitcoin appeared on the financial markets in 2008 as one of the most significant developments of our century. However, it has been closely analysed since then for the benefits and hazards it poses in

terms of economic growth, financial system stability, and general societal welfare." The findings reveal that "Bitcoin has a significant tendency to improve an investor's risk-reward profile. Once Bitcoin is included in the universe of investable assets, this efficiency is plainly seen in the upward movements of the efficient frontiers. The efficiency of Bitcoin is valid for both limited and unrestricted short selling. It's crucial to highlight that the study conclusions are based on data collected over a decade and provide a medium to long-term perspective on Bitcoin, which was not the case in previous researches."

(Qarni and Gulzar, 2021)

The benefits of trading in alternative currency in the forex market and Bitcoin for portfolio diversification have been examined in this study. The study was conducted using "the spillover index technique, the spillover asymmetry measurements, and the frequency connectedness method". The data show that "there is low-level integration and asymmetric volatility spillover across Bitcoin markets and foreign currency pairings for six main trading currencies, as well as a prominent role for short-horizon spillover (US dollar, euro, Japanese yen, British pound sterling, Australian dollar, and Canadian dollar). Alternative monetary system for foreign currency portfolios comprising of main trading currencies, bitcoin trading in euro has been demonstrated to give the most substantial portfolio diversification advantage. Further, the results on the Bitcoin market's spillover dynamics and portfolio diversification capacities for major trading currencies' foreign exchange markets have important implications for portfolio diversification and risk mitigation."

2.4. Cryptocurrency as Future Money

(Jenssen, 2014)

By responding to two key issues, "why are bitcoins valuable? why and how will countries attempt to control bitcoin use? this study aims to provide a thorough analysis and economic

knowledge of Bitcoin." The author states, "the research begins with a discussion of money itself, constructing a framework of different sorts of currencies in terms of their uses and attributes, which will serve as the foundation for the investigation. The paradigm created above is then used to identify bitcoin as digital commodity money based on its technological qualities." Following this, various applications of bitcoin to boost its value were examined, with special emphasis on Bitcoin's resistance to regulation. Furthermore, "real-world examples of other commodity currencies were presented to back up the notion that bitcoin can circulate without the need for use value or government endorsement. Governments seek economic control via controlling money, and it will be argued that there are significant reasons for governments to oppose the widespread adoption of bitcoin. This is understandable, given that the usage of bitcoin jeopardises governments' ability to manage money."

(Arnason, 2015)

The study answers "what cryptocurrency is and why it is valuable, as well as its future prospects and if it has the potential to become a mainstream currency in the future". Bitcoin can be defined as a decentralised blockchain-based digital currency. The author postulate that "it is valuable because its supply is restricted, and there is a desire for its cheap transaction costs, secrecy, financial opportunities, and potential for criminal usage. Bitcoin's future prospects are uncertain because of a number of serious drawbacks, including excessive price volatility, vulnerability to hacking, lack of central bank protection, and lack of consumer protection". As a result, the study concludes, "it is unlikely for cryptocurrency to become a widely accepted currency among the general public, as its two key advantages, anonymity and cheap transaction costs, are not necessarily what the normal consumer requires. Cryptocurrency and Bitcoin's technology, on the other hand, may be extended to other currencies or payment systems, potentially having a long-term influence on how people

spend money in the future".

(Kubát, 2015)

The study aims to examine the economic aspects of bitcoin by examining whether it complies with the legal, theoretical and empirical definition of money and analysing the "store of value" role of money on Bitcoin. The study concludes that "the law definition of money compliance is done for Czech, German and EU law in general but attitudes of US and Chinese governments are also mentioned and it has been found that bitcoin can't be easily considered as money; but bitcoin is a better store of value than fiat currencies due to its volatility – results shows that volatility and therefore risk of bitcoin is significantly higher than that of other currencies and assets."

(Zarifis et al., 2015)

This study incorporates digital currency with trust theories developed for e-commerce. The trust in "business-to-consumer e-commerce transactions" involving cryptocurrencies like Bitcoin has been investigated in particular. The authors postulate that "differences in the importance of institutional trust in transactions are studied, and new constructs are proposed; these new structures are included in a new trust paradigm for cryptocurrency transactions." The findings back with the idea that "the pace of adoption and reputation of digital currencies play a role in situational normalcy. As part of structural assurance, the nature of the digital currency, the digital currency payment system, the payment intermediary, the digital currency P2P infrastructure, as well as self-imposed and external regulation, are all deemed legitimate".

(DeVries, 2016)

The report performed a SWOT analysis of Bitcoin and highlighted current activities and events that may have an influence on the shift in economic paradigms. The author states that

"while cryptocurrencies are unlikely to replace traditional fiat money, they have the potential to transform the way Internet-connected global markets engage with one another, removing the obstacles that exist around traditional national currencies and exchange rates". Further, he postulates that "cryptocurrencies have the potential to change digital trade marketplaces by enabling a fee-free trading mechanism".

(Roussou & Stiakakis, 2016)

The study aims to present a research model to analyse the adoption of cryptocurrencies for payment by EU (European Union) companies. According to the authors of the study, "the survey's goal is to determine the degree of diffusion, acceptance, and adoption of digital currency as a technological innovation, as well as the degree of perceived usefulness, ease of use, and security of digital currency as a means of the transaction by businesses, using the Diffusion of Innovations (DOI) Theory (primarily the Innovation Decision Process Model - IDPM) and Technology Acceptance Model (TAM)".

(Presthus and O'Malley, 2017)

The study explored the motivation for the adoption of Bitcoin on the basis of the diffusion of innovation theory. They found that the main motivation for the users of Bitcoin is their "technological curiosity and not monetary incentives or extrinsic influences". Further, the non-users of Bitcoin are interested in it, but they question its security and benefits. The authors suggested four stages for Bitcoin to reach critical mass as per Roger's theory: First, individuals who are highly respected in society should start using Bitcoin; Second, the perception of Bitcoin as innovation must be changed, for instance, by implicating that critical mass has been reached already; Third, Bitcoin has to introduced first to people who are most perceptive to the innovation; Fourth, incentives have to be provided for using Bitcoin. They

concluded by stating that several studies have to be done in the future on Bitcoin as a medium of exchange.

(Sahoo, 2017)

The evolution and long-term viability of bitcoin as a cryptocurrency are topics covered in this article. In order to quantify volatility and gauge growth, the bitcoin logarithmic yield is utilized, which is helpful for figuring out whether bitcoin will be profitable in the long run. According to the researcher, "the increase of bitcoin's transaction volume is on the rise, as more day-to-day transactions are being made with the exchange of Bitcoin. The study also used the ARCH and GARCH methodologies to determine the volatility of this new digital money, with the GARCH result indicating that it is a very volatile currency. As a result, the majority of governments have yet to declare bitcoin to be legal in their jurisdiction. However, if bitcoin remains stable in the future, it will be widely acknowledged across the world, and people will have more trust in cryptocurrency technology and its utility in the long term."

(Alkadri, 2018)

The author postulated that "the unique nature of cryptocurrencies raises difficulties to the rigid implementation of established regulatory procedures, according to this research. Indeed, state and federal officials are unsure whether or not this cutting-edge technology can be regulated and, if so, how." Further, "consumers regularly fall prey to disinformation, which makes it tough for cryptocurrency firms to navigate the hazy regulatory landscape." To redress these issues, the study asserts that "bitcoin works as currency or money and should be regulated as such; following the Common Regulation of Virtual-Currency Business Act, the report recommends that each state create a uniform cryptocurrency-specific framework." The author postulates that "a coordinated strategy like this would lower compliance costs for cryptocurrency companies, safeguard consumers, and offer enough state and federal

supervision."

(Senner, 2018)

This study looks at cryptocurrencies from the standpoint of monetary theory. The development of digital currencies, particularly bitcoin, has reignited old and new monetary disputes. The study explored attempts to use 'stablecoins' to supplement or replace fiat money. It began by looking at today's endogenous and debt-backed money. Second, attempts to employ stablecoins to get around fixed supply coins like bitcoin's intrinsic speculative and deflationary architecture. Stablecoins feature variable supply designs based on ideas indicating that economic and liquidity expansion go hand in hand. However, the findings show that "stablecoins' algorithmically planned distribution of new coins is inferior to existing methods of money creation", mainly because of two reasons: i) it is not market-based, and (ii) it is not supported by an 'I Owe You'. Furthermore, in an attempt to manage prices, it relies on obsolete monetarist notions. The author argues that crypto-monetarism will fail in its current form because quantity adjustments are insufficient for price stability. Finally, in terms of price stability, the authors argued that "in (crypto) monetary policy, the illusionary duality between the real and financial circuit has to overcome."

(Sichinava, 2019)

The study argues that "cryptocurrencies will be the future currency on the basis of the reasoning that all of the prerequisites for the cryptocurrency as a product of the development of the exchange process and for its introduction have already been formed in the modern civilized world: cryptocurrency exchanges, cryptocurrency exchange points, cryptocurrency ATMs, and so on." As the data reveal, "Bitcoin may be acknowledged as a free payment method in a number of highly developed nations, if not the entire globe, resulting in significant changes in humanity's socio-economic growth."

(Broni, Boateng and Owusu, 2020)

The research explored the factors influencing bitcoin acceptance among individuals, as well as to see if using bitcoin technology to pay for transactions is superior to using conventional payment methods. The study, "through the lens of the UTAUT Model offered a 'conceptual model' assessing the driving elements that impact a behaviour toward the usage of bitcoins in a developing country, Ghana." The researchers utilised a qualitative strategy that included a purposive sample methodology to choose twelve respondents who are familiar with and use bitcoin technology. The findings revealed that "the majority of respondents were quite enthusiastic about the concept of bitcoin and intended to continue using it, subject to the utility, convenience of use, security, and market value of bitcoin."

(Jumde and Cho, 2020)

The study aims to compare fiat money with cryptocurrency to investigate whether cryptocurrency has the capacity to replace fiat money and to provide a framework for assessing the viability of potential candidates for dominating currency. The authors state that "the terms 'blockchain' and 'cryptocurrencies' have been buzz words with the emergence of Bitcoin. Cryptocurrencies were regarded to be quite promising, and they exploded in popularity in the hopes of eventually replacing traditional cash." They used the "analytic hierarchy process (AHP)" method to create a "ratio-scale from paired comparisons and graded the expected results for two options." To quantify the relative results of proposed currencies, nine criteria were chosen using a hierarchical structure. The findings revealed that "fiat money is still preferred over cryptocurrencies because of its unit of accounting and store of the value function."

(Kwon, 2020)

This study investigated whether Bitcoin is an investment asset, a commodity or a currency. It compared "the tail behaviour of daily return on Bitcoin to that of daily return on the US dollar, gold, and the stock market index, inspired by the concept that tail behaviour is a key attribute to determine the property of an asset and for market players to perceive the asset". Based on "Engle and Manganelli's (2004) conditional autoregressive Value at Risk", the study found that "the tail behaviour of Bitcoin and the dollar, as well as the stock market index, is similar in terms of contemporaneous correlation. Furthermore, the risk premium on Bitcoin's return is related to the tail of stock market return, and Bitcoin is shown to be an element of the time-varying investment opportunity set on the basis of Merton's (1973) ICAPM setting. These data indicate that Bitcoin is exchanged as a medium of exchange and a method of investment rather than as a commodity."

(López Zambrano and Camberos Castro, 2020)

The study aims to examine the elements that impact Bitcoin acceptance and use in Mexico, as lack of confidence is the major issue that confronts Bitcoin's usage. The UTAUT2 model, which includes the trust variable, is utilised for this. The model was empirically evaluated using structural equation models and a survey of 106 questionnaires using PLS-SEM. The key findings show that performance expectations, hedonistic drive, habit, and decentralisation are the most important elements influencing confidence in Bitcoin adoption and use. Further, the findings demonstrate the benefits of Bitcoin to businesses and everyone else who is interested.

(Mattke, Maier & Reis, 2020)

The study encompasses three surveys to see if people think of cryptocurrency as money. "For the three main functions of money, Study 1 (N=57) provides valid and reliable measuring

items. Study 2 (N=95) reveals that the general impression of cryptocurrencies' ability to perform key functions is favourable." Further, "the results of Study 3 (N=99) show that Bitcoin is considered to perform much better than Ethereum or Ripple in all three functions." The findings show that when studying people's adoption or usage of bitcoin as money, researchers should incorporate or at least adjust their basic conceptions of essential activities. In addition, the findings show that "information gained from Bitcoin usage or adoption studies cannot readily be applied to another cryptocurrency."

(Mutiso and Maguru, 2020)

The study aimed to see how far SMEs in Kenya had accepted cryptocurrency as a payment method, with a particular focus on SMEs in Kiambu County. "A total of 344 SMEs were sampled from a target of 3250 registered SMEs in Kiambu County for the study, which employed a descriptive survey approach. Primary data was gathered by a self-administered questionnaire and evaluated descriptively, while secondary data was gathered through an online journal literature review". According to the findings, "respondents were enthusiastic about the introduction of bitcoin as a payment method. The majority of them would not only prefer it to cash-based payment systems, but they would also do it as quickly as possible, and if given a chance, they would even ask the government for it. The study indicated that Kenya is a fertile ground for new payment technologies, particularly among SMEs in the service sector controlled by males, based on these findings. As a result, the research proposes that the government accept these new technology-based payment methods and raise awareness so that the informal sector understands how they function and the benefits of adopting them as a means of overcoming the obstacles connected with cash-based payment methods."

(Zimmerman, 2020)

The study provides a model to explain the high level of price volatility and speculative

activity in relation to the adoption of cryptocurrency as a means of payment. The author postulates that "cryptocurrency varies from other assets in two ways: its price is determined by the extent to which it is used as money, and its structure restricts settlement capability". A cryptocurrency transaction is not complete until it is registered on a blockchain ledger. Because there is a finite amount of blockchain space, there is competition between speculative and monetary usage. A user can buy priority by paying any miner who adds her money to the blockchain with fees. The potential of a cryptocurrency to act as a method of payment is harmed as a result of this crowding out, lowering its value and price. The information richness of the trade order flow increases with a lower price, making the price more volatile. The findings show that cryptocurrency prices are intrinsically more volatile than other assets' prices and that price formation for cryptocurrencies may function fundamentally different than for traditional assets. Because the act of speculating lowers the value of the cryptocurrency, the demand curve might be locally upward-sloping.

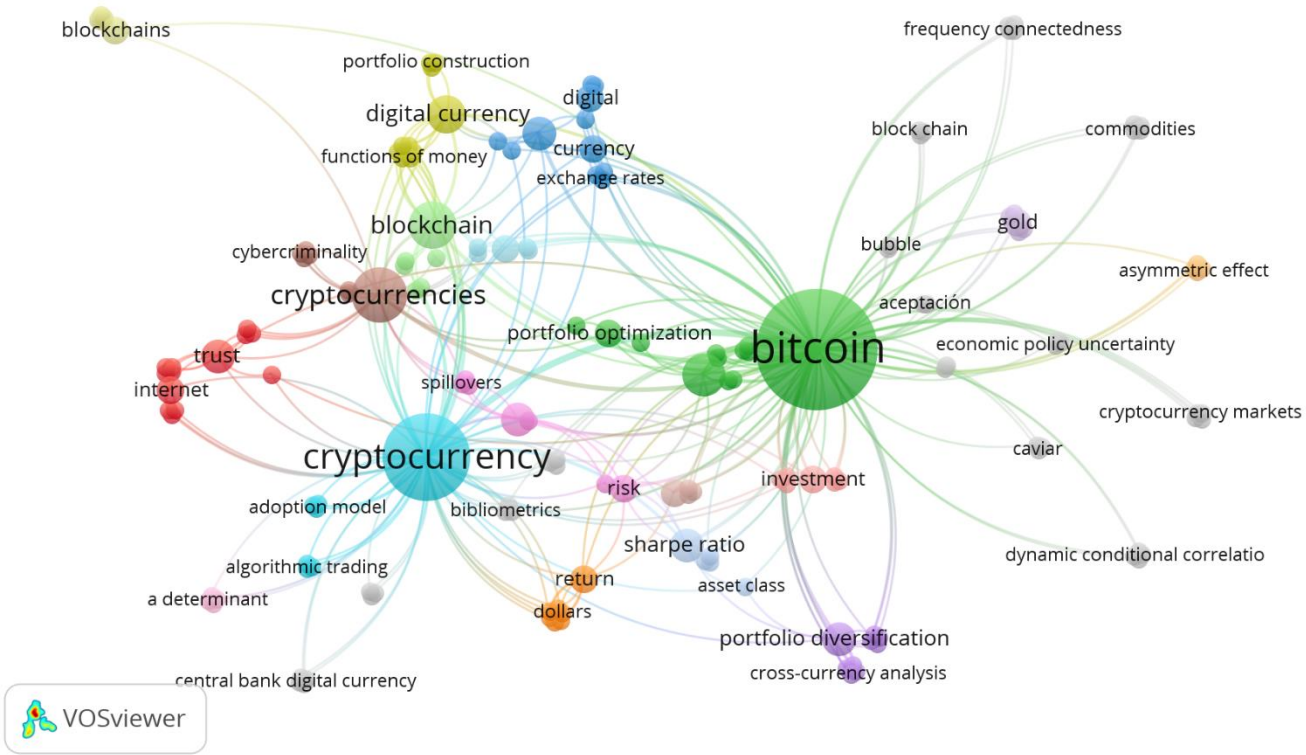
(Kunal et al., 2021)

The authors postulated that "in a world where fiat money ceases to exist, the researchers theorised that cryptocurrency will become the natural means of trade." The study compared cryptocurrencies to gold as a medium of trade using the "Kiyotaki & Wright (1989) model of commodity money". The findings affirmed cryptocurrencies' potential as the world's future currency, as well as its probable acceptance by major societies in the next years.

2.5 SUMMARY OF LITERATURE REVIEW

In the literature review, the existing literature was explored in four major categories. First, literature establishing the properties of a medium of exchange and the problems in the present fiat currency system were analysed; second, the literature on cryptocurrency was explored under three major trends – the raison D'etre of cryptocurrency, its function as a financial asset, and its competence in becoming a future global currency. The keyword analysis of the studied cryptocurrency literature is shown Figure 2.1.

Figure 2.1 – Keyword Analysis of Cryptocurrency Literature



From the above figure, it is crystal clear that most of the cryptocurrency research has been done on Bitcoin and cryptocurrencies as an investment asset. The review discovered that only a very small number of studies have concentrated on the function and potential of

cryptocurrencies as future money, and we haven't found any important studies that have concentrated on the potential of cryptocurrencies as a form of exchange in India. It is surprising because of the fact that "India has the largest number of cryptocurrency users in the world" (Livemint, 2021). Kunal et al. (2021) has stated that "social acceptance is the major factor in the acceptance of cryptocurrency as a means of payment." While cryptocurrency is gaining significant acceptance in developed economies like the US, the rate of adoption in emerging economies like India has not studied so far. It is essential for cryptocurrency to be adopted in countries like India to become a true global currency.

Chapter 3: Methodology

3.1 Research Question

The study aims to understand the impetuses and contests in the espousal of cryptocurrency as a medium of exchange in India. In order to fulfil the study objective, the following research questions were framed:

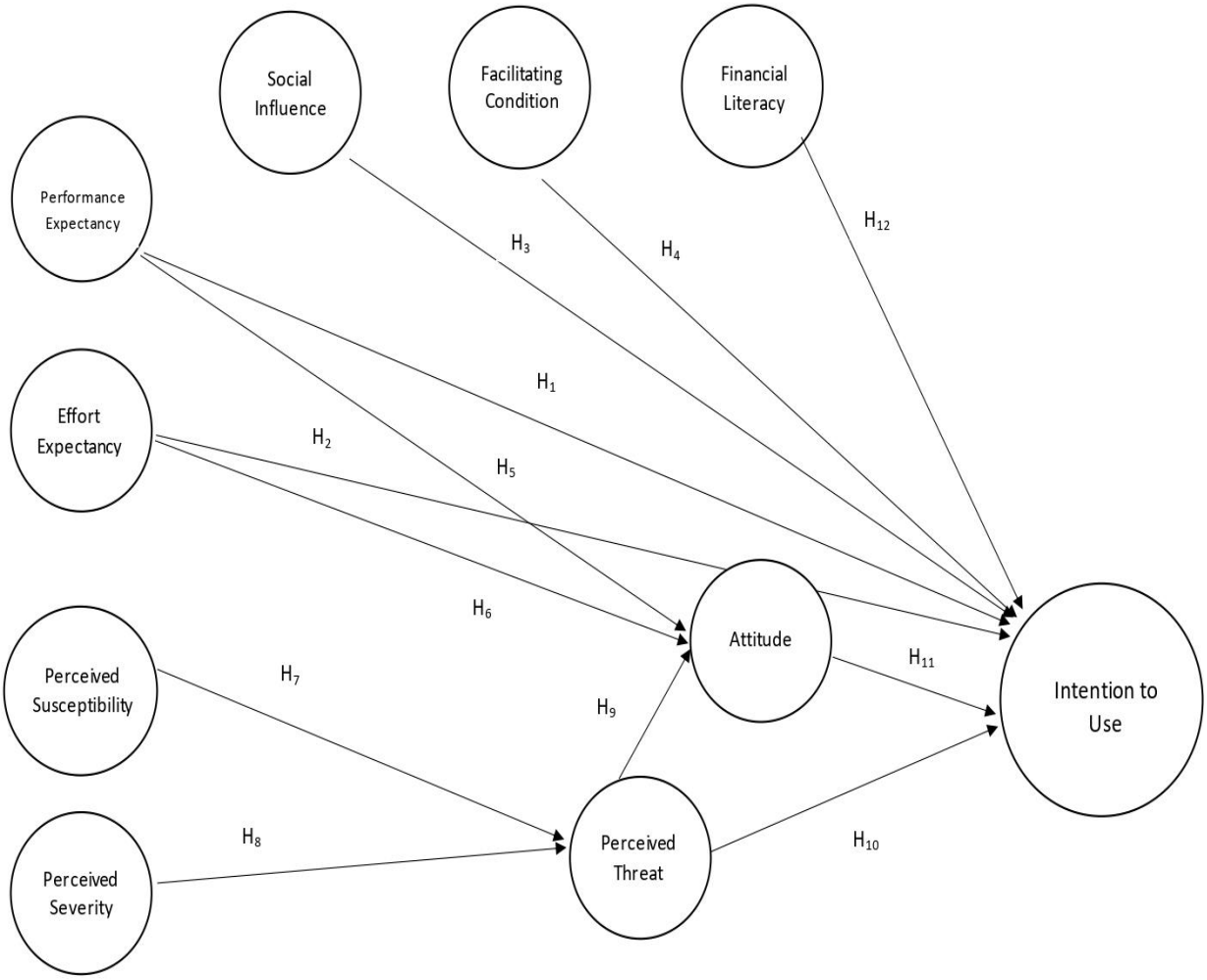
1. What are the impetuses in the espousal of cryptocurrency for digital payments in India?
2. What are the challenges in the espousal of cryptocurrency as a medium of exchange in India? and
3. What is the impact of these variables on the intention to use cryptocurrency as money in India?

3.2 Research Design

3.2.1 Theoretical Model

In order to study the impetuses and contests in the espousal of cryptocurrency as a medium of exchange, theoretical model has been developed (Figure 3.1), on the basis of two theories – "Unified Theory of Acceptance and Use of Technology (UTAUT)" *(Venkatesh et al., 2003)* and "Technology Threat Avoidance Model (TTAT)" *(Liang & Xue, 2009)*. "Facilitating Condition, Social Influence, Performance Expectancy, Effort Expectancy and Attitude" (Dwivedi et al., 2019; Rana et al., 2016) are the variables adopted from UTAUT. "Perceived Susceptibility, Perceived Severity and Perceived Threat" are the variables adopted from TTAT. Further, Hastings et al. (2013) argue the significance of financial knowledge on the use of money and investments in the economy. Hence, "Financial Literacy" has been added as a variable in the model.

Figure – 3.1: Theoretical Model of the Study



Control Variables: Gender, Age and Income *(Lammer et al., 2020)*

3.2.2 Variable Definition

- ***Intention to Use:*** The degree of willingness of an individual to use cryptocurrency as a medium of exchange. *(Venkatesh et al., 2012)*
- ***Attitude:*** An individual's positive or negative feelings about the use of cryptocurrency as a digital currency. *(Cao et al., 2021)*
- ***Performance Expectancy:*** An individual's belief that using cryptocurrencies can support him/her become financially efficient. *(Venkatesh et al., 2012)*

- ***Effort Expectancy:*** The extent of convenience involved in using cryptocurrencies. *(Venkatesh et al., 2012)*
- ***Facilitating Condition:*** The perception that there is a system in place to facilitate the use of cryptocurrencies. *(Venkatesh et al., 2012)*
- ***Social Influence:*** The extent to which a person believes society thinks they should use cryptocurrencies. *(Venkatesh et al., 2012)*
- ***Perceived Susceptibility:*** An individual's fear that using cryptocurrencies might be outlawed. *(Liang and Xue, 2009)*
- ***Perceived Severity:*** An individual's fear that using cryptocurrencies will be harmful. *(Liang and Xue, 2009)*
- ***Perceived Threat:*** The degree to which a person thinks using cryptocurrencies is dangerous and riskier. *(Liang and Xue, 2009)*
- ***Financial Literacy:*** An individual's belief that he is financially knowledgeable. *(Hastings et al., 2013)*

3.2.3 Hypotheses of the Study

H_1 – Performance Expectancy will have a significant influence on the intention to use cryptocurrency as a medium of exchange

H_2 – Effort Expectancy will have a significant influence on the intention to use cryptocurrency as a medium of exchange

H_3 – Social Influence will have a significant influence on the intention to use cryptocurrency as a medium of exchange

H_4 – Facilitating Conditions will have a significant influence on the intention to use cryptocurrency as a medium of exchange

H_5 – Performance Expectancy will have a significant influence on the attitude towards the use of cryptocurrency as a medium of exchange

H_6 – Effort Expectancy will have a significant influence on the attitude towards the use of cryptocurrency as a medium of exchange

H_7 – Perceived Susceptibility will have a significant influence on the perceived threat of using cryptocurrency as a medium of exchange

H_8 – Perceived Severity will have a significant influence on the perceived threat of using cryptocurrency as a medium of exchange

H_9 – Perceived threat will have a significant influence on the attitude towards the use of cryptocurrency as a medium of exchange

H_{10} – Perceived threat will have a significant influence on the intention to use cryptocurrency as a medium of exchange

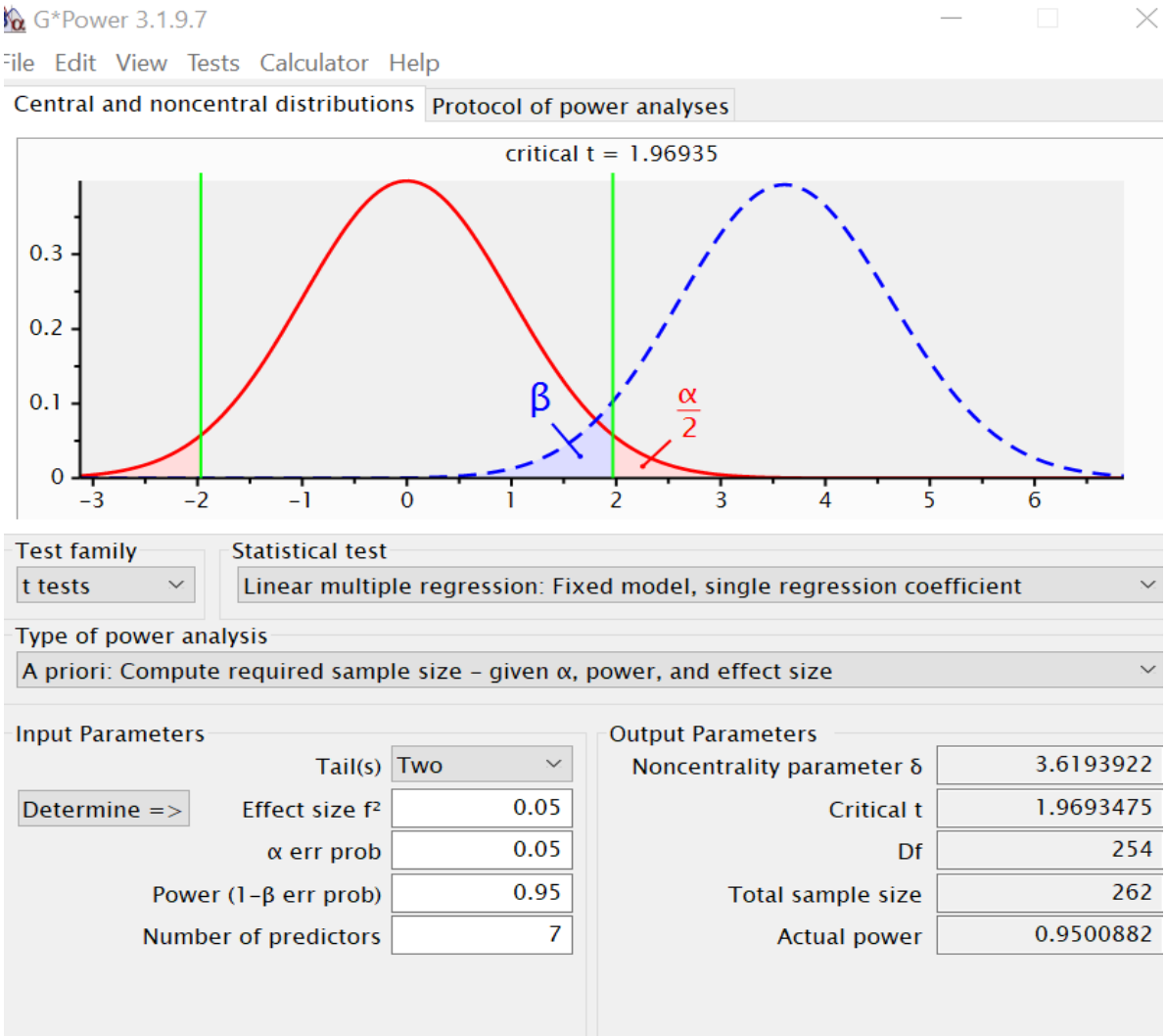
H_{11} – Attitude will have a significant influence on the intention to use cryptocurrency as a medium of exchange

H_{12} – Financial Literacy will have a significant influence on the intention to use cryptocurrency as a medium of exchange

3.2.4 Sample Size

G*Power software has been used to compute the required sample size needed for the proposed research model, and the results of the software are shown in Figure 3.2.

Figure 3.2: Minimum Sample Size



As the required sample size is 262, to ensure statistical accuracy of the model and to reduce Type I and II error, the sample size is fixed at 750 (nearly three times the needed sample size). It is believed that the increased sample size will ensure the robustness of the results.

3.2.5 Sampling Technique

The purposive sampling technique has been used for the study as the respondents must have a reasonable awareness of cryptocurrency to answer the questionnaire. All the respondents selected were cryptocurrency investors who invest and trade in predominant cryptocurrencies.

3.2.6 Data

The study is mainly based on primary data. The opinions of the respondents were collected using a well-structured and pre-tested questionnaire.

3.3. Measurement Scale

The theoretical model proposed for the study consist of 10 constructs. A 7-point rating scale is used to measure the opinion of the respondents with respect to the study constructs. The measurement scale developed on the basis of prior studies are summarized in Table 3.1.

Table 3.1: Constructs and Indicators of the Study

Construct	Indicator *(From 1 - strongly disagree to 7 - strongly agree)*	Reference
Performance Expectancy	PE01 - I find cryptocurrency as a useful form of money	Venkatesh et al. (2012)
	PE02 - Using cryptocurrency will increase the efficiency of my monetary transactions	
	PEO3 - Using cryptocurrency will help me to receive and make payments quickly	
	PE04 - Using cryptocurrency will enhance my wealth	

	PE05 - Using cryptocurrency will increase/increases the efficiency of my financial portfolio	
Effort Expectancy	EE01 - Learning how to use cryptocurrency is easy for me	Venkatesh et al. (2012)
	EE02 - My interaction with cryptocurrency is clear and understandable	
	EE03 - I find cryptocurrency easy to use	
	EE04 - It is easy for me to become skilful at using cryptocurrency	
Facilitating Condition	FC01 - I have the necessary resources to use cryptocurrency	Venkatesh et al. (2012)
	FC02 - I have the knowledge necessary to understand and use cryptocurrency	
	FC03 - Cryptocurrency is compatible with other technologies I use	
	FC04 - I can get help from others when I have difficulties in using cryptocurrency	
Financial Literacy	FL01 - I am at ease with understanding financial concepts and precepts	Hastings et al. (2013)
	FL02 - I have good knowledge of financial markets	
	FL03 - I am good at managing my financial assets	
Social Influence	SI01 - Peers who influence my behaviour think that I should use cryptocurrency	

	SI02 - Friends whose opinions I vale think that I should use cryptocurrency	Venkatesh et al. (2012)
	SI03 - People who are important to me think that I should use cryptocurrency	
Perceived Susceptibility	PS01 - Using cryptocurrency as money may become illegal in future	Liang and Xue (2009)
	PSO2 - The chances of cryptocurrency becoming an illegal currency are great	
	PSO3 - Indian government may ban the cryptocurrency in the near future	
Perceived Severity	PSE01 - High volatility of cryptocurrency might make it a less efficient form of money	Liang and Xue (2009)
	PSE02 - Cryptocurrency may be used by terrorist organizations	
	PSE03 - Cryptocurrency may increase black money in the economy	
	PSE04 - The issue of inheritance makes it a less likeable form of money	
	PSEO5 - Cryptocurrency being digital money, is vulnerable to hacking and other security threats	
Perceived Threat	PT01 - My fear of exposure to cryptocurrency risks is high	Liang and Xue (2009)
	PT02 - Compared with other currencies, cryptocurrency is risker to use	

	PT03 - Uncertainties associated with the use of cryptocurrency as money is higher	
Attitude	AT01 - Using cryptocurrency as money is a good idea	Cao et al. (2021)
	AT02 - I like the idea of using cryptocurrency as money	
	AT03 - Cryptocurrency is an effective form of money	
Intention to Use	IU01 - I intend to use cryptocurrency as money in the future	Venkatesh et al. (2012)
	IU02 - I am sure I will use cryptocurrency to make and receive payments in the near future	
	IU03 - I am holding cryptocurrency to use as money in future	

3.4 Data Analysis

"Web Power software" was used to assess "Mardia's multivariate skewness and kurtosis" in order to analyse the normalcy of the data gathered (Cain et al., 2017). The analysis results are displayed in Figure 3.2. The data do not exhibit multivariate normality, as can be observed from the image where the p-values for skewness and kurtosis were both less than 0.5. PLS-SEM is regarded as an appropriate method for the study in such a case when the data lack normality and distributional concerns are significant (Hair et al., 2019). Consequently, PLS-SEM has been carried out utilising SMART PLS software in order to evaluate the study's structural model. SPSS is used for descriptive analysis.

Figure 3.3: Normality of the data

Sample size: 711
Number of variables: 39

Univariate skewness and kurtosis

	Skewness	SE_skew	Z_skew	Kurtosis	SE_kurt	Z_kurt
V1	0.016	0.092	0.179	-0.541	0.183	-2.954
V2	-0.009	0.092	-0.102	-0.754	0.183	-4.116
V3	-0.036	0.092	-0.394	-0.592	0.183	-3.236
V4	-0.141	0.092	-1.539	-0.682	0.183	-3.726
V5	-0.311	0.092	-3.395	-0.671	0.183	-3.667
V6	-0.410	0.092	-4.469	-0.544	0.183	-2.974
V7	-0.052	0.092	-0.563	-0.243	0.183	-1.328
V8	-0.293	0.092	-3.199	-0.513	0.183	-2.803
V9	-0.355	0.092	-3.872	-0.358	0.183	-1.956
V10	-0.320	0.092	-3.486	-0.353	0.183	-1.928
V11	-0.227	0.092	-2.472	-0.715	0.183	-3.907
V12	0.077	0.092	0.845	-0.398	0.183	-2.174
V13	-0.117	0.092	-1.278	-0.775	0.183	-4.235
V14	-0.390	0.092	-4.257	-0.447	0.183	-2.442
V15	-0.376	0.092	-4.099	-0.752	0.183	-4.109
V16	-0.254	0.092	-2.767	-0.283	0.183	-1.547
V17	0.867	0.092	9.461	0.323	0.183	1.764
V18	0.887	0.092	9.675	0.992	0.183	5.416
V19	0.857	0.092	9.344	0.607	0.183	3.316
V20	0.977	0.092	10.655	1.091	0.183	5.956
V21	1.047	0.092	11.427	1.786	0.183	9.755
V22	0.944	0.092	10.300	0.916	0.183	5.005
V23	1.220	0.092	13.307	2.227	0.183	12.162
V24	1.104	0.092	12.048	1.276	0.183	6.970
V25	-0.095	0.092	-1.041	1.658	0.183	9.058
V26	0.029	0.092	0.319	0.921	0.183	5.032
V27	-1.341	0.092	-14.627	2.220	0.183	12.126
V28	0.273	0.092	2.978	-0.338	0.183	-1.845
V29	0.459	0.092	5.007	-0.669	0.183	-3.652
V30	0.340	0.092	3.709	-0.344	0.183	-1.876
V31	-0.257	0.092	-2.805	0.027	0.183	0.146
V32	-0.330	0.092	-3.597	-0.652	0.183	-3.562
V33	-0.266	0.092	-2.905	0.116	0.183	0.636
V34	-0.137	0.092	-1.494	0.249	0.183	1.362
V35	-0.309	0.092	-3.375	-0.675	0.183	-3.686
V36	-0.389	0.092	-4.240	0.144	0.183	0.785
V37	3.202	0.092	34.934	16.931	0.183	92.475
V38	0.003	0.092	0.031	-2.006	0.183	-10.955
V39	-1.038	0.092	-11.324	-0.925	0.183	-5.052

Mardia's multivariate skewness and kurtosis

	b	z	p-value
Skewness	301.2474	35697.8196	0
Kurtosis	1971.8191	87.8949	0

Chapter 4: Results and Analysis

In order to satisfy the objectives of the study, required data was collected from 750 respondents using a well-structured and pre-tested schedule questionnaire. After cleaning the data and removing incomplete responses and outliers, the responses of 711 respondents were analysed and presented in this unit. It could be noted that purposive sampling has been used for the study and all the respondents are cryptocurrency investors, as answering the questions required certain level of knowledge and understanding about cryptocurrency.

This unit is divided into two parts: part 1 deals with the interpretation of descriptive statistics, and part 2 deals with PLS-SEM results.

4.1 Descriptive Analysis

4.1.1 Demographic Profile

The demographic profile of the respondents, such as place, gender, age, education and income, were collected (Table 4.1.1). The table shows that data was collected from five major cities of India, viz., Chennai (41.9%), Hyderabad (24.9%), Bangalore (16.6%), Mumbai (8.7%) and Delhi (7.9%). Nearly 60% of the respondents are male, and more than 40% are female. Half of the respondents are less than 40 years of age, and half of them are more than 40 years of age.

With respect to the education level of the respondents, more than 55% of the respondents are postgraduates, 33% of them are undergraduates, and 11% are doctorates. The majority of the respondents selected for the study belongs to the income category of Rs. 50000 to Rs. 75000 per month.

Table 4.1.1 – Demographic Profile of Respondents

Place		Gender		Age (in years)		Education		Income (in INR)	
Chennai	298 (41.9)	**Male**	421 (59.2)	**18-30**	172 (24.2)	**UG**	237 (33.3)	**< 50K**	163 (22.9)
Hyderabad	177 (24.9)	**Female**	290 (40.8)	**30-40**	183 (25.7)	**PG**	395 (55.6)	**50K to 75K**	356 (50.1)
Bangalore	118 (16.6)			**40-50**	245 (34.5)	**Doctorate**	79 (11.1)	**75K to 100K**	136 (19.1)
Delhi	56 (7.9)			**Above 50**	111 (15.6)			**>100K**	56 (7.9)
Mumbai	62 (8.7)								
Sum	**711 (100)**	**Sum**	**711 (100)**	**Sum**	**711 (100)**	**Sum**	**711 (100)**	**Sum**	**711 (100)**

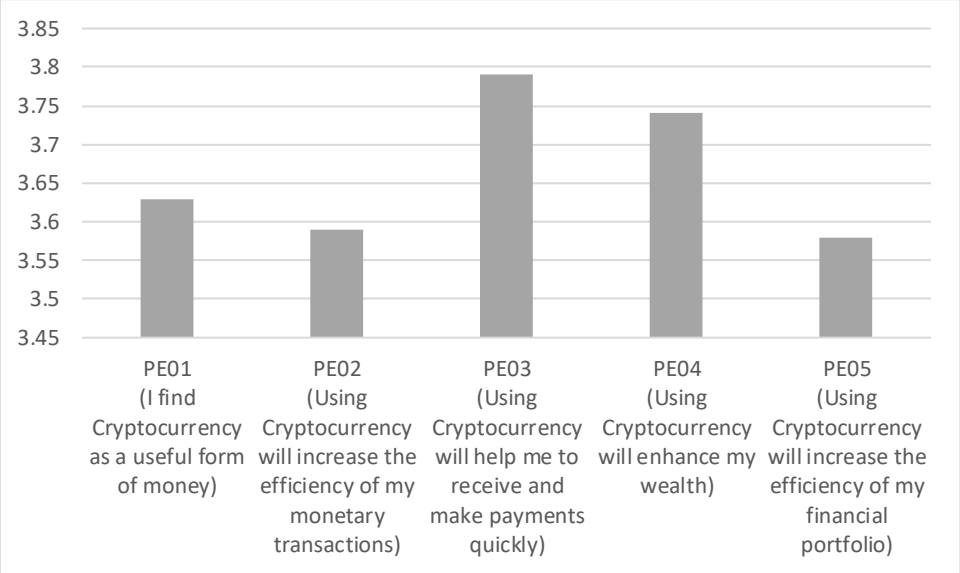
Source: *Primary Data*

Note: Percentages of the sum are shown in the numbers in parenthesis.

4.1.2 Performance Expectancy of Cryptocurrency

The performance expectancy construct measures the degree to which the respondents perceive that using cryptocurrency will help them in achieving their wealth maximization objectives. The construct is measured using five variables (PE01, PE02, PE03, PE04, PE05). The mean value of each of these variables is shown in Figure 4.1.1, and the detailed descriptive values in Table 4.1.2.

Figure 4.1.1: Performance Expectancy of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that most of the respondents (nearly 1/4th) "somewhat agree" with positive statements with respect to the performance expectancy of cryptocurrency, but followed by that nearly another 1/4th of the respondents are neutral about the performance expectancy of cryptocurrency. Among the variables, PEO3 (using cryptocurrency will help me to receive and make payments quickly) has the highest mean value, followed by PE04 (using cryptocurrency will enhance my wealth). Thus, it can be said that many investors are starting to believe that cryptocurrency will enhance their wealth and increase the net worth of their portfolios.

Table 4.1.2: Performance Expectancy of Cryptocurrency

Particulars	PE01 *(I find Cryptocurrency as a useful form of money)*	PE02 *(Using Cryptocurrency will increase the efficiency of my monetary transactions)*	PE03 *(Using Cryptocurrency will help me to receive and make payments quickly)*	PE04 *(Using Cryptocurrency will enhance my wealth)*	PE05 *Using Cryptocurrency will increase the efficiency of my financial portfolio)*
SDG	36 (5.1)	46 (6.5)	10 (1.4)	20 (2.8)	44 (6.2)
DG	142 (20)	135 (19)	128 (18)	140 (19.7)	127 (17.9)
SWD	131 (18.4)	155 (21.8)	141 (19.8)	119 (16.7)	122 (17.2)
NAND	193 (27.1)	153 (21.5)	198 (27.8)	193 (27.1)	223 (31.5)
SWA	172 (24.2)	178 (25)	198 (27.8)	208 (29.3)	180 (25.3)
AG	21 (3)	34 (4.8)	25 (3.5)	21 (3)	10 (1.4)
SAG	16 (2.3)	10 (1.4)	11 (1.5)	10 (1.4)	4 (0.6)
Sum	**711 (100)**	**711 (100)**	**711 (100)**	**711 (100)**	**711 (100)**

Source: *Primary Data*

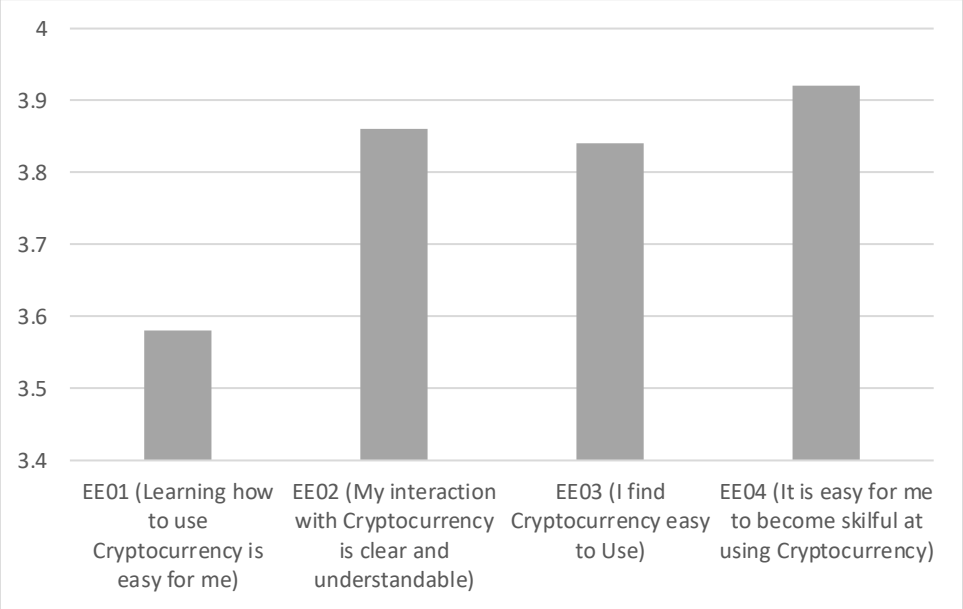
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.3 Effort Expectancy of Cryptocurrency

The effort expectancy construct measures the opinion of the respondents with respect to the degree of ease of use associated with the use of cryptocurrency. The construct is measured using four variables (EE01, EE02, EE03, and EE04). The mean value of each of these variables is shown in Figure 4.1.2, and the detailed descriptive values of these variables can be seen in Table 4.1.3.

Figure 4.1.2: Effort Expectancy of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that nearly 1/3rd of the respondents "somewhat agree" to the ease of use of cryptocurrency, but followed by that, nearly 30% of the respondents are neutral about the effort expectancy of cryptocurrency. Among the variables, EEO4 ("it is easy for me to become skilful at using cryptocurrency") has the highest mean value, followed by EE02 ("my interaction with cryptocurrency is clear and understandable"). Thus, it can be said that most of the investors have a moderate level of confidence with respect to the ease of using cryptocurrency.

Table 4.1.3: Effort Expectancy of Cryptocurrency

Particulars	EE01 *(Learning how to use Cryptocurrency is easy for me)*	EE02 *(My interaction with Cryptocurrency is clear and understandable)*	EE03 *(I find Cryptocurrency easy to Use)*	EE04 *(It is easy for me to become skilful at using Cryptocurrency)*
SDG	16 (2.3)	16 (2.3)	12 (1.7)	15 (2.1)
DG	93 (13.1)	95 (13.4)	80 (11.3)	83 (11.7)
SWD	141 (19.8)	145 (20.4)	162 (22.8)	145 (20.4)
NAND	206 (29)	246 (34.6)	189 (26.6)	220 (30.9)
SWA	232 (32.6)	157 (22.1)	235 (33.1)	221 (31.1)
AG	21 (3)	42 (5.9)	29 (4.1)	23 (3.2)
SAG	2 (0.3)	10 (1.4)	4 (0.6)	4 (0.6)
Sum	711 (100)	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

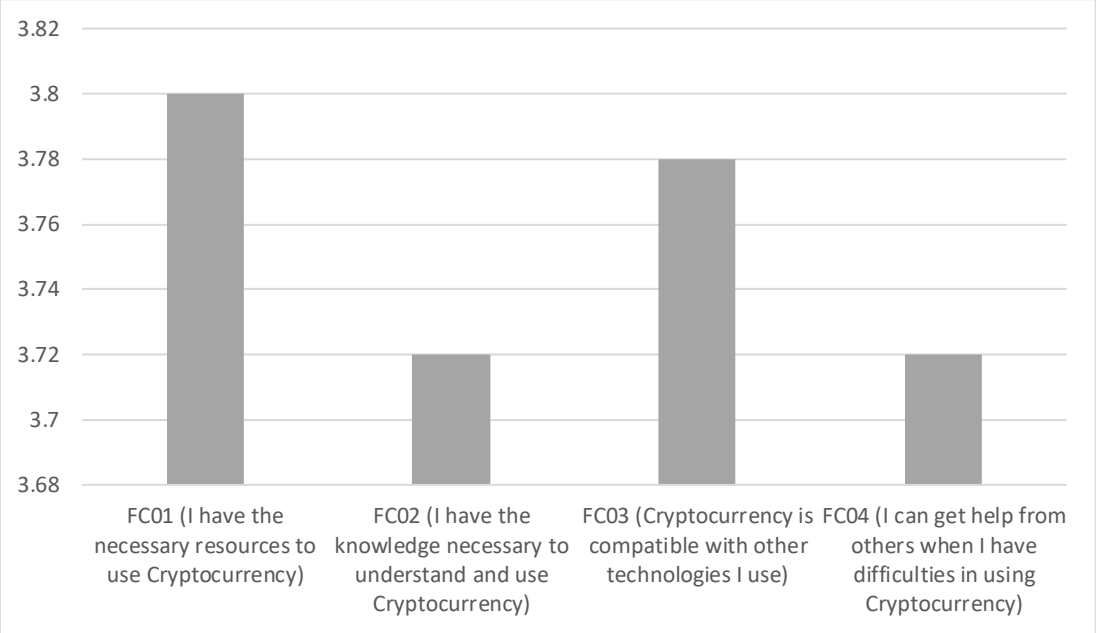
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = “Strongly Disagree”; DG = “Disagree”; SWD = “Somewhat Disagree”; NAND = “Neither Agree nor Disagree”; SWA = “Somewhat Agree”; AG = “Agree”; SAG = “Strongly Agree”.

4.1.4 Facilitating Conditions

The facilitating conditions construct refers to the degree to which the respondents believe that the present technical and technological infrastructure can assist in the use of cryptocurrency as a digital currency. The construct is measured using four variables (FC01, FC02, FC03, and FC04). The mean value of each of these variables is shown in Figure 4.1.3, and the detailed descriptive values in Table 4.1.4.

Figure 4.1.3: Facilitating Conditions – Mean Values



It has been inferred from the Table and Figure that most of the respondents (nearly 30%) believe that they have the necessary resources to use cryptocurrency. However, when we ignored the neutral responses, nearly 40% of the respondents are on the side of disagreement, and only 33.65% of the respondents are on the side of agreement with respect to the variables of facilitating conditions construct. It could be noted that facilitating conditions won't affect the behavioural intention but the use behaviour of the respondents. Hence, effort must be made to create the necessary blockchain supporting platforms and other technological conditions necessary for the common people to use cryptocurrency as money.

Table 4.1.4: Facilitating Conditions

Particulars	FC01 *(I have the necessary resources to use Cryptocurrency)*	FC02 *(I have the knowledge necessary to understand and use Cryptocurrency)*	FC03 *(Cryptocurrency is compatible with other technologies I use)*	FC04 *(I can get help from others when I have difficulties in using Cryptocurrency)*
SDG	34 (4.8)	44 (6.2)	23 (3.2)	32 (4.5)
DG	91 (12.8)	111 (15.6)	116 (16.3)	144 (20.3)
SWD	141 (19.8)	135 (19)	154 (21.7)	119 (16.7)
NAND	197 (27.7)	187 (26.3)	194 (27.3)	165 (23.2)
SWA	222 (31.2)	183 (25.7)	170 (23.9)	212 (29.8)
AG	16 (2.3)	47 (6.6)	34 (4.8)	27 (3.8)
SAG	10 (1.4)	4 (0.6)	20 (2.8)	12 (1.7)
Sum	711 (100)	711 (100)	711 (100)	711 (100)

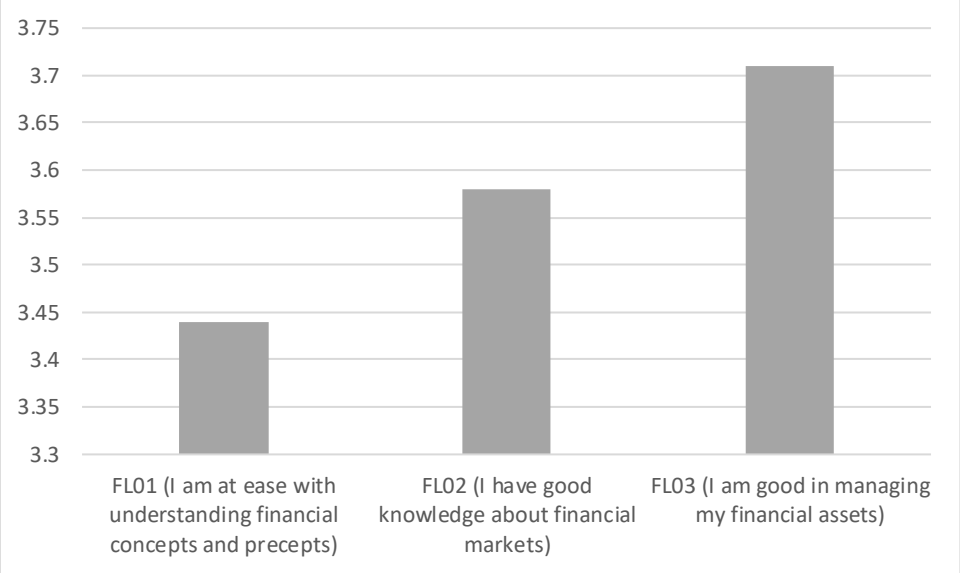
Source: *Primary Data*

Note: Percentages of the sum are shown in the numbers in parenthesis.
SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.5 Financial Literacy

The financial literacy construct measures the perceived ability of the respondents to understand and use various financial skills. This construct is added to the model as it is postulated in some of the literature that financial literacy will have a profound impact on the intention to use cryptocurrency. The construct is measured using three variables (FL01, FL02, and FL03). The mean value of each of these variables is shown in Figure 4.1.4, and the detailed descriptive values in Table 4.1.5.

Figure 4.1.4: Financial Literacy – Mean Values



It has been inferred from the Table and Figure that most of the respondents (nearly 90%) believe that they do not have the necessary skills in finance and understanding of its concepts, but still, they are holding and investing in financial assets. The irony is that the respondents are saying that they are neither at ease with understanding financial concepts and precepts (FL01) nor have good knowledge of financial markets (FL02) but they believe they are good at managing their financial assets (FL03). This shows that many of the respondents don't believe financial literacy is an important skill needed to manage their financial assets.

Table 4.1.5: Financial Literacy

Particulars	FL01 *(I am at ease with understanding financial concepts and precepts)*	FL02 *(I have good knowledge about financial markets)*	FL03 *(I am good in managing my financial assets)*
SDG	16 (2.3)	18 (2.5)	12 (1.7)
DG	11 (1.5)	12 (1.7)	84 (11.8)
SWD	381 (53.6)	335 (47.1)	40 (5.6)
NAND	255 (35.9)	240 (33.8)	539 (75.8)
SWA	45 (6.3)	98 (13.8)	32 (4.5)
AG	3 (0.4)	7 (1.0)	3 (0.4)
SAG	-	1 (0.1)	1 (0.1)
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

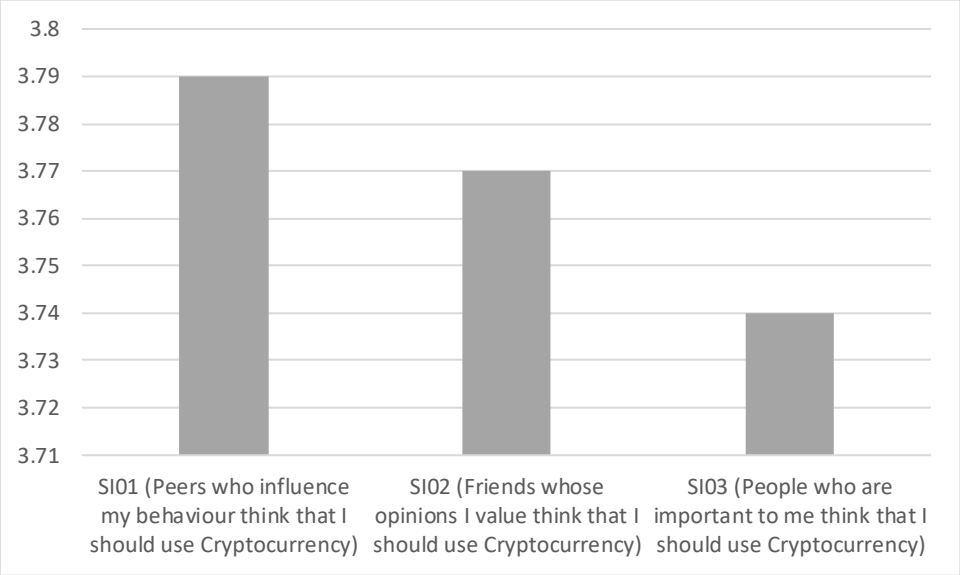
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = “Strongly Disagree”; DG = “Disagree”; SWD = “Somewhat Disagree”; NAND = “Neither Agree nor Disagree”; SWA = “Somewhat Agree”; AG = “Agree”; SAG = “Strongly Agree”.

4.1.6 Social Influence of Cryptocurrency

The social influence construct measures the degree to which the respondents feel the significance that their social network believes they should use cryptocurrency. The construct is measured using three variables (SI01, SI02, and SI03). The mean value of each of these variables is shown in Figure 4.1.5, and the detailed descriptive values in Table 4.1.6.

Figure 4.1.5: Social Influence of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that there is almost an equal divide with respect to social influence. On an average, more than 1/3rd of the respondents disagree that there has been any significant social influence for the use of cryptocurrency, however another 1/3rd of the respondents agree to the statements indicating that there was significant social influence. Among the variables, SIO1 (peers who influence my behaviour think that I should use cryptocurrency) has the highest mean value. This shows that workplaces are the predominant sources of influence for the use of cryptocurrency.

Table 4.1.6: Social Influence of Cryptocurrency

Particulars	SI01 *(Peers who influence my behaviour think that I should use Cryptocurrency)*	SI02 *(Friends whose opinions I value think that I should use Cryptocurrency)*	SI03 *(People who are important to me think that I should use Cryptocurrency)*
SDG	41 (5.8)	46 (6.5)	39 (5.5)
DG	98 (13.8)	116 (16.3)	115 (16.2)
SWD	115 (16.2)	103 (14.5)	88 (12.4)
NAND	213 (30)	184 (25.9)	268 (37.7)
SWA	212 (29.8)	221 (31.1)	164 (23.1)
AG	25 (3.5)	37 (5.2)	25 (3.5)
SAG	7 (1)	4 (0.6)	12 (1.7)
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

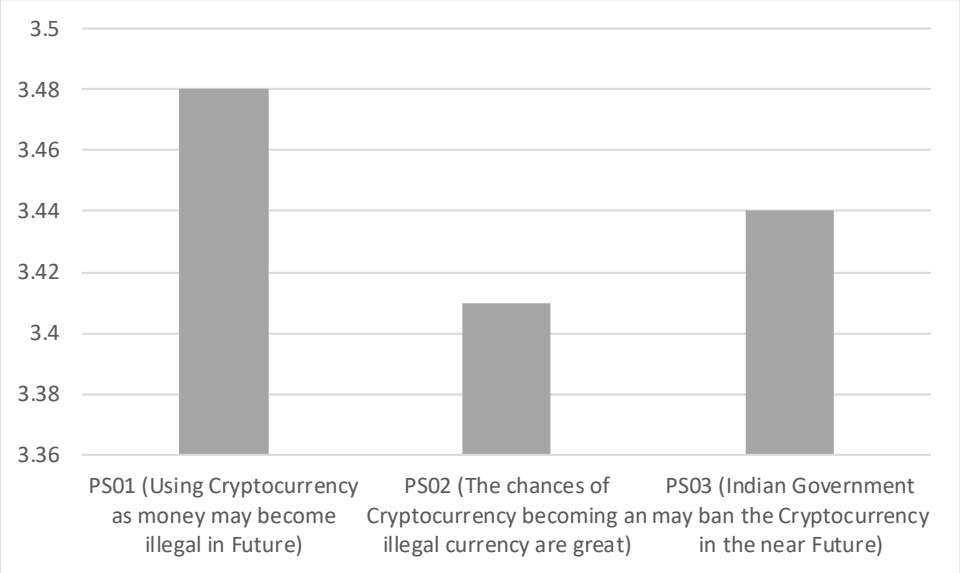
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = “Strongly Disagree”; DG = “Disagree”; SWD = “Somewhat Disagree”; NAND = “Neither Agree nor Disagree”; SWA = “Somewhat Agree”; AG = “Agree”; SAG = “Strongly Agree”.

4.1.7 Perceived Susceptibility of Cryptocurrency

The perceived susceptibility construct measures the degree of the respondents' perceptions regarding their susceptibility to cryptocurrency threats that has a significant influence on their willingness to utilize cryptocurrency for digital payments. The construct is measured using three variables (PS01, PS02, and PS03). The mean value of each of these variables is shown in Figure 4.1.6, and the detailed descriptive values in Table 4.1.7.

Figure 4.1.6: Perceived Susceptibility of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that majority of the respondents (more than 60%) disagree with the statements asserting the susceptibility of cryptocurrency in the future and more than 25% of the respondents are neutral with respect to susceptibility statements. Thus, it can be said that an overwhelming majority of cryptocurrency investors believe that the chances of cryptocurrency becoming illegal are very remote.

Table 4.1.7: Perceived Susceptibility of Cryptocurrency

Particulars	PS01 *(Using Cryptocurrency as money may become illegal in Future)*	PS02 *(The chances of Cryptocurrency becoming an illegal currency are great)*	PS03 *(Indian Government may ban the Cryptocurrency in the near Future)*
SDG	-	1 (0.1)	-
DG	26 (3.7)	30 (4.2)	33 (4.6)
SWD	413 (58.1)	426 (59.9)	414 (58.2)
NAND	184 (25.9)	191 (26.9)	191 (26.9)
SWA	81 (11.4)	56 (7.9)	66 (9.3)
AG	7 (1)	7 (1)	7 (1)
SAG	-	-	-
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

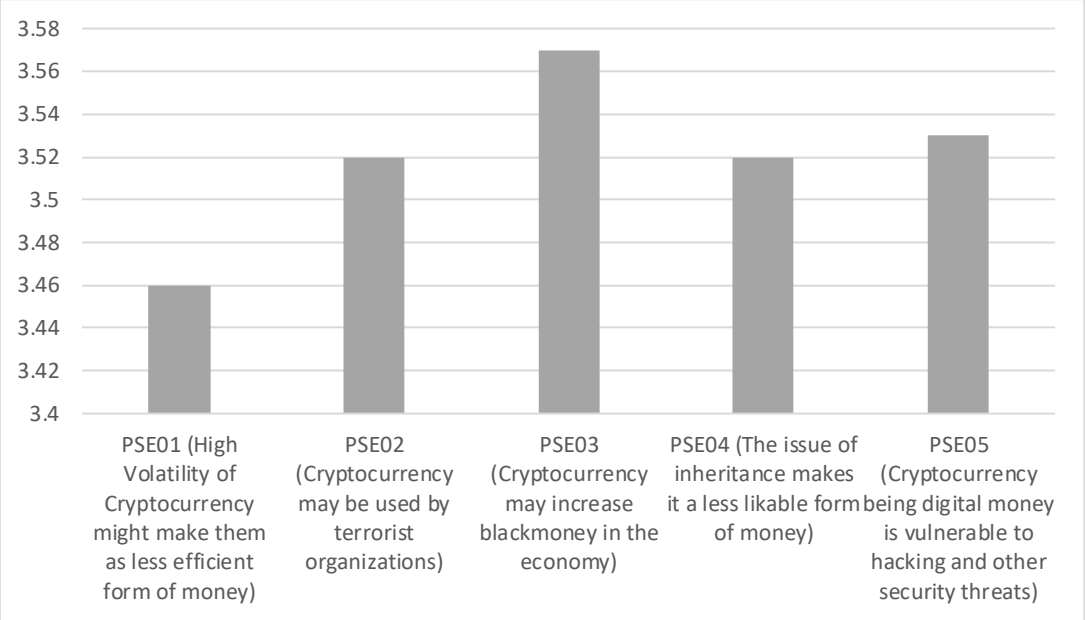
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.8 Perceived Severity of Cryptocurrency

The perceived severity construct measures the degree of the respondents' perceptions with respect to the severity of technology threats associated with cryptocurrency. The construct is measured using five variables (PSE01, PSE02, PSE03, PSE04, and PSE05). The mean value of each of these variables is shown in Figure 4.1.7, and the detailed descriptive values in Table 4.1.8.

Figure 4.1.7: Perceived Severity of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that only 10%, on average, of the respondents, agree with the severity of risks associated with the use of cryptocurrency as a medium of exchange. The majority of the respondents (more than 60%) disagree to the statements asserting the severity of cryptocurrency, and more than 25% of the respondents are neutral with respect to severity statements. Among the variables, PSE03 (cryptocurrency may increase black money in the economy) has the highest mean score, which suggests that some of the respondents believe that cryptocurrency may further lead to inequality in society.

Table 4.1.8: Perceived Severity of Cryptocurrency

Particulars	PSE01 *(High Volatility of Cryptocurrency might make them as less efficient form of money)*	PSE02 *(Cryptocurrency may be used by terrorist organizations)*	PSE03 *(Cryptocurrency may increase black-money in the economy)*	PSE04 *(The issue of inheritance makes it a less likable form of money)*	PSE05 *(Cryptocurrency being digital money is vulnerable to hacking and other security threats)*
SDG	1 (0.1)	3 (0.4)	1 (0.1)	2 (0.3)	1 (0.1)
DG	37 (5.2)	37 (5.2)	32 (4.5)	22 (3.1)	24 (3.4)
SWD	411 (57.8)	379 (53.3)	378 (53.2)	403 (56.7)	409 (57.5)
NAND	177 (24.9)	200 (28.1)	188 (26.4)	200 (28.1)	178 (25)
SWA	69 (9.7)	67 (9.4)	89 (12.5)	63 (8.9)	78 (11)
AG	15 (2.1)	18 (2.5)	19 (2.7)	15 (2.1)	18 (2.5)
SAG	1 (0.1)	7 (1)	4 (0.6)	6 (0.8)	3 (0.4)
Sum	711 (100)	711 (100)	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

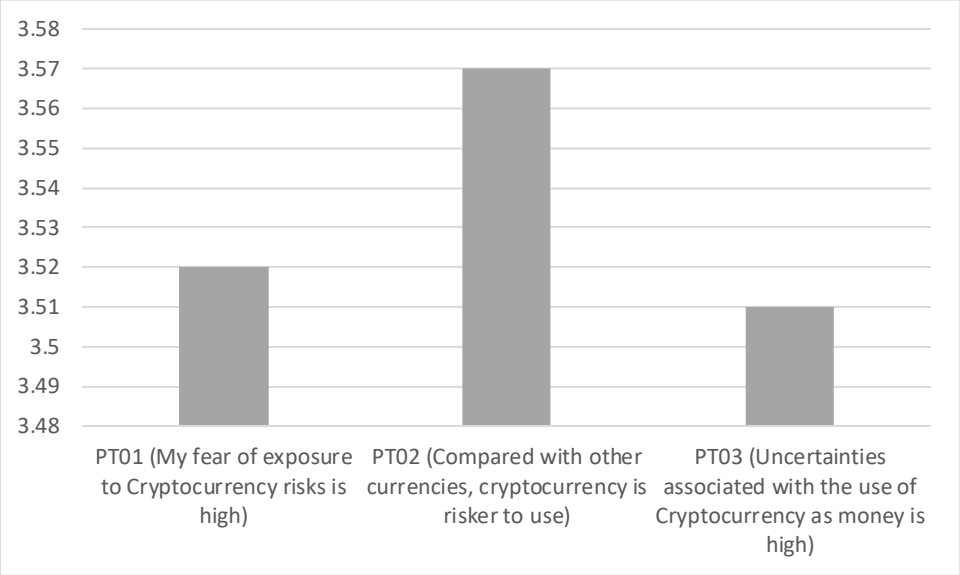
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.9 Perceived Threat of Cryptocurrency

The perceived threat construct measures the degree of respondents' perceptions with respect to the negative consequences of using cryptocurrency. The construct is measured using three variables (PT01, PT02, and PT03). The mean value of each of these variables is shown in Figure 4.1.8, and the detailed descriptive values in Table 4.1.9.

Figure 4.1.8: Perceived Threat of Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that more than 50% of the respondents disagree with the statements asserting the threats of using cryptocurrency as a medium of exchange. However, nearly 1/3rd of them are neutral with respect to cryptocurrency threats. If people who are investing in cryptocurrency are unsure whether it is safe to utilize cryptocurrency as a digital currency or not, the percentage of threat perception will be higher among the common people who don't have any exposure to cryptocurrency. Thus, proper regulatory measures must be taken to remove the risks and uncertainties associated with cryptocurrency.

Table 4.1.9: Perceived Threat of Cryptocurrency

Particulars	PT01 *(My fear of exposure to Cryptocurrency risks is high)*	PT02 *(Compared with other currencies, cryptocurrency is risker to use)*	PT03 *(Uncertainties associated with the use of Cryptocurrency as money is high)*
SDG	-	-	-
DG	38 (5.3)	31 (4.4)	37 (5.2)
SWD	338 (47.5)	363 (51.1)	349 (49.1)
NAND	265 (37.3)	200 (28.1)	251 (35.3)
SWA	70 (9.8)	117 (16.5)	74 (10.4)
AG	-	-	-
SAG	-	-	-
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

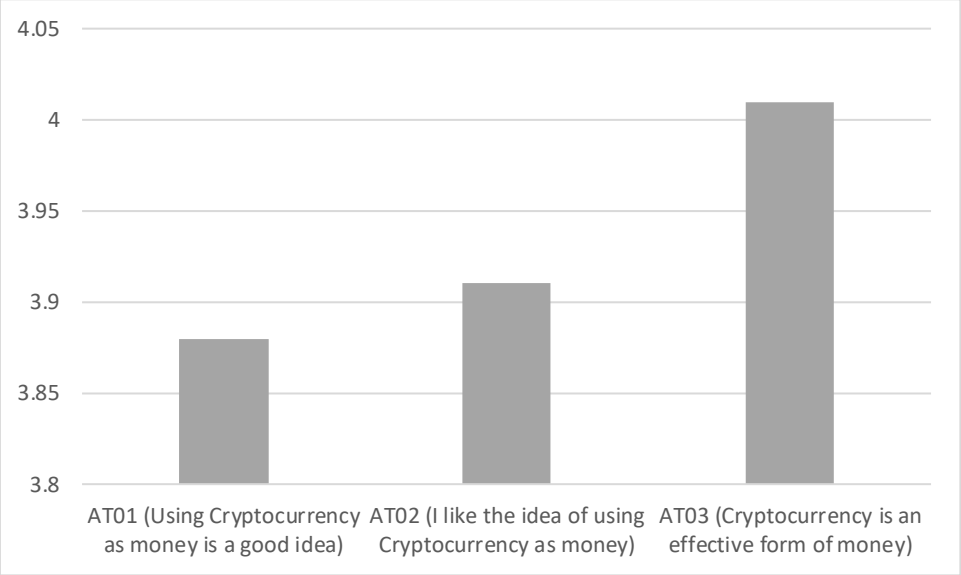
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.10 Attitude Towards Cryptocurrency

The attitude construct measures the attitude of the respondents toward the use of cryptocurrency as a medium of exchange. The construct is measured using three variables (AT01, AT02, and AT03). The mean value of each of these variables is shown in Figure 4.1.9, and the detailed descriptive values in Table 4.1.10.

Figure 4.1.9: Attitude Towards Cryptocurrency – Mean Values



It has been inferred from the Table and Figure that only 1/3rd of the respondents have a positive attitude towards the use of cryptocurrency as a medium of exchange; the remaining respondents are either neutral or show a negative attitude toward the use of cryptocurrency as money. Most of the investors are holding cryptocurrency as an asset class only, and there needs some great push in the mindset of the people holding cryptocurrency to use it as money.

Table 4.1.10: Attitude Toward Cryptocurrency

Particulars	AT01 *(Using Cryptocurrency as money is a good idea)*	AT02 *(I like the idea of using Cryptocurrency as money)*	AT03 *(Cryptocurrency is an effective form of money)*
SDG	28 (3.9)	18 (2.5)	27 (3.8)
DG	69 (9.7)	114 (16)	68 (9.6)
SWD	139 (19.5)	110 (15.5)	119 (16.7)
NAND	254 (35.7)	194 (27.3)	220 (30.9)
SWA	175 (24.6)	228 (32.1)	233 (32.8)
AG	36 (5.1)	42 (5.9)	20 (2.8)
SAG	10 (1.4)	5 (0.7)	24 (3.4)
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

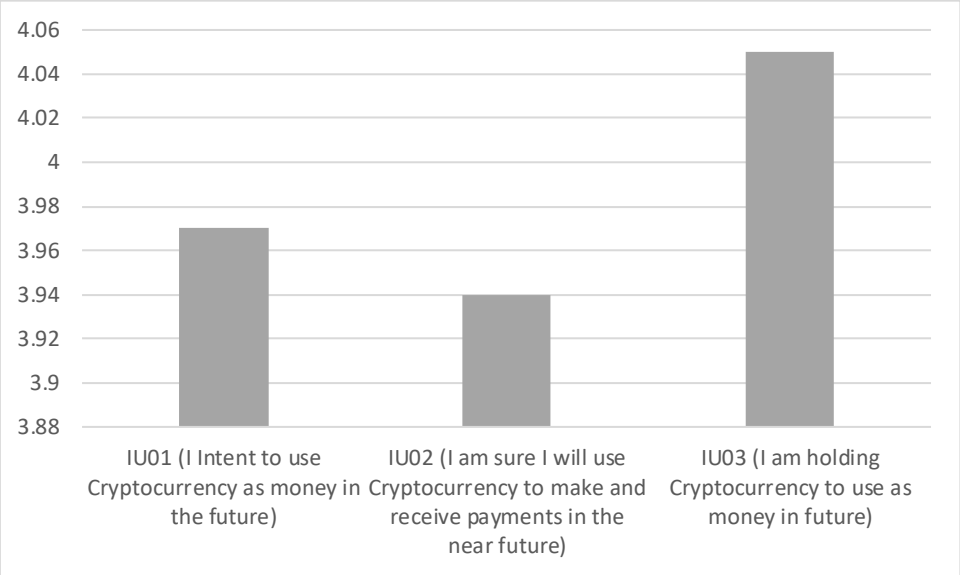
Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.1.11 Intention To Use Cryptocurrency as Money

The intention to use construct measures the degree to which the respondents intend to use cryptocurrency as a global currency in future. The construct is measured using three variables (IU01, IU02, and IU03). The mean value of each of these variables is shown in Figure 4.1.10, and the detailed descriptive values in Table 4.1.11.

Figure 4.1.10: Intention to Use Cryptocurrency as Money – Mean Values



It has been inferred from the Table and Figure that nearly 1/3rd of the respondents have the intention to utilize cryptocurrency for digital payments in the near future; the remaining respondents are either neutral or disagree with the statements asserting the intention to use cryptocurrency as money. The mean values show that, on a scale of 7, the intention to utilize cryptocurrency lies in the range of 3.97 to 4.05. Thus, we can conclude that the intention to use is low among the respondents.

Table 4.1.11: Intention to Use Cryptocurrency as Money

Particulars	IU01 *(I Intent to use Cryptocurrency as money in the future)*	IU02 *(I am sure I will use Cryptocurrency to make and receive payments in the near future)*	IU03 *(I am holding Cryptocurrency to use as money in future)*
SDG	22 (3.1)	7 (1)	17 (2.4)
DG	48 (6.8)	110 (15.5)	57 (8)
SWD	158 (22.2)	120 (16.9)	123 (17.3)
NAND	250 (35.2)	195 (27.4)	242 (34)
SWA	180 (25.3)	243 (34.2)	226 (31.8)
AG	38 (5.3)	31 (4.4)	37 (5.2)
SAG	15 (2.1)	5 (0.7)	9 (1.3)
Sum	711 (100)	711 (100)	711 (100)

Source: *Primary Data*

Note: Percentages of the sum are shown in the numbers in parenthesis.

SDG = "Strongly Disagree"; DG = "Disagree"; SWD = "Somewhat Disagree"; NAND = "Neither Agree nor Disagree"; SWA = "Somewhat Agree"; AG = "Agree"; SAG = "Strongly Agree".

4.2 PLS-SEM Results

4.2.1 Assessment of the Measurement Model

Hair et al. (2019) guidelines on how to report PLS-SEM results have been followed for measurement model assessment. In this study, the individual indicator variables are reflective in nature. ***Hair et al. (2019)*** state that "assessment of reflective measurement models comprises of measuring the internal reliability, internal consistency, convergent validity, and discriminant validity."

Internal reliability is ensured by looking into the indicator loadings, which are shown in Table 4.2.1.

Table 4.2.1: Indicator Loadings

Construct	Item	Loading
Performance Expectancy	PE01	0.837
	PE02	0.849
	PE03	0.818
	PE04	0.901
	PE05	0.835
Effort Expectancy	EE01	0.868
	EE02	0.896
	EE03	0.869
	EE04	0.897
Facilitating Condition	FC01	0.874
	FC02	0.895
	FC03	0.841
	FC04	0.91
Financial Literacy	FL01	0.766
	FL02	0.888
	FL03	0.784
Social Influence	SI01	0.911
	SI02	0.912
	SI03	0.871
Perceived Severity	PSE01	0.866
	PSE02	0.821
	PSE03	0.762
	PSE04	0.844
	PSE05	0.894

Perceived Susceptibility	PS01	0.772
	PS02	0.874
	PS03	0.891
Perceived Threat	PT01	0.783
	PT02	0.762
	PT03	0.845
Attitude	AT01	0.94
	AT02	0.884
	AT03	0.939
Intention to Use	IU01	0.916
	IU02	0.874
	IU03	0.923

Source: *Primary Data*

Note: PLS-SEM analysis is done using SMART PLS software.

Saari et al. (2021) postulate that "indicator loadings explain the amount of variance shared between the individual variables and the construct associated with them." Indicator loadings ensure the indicator reliability of reflective measurement models. It can be seen in Table 4.2.1 that all the indicator loadings of our measurement models are more than the recommended critical value of 0.708 ***(Hair et al., 2019)***. The crucial value of 0.708 denotes that the corresponding construct adequately provides item dependability by explaining more than 50% of the variation of the related indicator. Thus, we can say that our model has satisfactory indicator reliability.

After ensuring indicator reliability, the next step is to assess internal consistency and convergent validity. The internal consistency of reflective constructs is evaluated using the composite reliability and ρA, while the convergent validity of reflective constructs is evaluated using AVE (Average Variance Extracted). The compositie reliability, ρA and AVE of our assessment model are shown in Table 4.2.2. It has been inferred from Table 4.2.2 that both the composite reliabilty and ρA lies in between the recommended thresholds of 0.70 and 0.95. and all the AVE values surpass the recommended threshold value of 0.5. Thus, we can say that our reflective assessment model has a satisfactory level of internal consistency as well as convergent validity.

Table 4.2.2: Reliability and Validity

Constructs	ρA	Composite Reliability	Average Variance Extracted
Performance Expectancy	0.908	0.926	0.806
Effort Expectancy	0.912	0.934	0.779
Social Influence	0.928	0.926	0.806
Facilitating Condition	0.909	0.932	0.775
Financial Literacy	0.865	0.855	0.663
Perceived Severity	0.899	0.922	0.704
Perceived Susceptibility	0.808	0.884	0.718
Perceived Threat	0.718	0.84	0.636
Attitude	0.913	0.944	0.85
Intention to Use	0.889	0.931	0.818

Source: *Primary Data*

Note: PLS-SEM analysis is done using SMART PLS software.

The final step in the assessment of the reflective measurement model is to ensure discriminant validity, which explains the extent to which each construct is empirically separate from the other constructs. ***Saari et. al (2021)*** state that "HTMT (Heterotrait-monotrait) ratio is used to assess the discriminant validity of the model." The HTMT values are shown in Table 4.2.3.

HTMT is the mean correlation value of items across constructs in relation to the geometric mean of average correlations for items measuring the same construct. When HTMT values are high, discriminant validity is said to be low. It can be seen from Table 4.2.3. that all the HTMT values of our reflective measurement model are significantly lower than the conservative threshold limit of 0.85. Thus, it can be said that the discriminant validity of our model is satisfactorily established.

Table 4.2.3: HTMT Ratio of Correlations

	Attitude	Effort Expectancy	Facilitating Condition	Financial Literacy	Intention to Use	Perceived Severity	Perceived Susceptibility	Perceived Threat	Performance Expectancy
Effort Expectancy	**0.744** [0.678; 0.806]								
Facilitating Condition	**0.431** [0.343; 0.520]	**0.385** [0.300; 0.469]							
Financial Literacy	**0.331** [0.236; 0.425]	**0.335** [0.239; 0.423]	**0.418** [0.326; 0.509]						
Intention to Use	**0.576** [0.482; 0.667]	**0.474** [0.384; 0.559]	**0.345** [0.257; 0.433]	**0.347** [0.255; 0.444]					
Perceived Severity	**0.102** [0.050; 0.199]	**0.092** [0.061; 0.170]	**0.041** [0.036; 0.111]	**0.187** [0.108; 0.278]	**0.269** [0.171; 0.367]				
Perceived Susceptibility	**0.081** [0.045; 0.174]	**0.053** [0.037; 0.141]	**0.022** [0.24; 0.112]	**0.118** [0.072; 0.188]	**0.193** [0.093; 0.292]	**0.077** [0.063; 0.137]			
Perceived Threat	**0.292** [0.182; 0.399]	**0.264** [0.168; 0.365]	**0.219** [0.155; 0.319]	**0.316** [0.215; 0.423]	**0.848** [0.788; 0.902]	**0.453** [0.343; 0.564]	**0.344** [0.234; 0.457]		

	Attitude	Effort Expectancy	Facilitating Condition	Financial Literacy	Intention to Use	Perceived Severity	Perceived Susceptibility	Perceived Threat	Performance Expectancy
Performance Expectancy	**0.395** [0.305; 0.480]	**0.340** [0.249; 0.426]	**0.332** [0.245; 0.416]	**0.301** [0.211; 0.393]	**0.330** [0.243; 0.415]	**0.058** [0.049; 0.118]	**0.113** [0.062; 0.207]	**0.237** [0.147; 0.335]	
Social Influence	**0.421** [0.338; 0.500]	**0.367** [0.277; 0.453]	**0.457** [0.363; 0.548]	**0.495** [0.394; 0.591]	**0.486** [0.406; 0.565]	**0.169** [0.095; 0.255]	**0.129** [0.076; 0.220]	**0.387** [0.291; 0.478]	**0.310** [0.221; 0.395]

Source: *Primary Data*

Note: PLS-SEM analysis is done using SMART PLS software.

The figures in brackets indicate the lower and upper bound of the 95% confidence interval.

4.2.2 Assessment of the Structural Model

The guidelines of ***Hair et al. (2019)*** has been followed for structural model assessment of the study. According to ***Hair et al. (2019)***, "assessment of the structural model involves three important things viz., checking the collinearity issues, checking the relevance and significance of path coefficients and checking the models' explanatory and predictive power." The results of our structural model were shown in Table 4.2.4, and the significance of the path coefficients with relevant hypothesis has been separately shown in Figure 4.2.1.

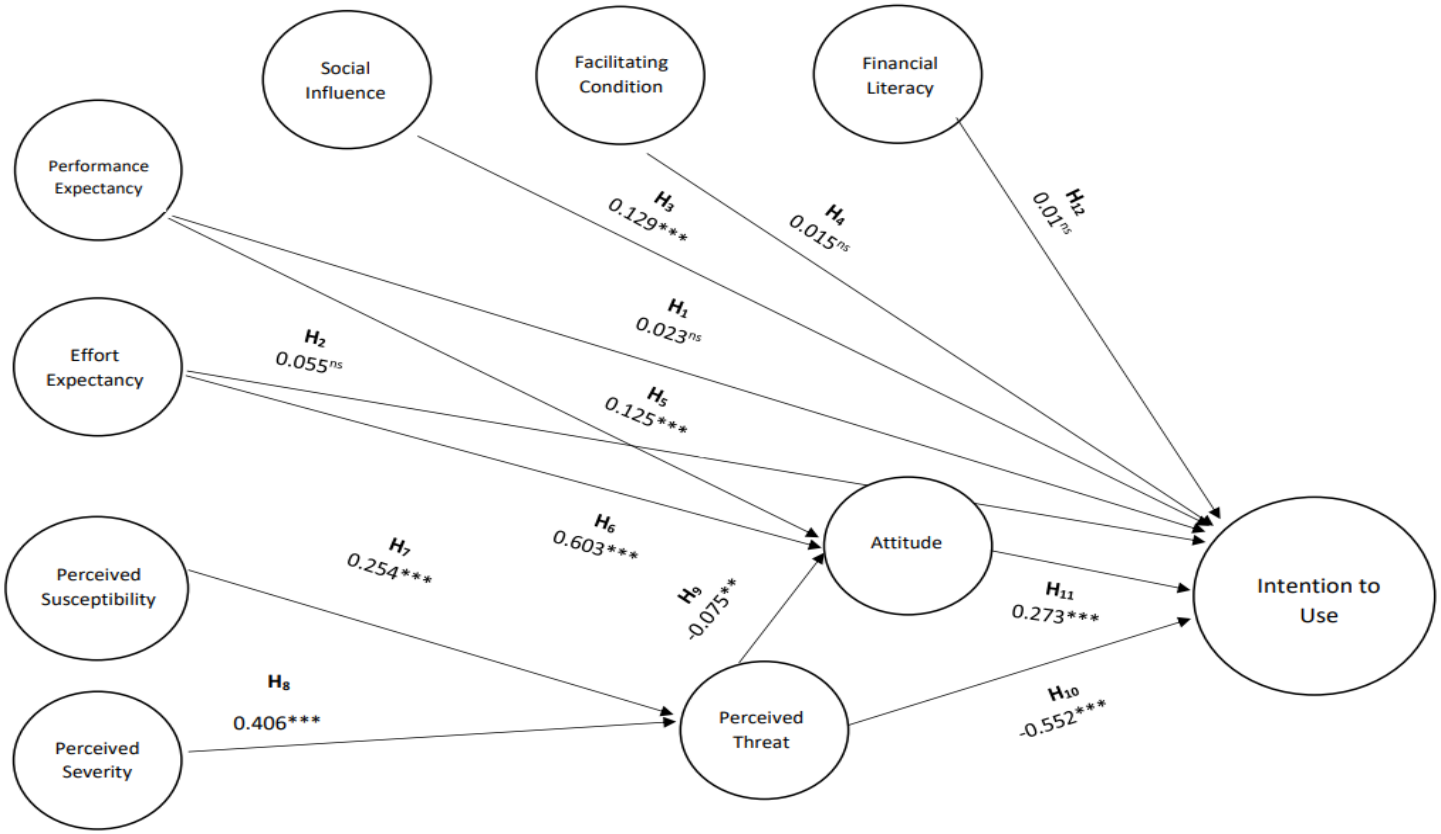
In model, collinearity issues has been checked using the Variance Inflation Factor (VIF). It can be seen from Table 4.2.4 that the VIF values are close to 3 and lower. The largest inner VIF value of our model construct is 2.108 ***(Hair et al., 2019)***. Thus, we can say that "collinearity is not at a critical level in the inner model and will not affect the regression results." In the next step, the path coefficients' significance and size has been assessed. With respect to control variables, gender has significant impact on four constructs, namely performance expectancy (β = -0.143), social influence (β = -0.181), financial literacy (β = -0.166), and perceived threat (β = 0.192); age has a significant impact on six constructs, namely performance expectancy (β = -0.227), effort expectancy (β = -0.188), perceived severity (β = 0.164), facilitating condition (β = -0.127), financial literacy (-0.258), and perceived threat (β = -0.204); and income has significant impact on seven constructs namely performance expectancy (β = 0.587), effort expectancy (β = 0.234), perceived susceptibility (β = -0.146), social influence (β = 0.330), facilitating condition (β = 0.288), financial literacy (β = 0.202), and perceived threat (β = -0.201). However, control variables don't have any significant impact on the endogenous construct of the model.

Figure 4.2.1 illustrates the size and significance of path coefficients between the endogenous and exogenous constructs. It can be seen from figure 4.2.1 that perceived susceptibility (β =

0.254) and perceived severity (β = 0.406) has a significant positive correlation with the perceived threat. Further, perceived threat (β = -0.075) has a significant negative correlation with attitude and both performance expectancy (β = 0.125) and effort expectancy (β = 0.603) has a significant positive correlation with attitude. Furthermore, performance expectancy, effort expectancy, facilitating condition, and financial literacy don't have any significant impact on intention to use. Finally, social influence (β = 0.129) and attitude (β = 0.273) are positively correlated and significant, whereas perceived threat (β = -0.552) has a significnat negative correlation with intention to use (endogeneous construct).

A look into the R^2 values in Table 4.2.3 shows that perceived susceptibiltiy and perceived severity are the important predictor constructs in explaining perceived threat (R^2 = 0.246); perceived threat, performance expectancy, and effort expectancy are the important predictor constructs in explaining attitude (R^2 = 0.501); and social influence, perceived threat and attitude were the three major predictor constructs in explaining the intention to use (0.616). As the R^2 value of the endogenous construct is more than 0.50, the model has achieved a moderate-to-high level of success (Hair et al., 2019) in explaining the intention to utilize cryptocurrency as a currency for digital payments in India. It could be noted that perceived threat (f^2 = 0.677) has the largest f^2 effect size among the predictor constructs, followed by attitude (f^2 = 0.093) and social influence (f^2 = 0.029).

Figure 4.2.1: Structural Model Results



Note: *Control Variables - gender, age and income.*
**** = p<0.01; ** = p<0.05; ns = Not Significant.*

Table 4.2.4: Structural Model Results

Outcome	R^2	Predictor	Direct Paths & Hypotheses	β	CI	Significance?	f^2	VIF
Performance Expectancy	0.183	CV	Gender -> Performance Expectancy	-0.143	[-0.276; -0.004]	Yes	0.007	3.625
		CV	Age -> Performance Expectancy	-0.227	[-0.339; -0.112]	Yes	0.024	2.659
		CV	Income -> Performance Expectancy	0.587	[0.493; 0.680]	Yes	0.194	2.171
Effort Expectancy	0.057	CV	Gender -> Effort Expectancy	0.12	[-0.037; 0.277]	No	0.004	3.625
		CV	Age -> Effort Expectancy	-0.188	[-0.309; -0.065]	Yes	0.014	2.659
		CV	Income -> Effort Expectancy	0.234	[0.126; 0.343]	Yes	0.027	2.171
Perceived Susceptibility	0.023	CV	Gender -> Perceived Susceptibility	0.097	[-0.090; 0.284]	No	0.003	3.625
		CV	Age -> Perceived Susceptibility	0.126	[-0.033; 0.281]	No	0.006	2.659

Outcome	R^2	Predictor	Direct Paths & Hypotheses	β	CI	Significance?	f^2	VIF
		CV	Income -> Perceived Susceptibility	-0.146	[-0.268; -0.024]	Yes	0.01	2.171
Perceived Severity	0.057	CV	Gender -> Perceived Severity	0.001	[-0.153; 0.159]	No	0	3.625
		CV	Age -> Perceived Severity	0.164	[0.029; 0.298]	Yes	0.011	2.659
		CV	Income -> Perceived Severity	0.099	[-0.020; 0.211]	No	0.005	2.171
Social Influence	0.023	CV	Gender -> Social Influence	-0.181	[-0.317; -0.039]	Yes	0.009	3.625
		CV	Age -> Social Influence	-0.024	[-0.135; 0.088]	No	0	2.659
		CV	Income-> Social Influence	0.215	[0.100; 0.330]	Yes	0.022	2.171
Facilitating Condition	0.061	CV	Gender -> Facilitating Condition	0.026	[-0.103; 0.162]	No	0	3.625
		CV	Age -> Facilitating Condition	-0.127	[-0.222; -0.033]	Yes	0.006	2.659
		CV	Income -> Facilitating Condition	0.288	[0.170; 0.407]	Yes	0.041	2.171

Outcome	R^2	Predictor	Direct Paths & Hypotheses	β	CI	Significance?	f^2	VIF
Financial Literacy	0.09	CV	Gender -> Financial Literacy	-0.166	[-0.310; -0.006]	Yes	0.008	3.625
		CV	Age -> Financial Literacy	-0.258	[-0.366; -0.155]	Yes	0.028	2.659
		CV	Income -> Financial Literacy	0.202	[0.090; 0.317]	Yes	0.021	2.171
Perceived Threat	0.246	PS	Perceived Susceptibility -> Perceived Threat	0.254	[0.176; 0.333]	Yes	0.084	1.024
		PSE	Perceived Severity -> Perceived Threat	0.406	[0.325; 0.486]	Yes	0.207	1.06
		CV	Gender -> Perceived Threat	0.192	[0.062; 0.322]	Yes	0.014	3.635
		CV	Age -> Perceived Threat	-0.204	[-0.312; -0.098]	Yes	0.02	2.703
		CV	Income -> Perceived Threat	-0.201	[-0.297; -0.102]	Yes	0.024	2.204
Attitude	0.501	PE	Performance Expectancy -> Attitude	0.125	[0.052; 0.202]	Yes	0.024	1.412
		EE	Effort Expectancy -> Attitude	0.603	[0.529; 0.673]	Yes	0.623	1.936

Outcome	R^2	Predictor	Direct Paths & Hypotheses	β	CI	Significance?	f^2	VIF
		PT	Perceived Threat -> Attitude	-0.075	[-0.143; -0.010]	Yes	0.01	1.173
		CV	Gender -> Attitude	0.065	[-0.030; 0.166]	No	0.002	3.732
		CV	Age -> Attitude	-0.058	[-0.139; 0.022]	No	0.002	2.772
		CV	Income -> Attitude	0.078	[-0.008; 0.161]	No	0.005	2.606
Intention to Use	0.616	PE	Performance Expectancy -> Intention to Use	0.023	[-0.037; 0.082]	No	0.001	1.412
		EE	Effort Expectancy -> Intention to Use	0.055	[-0.018; 0.128]	No	0.004	1.936
		SI	Social Influence -> Intention to Use	0.129	[0.064; 0.198]	Yes	0.029	1.495
		FC	Facilitating Condition -> Intention to Use	0.015	[-0.048; 0.079]	No	0	1.423
		FL	Financial Literacy -> Intention to Use	0.01	[-0.053; 0.074]	No	0	1.491

Outcome	R^2	Predictor	Direct Paths & Hypotheses	β	CI	Significance?	f^2	VIF
		PT	Perceived Threat -> Intention to Use	-0.552	[-0.608; -0.490]	Yes	0.677	1.173
		AT	Attitude -> Intention to Use	0.273	[0.194; 0.358]	Yes	0.093	2.108
		CV	Gender -> Intention to Use	0.043	[-0.065; 0.151]	No	0.001	3.794
		CV	Age -> Intention to Use	-0.037	[-0.132; 0.061]	No	0.001	2.838
		CV	Income -> Intention to Use	0.015	[-0.059; 0.091]	No	0	2.632

Source: *Primary Data*

Note: PLS-SEM analysis is done using SMART PLS software.

CI = "95% bootstrap two-tailed confidence interval", CV = "Control Variable", PE = "Performance Expectancy", EE = "Effort Expectancy", FC = "Facilitating Conditions", FL = "Financial Literacy", SI = "Social Influence", PS = "Perceived Susceptibility", PSE = "Perceived Severity", PT = "Perceived Threat", AT = "Attitude".

4.2.3 Mediation Anlaysis

The significance and strength of the mediating constructs have been assessed using bootstrapping procedure at a 95% confidence interval, and the results are shown in Table 4.2.5.

Table 4.2.5: Structural Mediation

Path	B	CI	Significance?
Perceived Susceptibility -> Perceived Threat -> Intention to Use	-0.143	[-0.192; -0.097]	Yes
Perceived Susceptibility -> Perceived Threat -> Attitude -> Intention to Use	-0.005	[-0.012; 0.000]	No
Perceived Susceptibility -> Perceived Threat -> Attitude	-0.019	[-0.037; -0.001]	Yes
Perceived Severity -> Perceived Threat -> Attitude -> Intention to Use	-0.008	[-0.019; 0.000]	No
Perceived Severity -> Perceived Threat -> Attitude	-0.029	[-0.059; -0.002]	Yes
Perceived Severity -> Perceived Threat -> Intention to Use	-0.225	[-0.276; -0.174]	Yes
Performance Expectancy -> Attitude -> Intention to Use	0.034	[0.013; 0.060]	Yes
Effort Expectancy -> Attitude -> Intention to Use	0.165	[0.115; 0.222]	Yes
Perceived Threat -> Attitude -> Intention to Use	-0.021	[-0.045; -0.002]	Yes

Source: *Primary Data*

Note: *PLS-SEM analysis is done using SMART PLS software.*

CI = 95% bootstrap two-tailed confidence interval.

It can be seen from the table, that perceived susceptibility (β = -0.143) and perceiveed severity (β = -0.225) have a significant larger negative influence on the intention via perceived threat; and they have significant smaller negative impact on attitude ((β = -0.019 for perceived susceptibilty and β = -0.029 for perceived severity) via perceived threat. However, both perceived susceptibility and perceived severity have no significant impact on intention to use via mediators of perceived threat and attitude.

Performance expectancy (β = 0.034) has a significantly smaller positive impact on intention to use via atttiude, and effort expectancy (β = 0.165) has a significantly larger positive impact on intention to use via attitude. On the other hand, perceived threat (β = -0.021) has a significant smaller negative influence on the intention via attitude.

Mediating effect of Attitude

In order to understand the strength of attitude as a mediator, VAF (Variance Accounted For) method has been used. VAF value represents the ratio of the Beta Co-efficient of the indirect effect to the total effect. The mediating effect of attitude on perceived threat and intention to use is shown in Figure 4.2.2 and Table 4.2.6. As the VAF value is less than 0.2, we can conclude that there exist no mediation effect of attitude in the relationship between perceived threat and intention to use.

From Table 4.2.7 and Figure 4.2.3, it can be understood that there exists a partial mediation effect of attitude on the relationship between performance expectancy and intention to use, as the VAF value is between 0.2 and 0.8 (VAF = 0.58). Since all the three beta values are positive, we can say that the partial mediation is complementary in nature.

Table 4.2.8 and Figure 4.2.4 shows the impact of attitude as a mediator on the relationship between effort expectancy and intention to use. Since the VAF value is between 0.2 and 0.8

(VAF = 0.68), the mediation effect of attitude is partial. As all the three beta values are positive, we can say that the partial mediation is complementary in nature.

Figure 4.2.2: Mediating effect of Attitude on Perceived Threat and Intention to Use

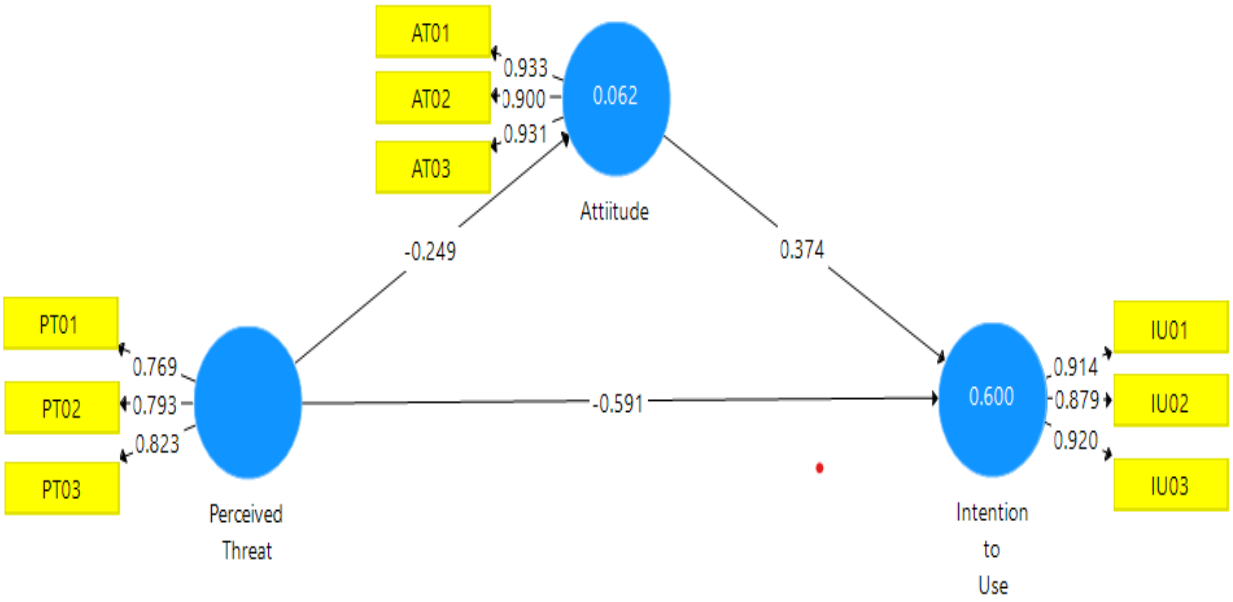


Table 4.2.6: VAF Analysis (Perceived Threat -> Attitude -> Intention to Use)

Mediation Path	Direct Effect	Indirect Effect	Total Effect
Perceived Threat -> Intention to Use	-0.591		
Perceived Threat -> Attitude		-0.249	-
Attitude -> Intention to Use		0.374	
Total	-0.591	-0.093	-0.684
VAF		**0.14**	

Source: *Primary Data*

Note: *PLS-SEM analysis is done using SMART PLS software.*

Figure 4.2.3: Mediating effect of Attitude on Performance Expectancy and Intention to Use

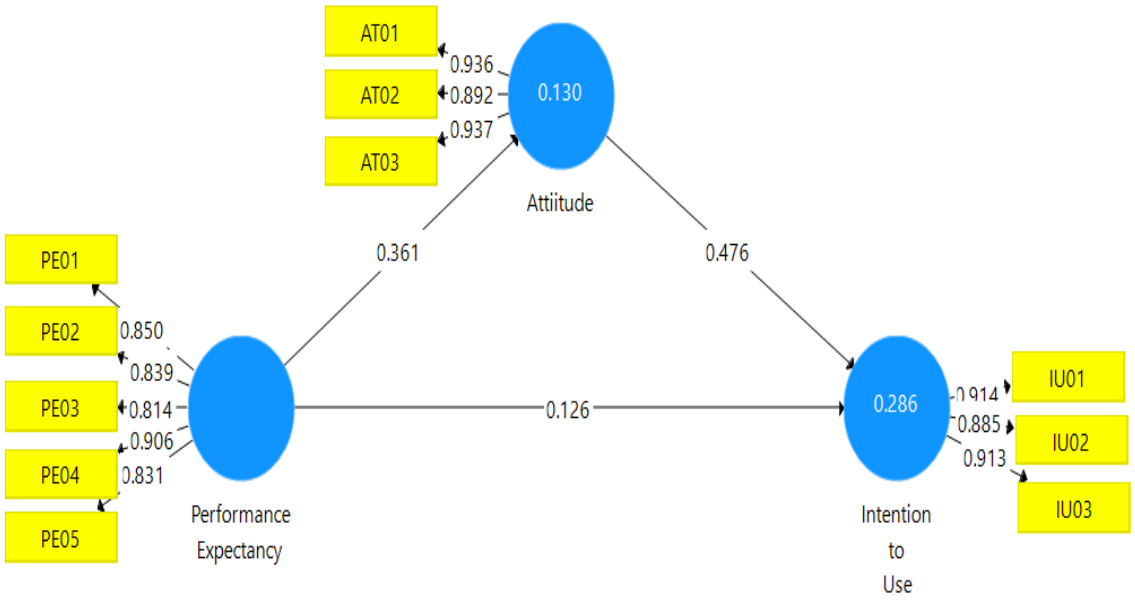


Table 4.2.7: VAF Analysis (Performance Expectancy -> Attitude -> Intention to Use)

Mediation Path	Direct Effect	Indirect Effect	Total Effect
Performance Expectancy -> Intention to Use	0.126		-
Performance Expectancy -> Attitude		0.361	
Attitude -> Intention to Use		0.476	
Total	0.126	0.172	0.298
VAF		**0.58**	

Source: *Primary Data*

Note: *PLS-SEM analysis is done using SMART PLS software.*

Figure 4.2.4: Mediating effect of Attitude on Effort Expectancy and Intention to Use

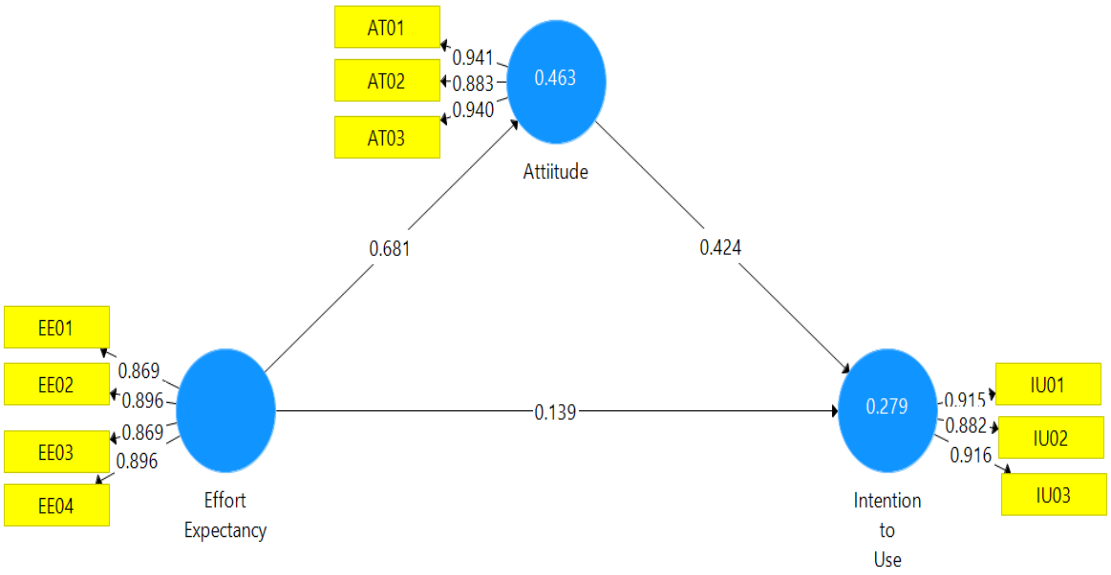


Table 4.2.8: VAF Analysis (Effort Expectancy -> Attitude -> Intention to Use)

Mediation Path	Direct Effect	Indirect Effect	Total Effect
Effort Expectancy -> Intention to Use	0.139		-
Effort Expectancy -> Attitude		0.681	
Attitude -> Intention to Use		0.424	
Total	0.139	0.289	0.428
VAF		0.68	

Source: *Primary Data*

Note: *PLS-SEM analysis is done using SMART PLS software.*

4.2.4 Predictive Relevance of the Model

Table 4.2.4 indicates that the model has achieved a moderate-to-high level of success (Hair et al., 2019) in explaining the intention to use cryptocurrency for digital payments in India, as the R^2 value of the endogenous construct (0.616) is more than 0.50. However, the R^2 statistics explain only the in-sample explanatory power of the model ***(Saari et al., 2021).*** In order to assess the model's out-of-sample predictive relevance, Q^2 values have been obtained for major constructs using the blindfolding technique, and the results are shown in Table 4.2.9.

Table 4.2.9: Predictive Relevance of the Model

Construct	Q^2 Predict
Attitude	0.397
Perceived Threat	0.125
Intention to Use	0.498

Source: *Primary Data*

Note: *PLS-SEM analysis is done using SMART PLS software*.

It can be seen from Table 4.2.9 that the $Q^2_{predict}$ values are above zero. ***Hair et al (2019)*** postulate that "$Q^2_{predict}$ is used to confirm that the estimates have outpaced the most naïve benchmark, which has been defined as the indicator means from the analysis sample." This proves the model's out-of-sample predictive relevance.

4.2.5 Importance-Performance Map Analysis (IMPA)

In order to identify the impact and performance of the constructs with respect to the endogenous construct, importance-performance map analysis (IMPA) has been conducted with the intention to use as the target construct, and the results are shown in Table 4.2.10 and Figure 4.2.5. ***Saari et al. (2021)*** state that "the results of IMPA demonstrate for which exogenous construct the total effects are important by explaining the variance of the endogenous construct."

It has been inferred from Table 4.2.10, and Figure 4.2.5 that perceived threat (-0.998), attitude (0.258), and effort expectancy (0.237) have the largest total effects and are important in explaining the intention to use cryptocurrency as a medium of exchange (performance perceived threat – 51.005; performance attitude – 48.907; and performance effort expectancy – 48.029). Social influence has a smaller total effect (0.114) but realizes above-average performance (46.138). Perceived susceptibility (-0.236) and perceived severity (-0.302) have an above-average total effect, but they score low in performance (performance perceived susceptibility – 40.546 and performance perceived severity – 41.938). Facilitating conditions (0.02), financial literacy (-0.004), and performance expectancy (0.072) have a very small total effect and also score low in performance (performance facilitating condition – 45.908; performance financial literacy – 45.206; and that of performance expectancy is 44.62).

If 1 unit of the performance of perceived threat decreases, say from 51.005 to 50.005, then the intention to use will increase from 49.859 to 50.857. This is the highest increase in the performance of our target construct, that is, the intention to use. Thus it can be said that perceived threat plays a very significant role in the intention to use cryptocurrency as money.

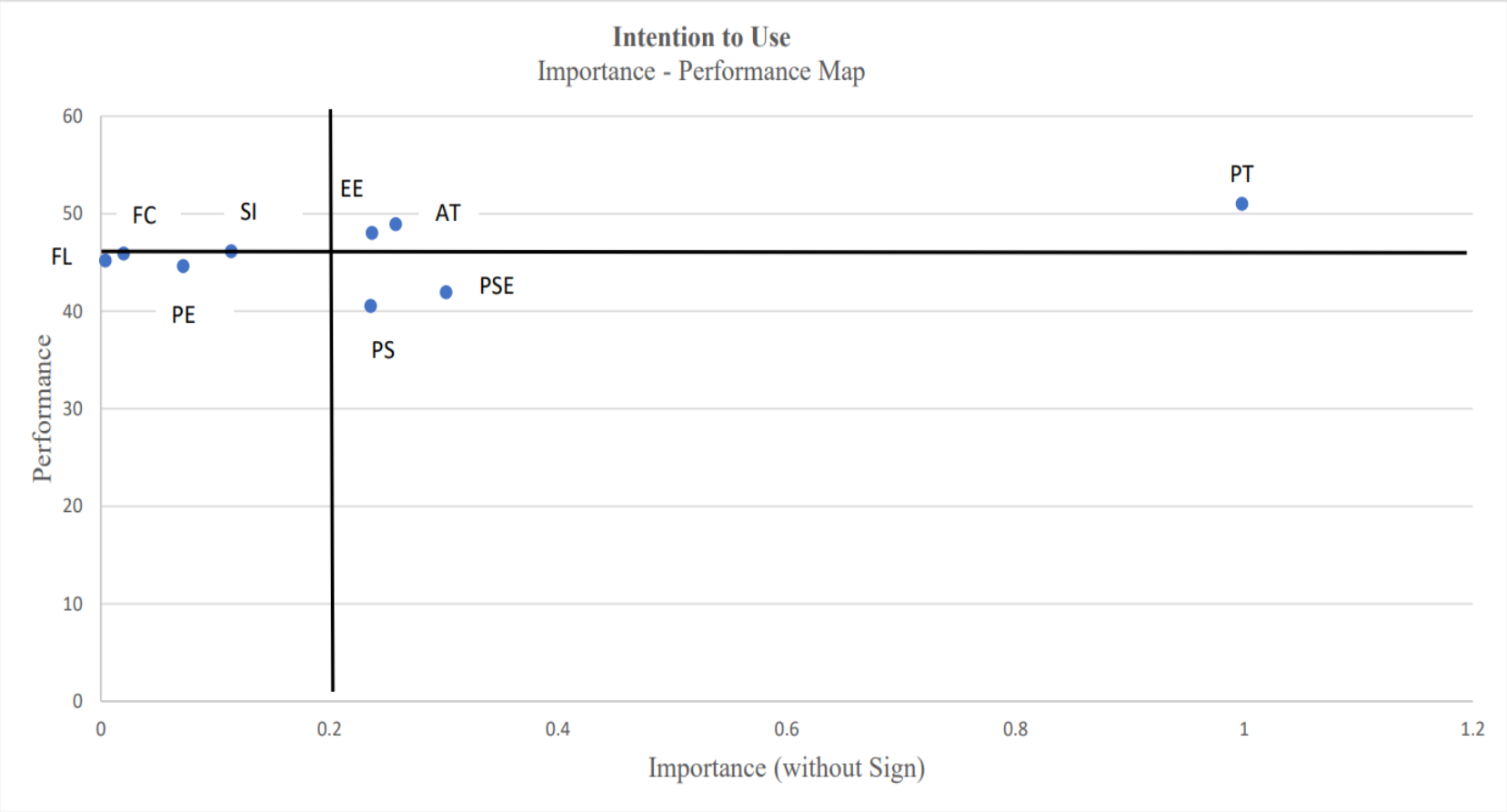
Table 4.2.10: Importance-Performance Map Analysis

Particulars	Unstandardized Total Effect (With Sign)	Unstandardized Total Effect (Without Sign)	Performance	LV Performance
Attitude	0.258	0.258	48.907	-
Effort Expectancy	0.237	0.237	48.029	-
Facilitating Condition	0.02	0.02	45.908	-
Financial Literacy	-0.004	0.004	45.206	-
Perceived Severity	-0.302	0.302	41.938	-
Perceived Susceptibility	-0.236	0.236	40.546	-
Perceived Threat	-0.998	0.998	51.005	-
Performance Expectancy	0.072	0.072	44.62	-
Social Influence	0.114	0.114	46.138	-
Intention to Use	-	-	-	**49.859**
Average	**-**	**0.2**	**46**	

Source: *Primary Data*

Note: PLS-SEM analysis is done using SMART PLS software.

Figure: 4.2.5: Importance-Performance Map Analysis



Note: *PE = Performance Expectancy, EE = Effort Expectancy, FC = Facilitating Conditions, FL = Financial Literacy, SI = Social Influence, PS = Perceived Susceptibility, PSE = Perceived Severity, PT = Perceived Threat, AT = Attitude.*

Chapter 5: Discussion

The study findings show that the construct "perceived threat" is the most significant factor in the espousal of cryptocurrency as a medium of exchange in India. It affects both the construct "attitude" and the construct "intention to use". The IMPA showed that if 1 unit of the performance of perceived threat decreases, say from 51.005 to 50.005, then the intention to use will increase from 49.859 to 50.857. This is the highest increase in the performance of our target construct, that is, the intention to use. This result is consistent with the recent study on associated risks and threats in the use of cryptocurrency ***(Madey, 2017)***. Thus, the removal of major threats to the adoption of cryptocurrency, such as black marketing, collapsing concerns and threats of unknown identity ***(Sharma, 2022)*** has become necessary to increase the adoption of cryptocurrency for digital payments. It could be noted that the descriptive analysis of the study showed that more than 1/3rd of the respondents are neutral with respect to cryptocurrency threats. If people who are investing in cryptocurrency are unsure whether it is safe to use cryptocurrency as a medium of exchange or not, the percentage of threat perception will be higher among the common people who don't have any exposure to cryptocurrency. Thus, proper regulatory measures must be made to remove the risks and uncertainties associated with cryptocurrency (***Limba, Stankevicius & Andrulevicius, 2019)***.

In addition to the perceived threat, the constructs "perceived susceptibility" and "perceived severity" has a significant larger impact on intention to use via perceived threat, and they have a significant smaller negative impact on attitude via perceived threat. It could be noted that an overwhelming majority of the respondents believe that the chances of cryptocurrency becoming illegal is very remote. However, some of the respondents believe that cryptocurrency may further increase income inequality in society. This result is consistent with the recent study on wealth inequality in cryptocurrency ***(Sai, Buckley & Gear, 2021).***

According to our findings, attitude is also important in explaining the intention to use cryptocurrency as money. This result is consistent with the recent study on the influence of the attitude of the users on the intention to use ***(Zhu, Lin, & Hsu, 2012)***. The results of the descriptive analysis show that only 1/3rd of the respondents have a positive attitude towards the use of cryptocurrency for digital payments. The majority are holding cryptocurrency as an asset class only, and there needs some great push in the mindset of the people holding cryptocurrency to use it as money ***(Baur, Lee & Hong, 2015)***.

The study findings show that effort expectancy has a strong positive correlation with attitude. Further, attitude acts as a complementary partial mediator between effort expectancy and intention to use and also between performance expectancy and intention to use. These findings are in line with recent studies on the impact of performance and effort expectancy on attitude ***(Knutsen, 2005; Pangaribuan & Wulandar, 2019)***. It can be said that many investors are starting to believe that cryptocurrency will enhance their wealth and increase the net worth of their portfolios. However, performance expectancy and effort expectancy doesn't have any significant direct impact on the intention to use cryptocurrency for digital payments.

The third important variable affecting the espousal of cryptocurrency is social influence. It has a significant positive impact on the intention to use. Both IMPA and f^2 values support this claim. Further, descriptive analysis has shown that workplaces are the major source of influence for the intention to use cryptocurrency. This finding is in line with the results of a recent study on the impact of social influence on the adoption of cryptocurrency ***(Thompson, 2020; Almarashdeh et al., 2021; Saiedi, Brostrom & Ruiz, 2021)***. It could be noted that ***Kunal et al. (2021)*** hypothesized that "in a world where fiat money ceases to exist, cryptocurrency will become the natural medium of exchange, and for that to happen, they argue that social acceptance is the critical and most important factor."

With respect to the construct facilitating conditions, most of the respondents disagree with the statements asserting the existence of the necessary infrastructure and compatible technologies for the adoption of cryptocurrency for digital payments. However, the results of the structural model show that facilitating conditions don't have any significant impact on the espousal of cryptocurrency. This result may be because of the fact that facilitating conditions won't affect the behavioural intention but the use behaviour of the respondents ***(Gu, Lee & Suh, 2009)***. Hence, effort must be made to create necessary blockchain supporting platforms and other technological conditions necessary for common people to utilize cryptocurrency for digital payments.

It is interesting to see that most of the respondents don't believe that financial literacy is an important skill needed to manage their financial assets. The irony is they perceive that they are neither at ease with understanding financial concepts and precepts nor they have good knowledge about financial markets, but they believe they are good at managing their financial assets. This is further stressed by the results of the structural model, which show that financial literacy doesn't have any significant impact on the intention to use cryptocurrency. This finding of the study is in line with recent research in the field of financial literacy and wealth management ***(Lusardi, 2015; Bhatt & Bhatt, 2020)***. These studies are not able to establish any significant relationship between financial literacy and efficiency in wealth management. The major reason attributed to this fact is that many people rely on the opinion of investment advisers and financial planners for investments and portfolio management.

The structural model of the study used three control variables – gender, age and income, and the results show that none of the control variables has a significant influence on the endogenous construct. However, they have a significant impact on major predictor constructs: gender and income have a significant impact on perceived threat and social

influence, and; perceived threat as well as perceived severity has been significantly affected by age.

The study established that perceived threat, attitude, and social influence are the significant factors affecting the adoption of cryptocurrency in India. Effort expectancy and performance expectancy are having a significant impact on the intention to use via attitude, whereas perceived severity and perceived susceptibility are significantly affecting the intention to use via perceived threat. Financial literacy and facilitating conditions don't seem to have any impact on the intention to use blockchain based cryptocurrency for digital payments.

As the R^2 value of the endogenous construct is more than 0.50, the model has achieved a moderate-to-high level of success ***(Hair et al., 2019)*** in explaining the motivations and challenges in the adoption of cryptocurrency as a medium of exchange in India. It could be noted that perceived threat has the largest f^2 effect size among the predictor constructs, followed by attitude and social influence.

$Q^2_{predict}$ value of the endogenous construct is above zero. ***Hair et al. (2019)*** state that "$Q^2_{predict}$ is used to verify that the predictions have outpaced the most naïve benchmark, which has been defined as the indicator means from the analysis sample." Thus, the results prove the out-of-sample predict relevance of the model.

Chapter 6: Conclusion

The deciding factor in the emergence of cryptocurrency as a global currency for digital payments depends on the level of acceptance it gains in society. While cryptocurrency is gaining significant acceptance in developed economies like the US, the rate of adoption in emerging economies like India has not been studied so far. It is essential for cryptocurrency to be adopted in countries like India to become a true global currency. Hence, the study aims to find out the impetuses and contests in the espousal of cryptocurrency in India.

In order to study the impetuses and contests (motivations and challenges) in the espousal of cryptocurrency as a medium of exchange, a theoretical model has been developed, on the basis of two theories; UTAUT and TTAT. Facilitating condition, social influence, performance expectancy, effort expectancy, and attitude were the variables adopted from UTAUT. Perceived susceptibility, perceived severity and perceived threat were the variables adopted from TTAT. In addition, financial literacy has been introduced as a new variable in this theoretical model.

The software - G*power has been employed to compute the minimum number of respondents needed for the theoretical model of the study. The output showed that 262 is the minimum sample size required for the study. In order to ensure statistical accuracy of the model and to reduce both Type I and Type II errors, a sample size of 750 (nearly three times the needed sample size) has been used. The purposive sampling technique has been adopted as the study requires respondents to be aware of cryptocurrency. The study is mainly based on primary data. The opinions of the respondents were collected using a well-structured questionnaire (Annexure I).

The required data was gathered from 750 respondents. After cleaning the data and removing incomplete responses and outliers, the responses of 711 respondents were analysed.

Descriptive analysis has been done using SPSS, and the PLS-SEM assessment is done using SMART-PLS software.

The study established that perceived threat, attitude, and social influence are the significant factors affecting the acceptance of cryptocurrency in India. Effort expectancy and performance expectancy are having a significant impact on the intention to use via attitude, whereas perceived severity and perceived susceptibility are significantly affecting the intention to use via perceived threat. Financial literacy and facilitating conditions don't seem to have any impact on the intention to use cryptocurrency for digital payments.

The structural model has achieved a moderate-to-high level of success in explaining the motivations and challenges in the espousal of cryptocurrency as a digital currency in India, as the R^2 value of the endogenous construct is more than 0.50. It could be noted that perceived threat has the largest effect size among predictor constructs, followed by attitude and social influence.

The Important-Performance Map Analysis (IPMA) also showed that perceived threat is the most significant factor in the espousal of cryptocurrency as a medium of exchange in India. If 1 unit of the performance of the perceived threat decreases, say from 51 to 50, then the intention to use cryptocurrency will increase by 0.998 units, say from 50 to 50.998. This is the highest increase in the performance of our target construct, that is, the intention to use.

Based on the IPMA results, it is recommended that the perceived threat (risks and uncertainties in the use of cryptocurrency for digital payments) must be addressed through policy changes and regulations. A tug of war is currently taking place in India, as it is in many other countries such as Russia, between the central bank, which is advocating for the prohibition of cryptocurrencies, and government ministries such as finance and IT, which want the country to participate in the newly emerging Web 3.0 economy. Given how quickly

digital assets have developed in the last year, Alexander Höptner (CEO of Bitmex crypto exchange), believes that "if Indian policymakers take a positive position on cryptocurrencies, the country might flip the needle for mass market crypto acceptance globally" ***(Mahanta, 2022)***.

Another significant variable in the adoption of cryptocurrency is the attitude of Indian people towards the use of cryptocurrency. Indian Prime Minister Narendra Modi stated that new technology such as cryptocurrency should be used to strengthen rather than weaken democracy. Unregulated digital currency transactions, according to Indian policymakers, might jeopardise macroeconomic and financial stability. Instead of banning cryptocurrencies, the Modi administration is drafting laws to regulate their usage ***(Reuters, 2021).*** This shows that the Indian government is not against cryptocurrency. Even though, at present, cryptocurrency assets are taxed at a higher rate of 30%, many see it as a blessing in disguise and a welcome step in the legalisation of the use of cryptocurrency in India. Thus, there is a silver lining that people in India will gain a positive attitude towards cryptocurrency in the near future.

The findings of the study proved that social influence is one of the significant variables influencing the adoption of cryptocurrency. To gain significant social influence, highly respected individuals in India should start to use cryptocurrency for digital payments ***(Presthus & O'Malley, 2017)***. Further, the inclusion of cryptocurrency as one of the payment options on Facebook or WhatsApp in India will also influence more people to accept cryptocurrency for digital payments.

The study is limited to respondents in the major cities of India, and only people who are cryptocurrency investors were purposively selected for the study. Thus, future studies could examine the perceptions of people who are not cryptocurrency investors. Furthermore, future

studies can also examine other factors that affect the intention to use cryptocurrency, such as social media influence.

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Annexure - Questionnaire

Demographics

1. Place
    a) Chennai
    b) Hyderabad
    c) Delhi
    d) Mumbai
2. Gender
    a) Male
    b) Female
3. Age
    a) 18-30 years
    b) 30-40 years
    c) 40-50 years
    d) Above 50 years
4. Education
    a) UG
    b) PG
    c) Doctorate
5. Income
    a) Less than Rs. 50000 per month
    b) Rs. 50000 to Rs. 75000 per month
    c) Rs. 75000 to Rs. 100000 per month
    d) Above Rs. 100000 per month

Please rate the Below Statements.

(From 1 – strongly disagree to 7 – strongly agree)

Construct	Indicator	1	2	3	4	5	6	7
Performance Expectancy	PE01 - I find cryptocurrency as a useful form of money							
	PE02 - Using cryptocurrency will increase the efficiency of my monetary transactions							
	PEO3 - Using cryptocurrency will help me to receive and make payments quickly							
	PE04 - Using cryptocurrency will enhance my wealth							
	PE05 - Using cryptocurrency will increase/increases the efficiency of my financial portfolio							
Effort Expectancy	EE01 - Learning how to use cryptocurrency is easy for me							
	EE02 - My interaction with cryptocurrency is clear and understandable							

	EE03 - I find cryptocurrency easy to use							
	EE04 - It is easy for me to become skilful at using cryptocurrency							
Facilitating Condition	FC01 - I have the necessary resources to use cryptocurrency							
	FC02 - I have the knowledge necessary to understand and use cryptocurrency							
	FC03 - Cryptocurrency is compatible with other technologies I use							
	FC04 - I can get help from others when I have difficulties in using cryptocurrency							
Financial Literacy	FL01 - I am at ease with understanding financial concepts and precepts							
	FL02 - I have good knowledge of financial markets							
	FL03 - I am good at managing my financial assets							

Social Influence	SI01 - Peers who influence my behaviour think that I should use cryptocurrency							
	SI02 - Friends whose opinions I vale think that I should use cryptocurrency							
	SI03 - People who are important to me think that I should use cryptocurrency							
Perceived Susceptibility	PS01 - Using cryptocurrency as money may become illegal in future							
	PSO2 - The chances of cryptocurrency becoming an illegal currency are great							
	PSO3 - Indian government may ban the cryptocurrency in the near future							
Perceived Severity	PSE01 - High volatility of cryptocurrencies might make them a less efficient form of money							
	PSE02 - Cryptocurrency may be used by terrorist organizations							

	PSE03 - Cryptocurrency may increase black money in the economy							
	PSE04 - The issue of inheritance makes it a less likeable form of money							
	PSEO5 - Cryptocurrency being digital money, is vulnerable to hacking and other security threats							
Perceived Threat	PT01 - My fear of exposure to cryptocurrency risks is high							
	PT02 - Compared with other currencies, cryptocurrency is risker to use							
	PT03 - Uncertainties associated with the use of cryptocurrency as money is higher							
Attitude	AT01 - Using cryptocurrency as money is a good idea							
	AT02 - I like the idea of using cryptocurrency as money							
	AT03 – A cryptocurrency is an effective form of money							

Intention to Use	IU01 - I intend to use cryptocurrency as money in the future							
	IU02 - I am sure I will use cryptocurrency to make and receive payments in the near future							
	IU03 - I am holding cryptocurrency to use as money in future							