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INVESTOR BEHAVIOR IN THE CRYPTOCURRENCY MARKET

A quantitative study investigating individual investors' adoption
intention to Bitcoin in the cryptocurrency market

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Abstract

Background: The emerging cryptocurrency market becomes more and more recognized around the globe. Therefore, it has become of great interest to policymakers, institutional investors, and individual investors. The new encrypted blockchain technology offers individual investors contemporary opportunities to invest contrary to traditional means. However, the volatile market presents instabilities and uncertainty for market participants creating a research gap for academics to investigate what poses these difficulties.

Purpose: The objective of the study is to investigate the determinants that affect individual investors' adoption intention of Bitcoin. By incorporating theories to understand investment behaviors and attitudes.

Methodology: The thesis utilized a quantitative methodology and collected data through an online questionnaire with the help of a Likert-scale instrument. The survey participants ended with a number of 114 respondents that are characterized as young adult investors. Interpretation and evaluation of the results were analyzed through an OLS linear regression with the help of a software program, Minitab.

Findings: The research question was answered to a satisfactory level, where results attested to past works of literatures. The study found that consumer characteristic is a driving cause for individual investors' adoption intention of Bitcoin. To elaborate, subjective norms of individuals navigate their attitude towards Bitcoin, and investors' peers' opinions and acceptance play a crucial role in their engagement in the market. The herding trend was the most significant variable that contributed to investors' adoption intention. The results also showed a significant correlation toward the technology acceptance model. Nonetheless, the study lacked empirical evidence to support market characteristics steering private investors' adoption intention.

Implications & Future Research suggestions: The main implications of the study were factors that regarded data collection and methods. Due to a time limitation, the survey was not available for a longer period of time, a longitudinal study could be of interest whilst incorporating more consumer characteristics into the analysis. In addition, future scholars ought to focus on market characteristics and how they influence varying cryptocurrencies such as Ethereum and Tether alongside Bitcoin. To conclude, a larger scope of the study could bring about more significant results and interesting findings.

Keywords: Cryptocurrency, Bitcoin, Adoption Intention, Behavioral Finance, Technological Acceptance Model, OLS, Herding behavior

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Glossary

Herding: has many varying definitions. Fundamentally, herding behaviour refers to when individuals act collectively without any sense of rationality in decision making while mimicking other actions in the market.

Tail Risk: A risk that occurs in a rare event

Blockchain: is a public digitalized ledger where the system notes all the transactions in a computer system shared to peer-to-peer which makes it difficult to hack.

Unsophisticated / Noise traders: new investors that do not possess any prior/ privilege knowledge about the market and are often more prone to act irrationally and follow the trend in the market rather than implementing own strategic strategies to investing.

Bullish market: A rising market.

Bearish market: A period in the market expected to decline.

Information Asymmetry: An imbalance between two parties about all the relevant factors and knowledge crucial for negotiation.

1. Introduction

The purpose of the introductory chapter is to offer the reader insights into the respective topic and the scope of the research. A research background will be introduced whilst identifying research gaps in previous scientific investigations. And henceforth, an attempt to provide an extension of the current knowledge. Subsequently, presenting the research questions, accounting for the limitations, and stipulating the disposition of the following study.

1.1 Research Background

Cryptocurrency in recent years has become a widely popular discussion topic amongst investors and policymakers. Nonetheless, more specifically for individual investors as cryptocurrencies can act as complementary substitutions to monetary instruments; provide alternative investment opportunities; or as a hedging instrument against other conventional financial assets (Youssef, 2020, p.7). As a new technology-driven market many researchers have focused on private investors' behavior within the respective market and the main causes for such behaviors. Further academics have investigated what factors drive adoption intention. Lastly, additional research that has been conducted also examines the nature of the cryptocurrency market and whether current theories such as behavioral finance or efficient market hypothesis are applicable in the emerging market. The following study is of great importance due to the ever-changing economy and understanding the fundamentals of the currently volatile and speculative cryptocurrency market is crucial for future investment decisions.

Cryptocurrency market first came to light in 2009 as Bitcoin was introduced as the first cryptocurrency by an unknown creator, Satoshi Nakamoto. The market works as a digitalized currency with a decentralized system. Currencies are transferred using cryptography to certify legitimacy and unique transactions. (Farell, 2015, p.2) A suppressing matter regarding cryptocurrency is the massive price fluctuations in the market. The significant instability with cryptocurrency prices does not solely stem from the fact of being an emerging market. Instead, they can be explained by various market microstructure variables and the general economic conditions. Namely, economic policy uncertainty; market returns; volatility; and volume (Youssef, 2020, p.6). Another consequential factor that contributes to the price volatility of cryptocurrencies is the price dynamic of cryptocurrencies. For instance, Bitcoin seems to exhibit distinctive patterns of price turbulences compared to other currencies such as gold. (Fonseca et al 2019, p.154; Dwyer, 2015). Nonetheless, the most determining factor for erratic price fluctuations in the cryptocurrency market can be explained by behavioral finance theory, more specifically the herding behavior of private investors (Youssef, 2020, p.2). This, in turn, translates to investors' demand for the respective currency which determines prices.

Due to the volatile nature of the cryptocurrency market, many scholars have provided varying interpretations of whether the cryptocurrency market is efficient or inefficient in accordance with the efficient market theory. Several authors argue that the cryptocurrency market is inefficient due to numerous reasons. Such as herding behavior by private investors (Youssef, 2020, p.8), information asymmetry between traders in the market (Park, 2020, p.4049), and attention-driven trading (Subramaniam & Chakraborty, 2019, p.111) Whereas, other works of literature declare that the cryptocurrency market is informationally efficient following the efficient market hypothesis. However, the respective literature also

acknowledges the variations between levels of efficiency depending on the liquidity of the cryptocurrency market. (Yang & Zhao, 2020, p. 2400; Corbet et al, 2018; Nadarajah & Chu, 2017; Urquarth, 2016)

Another researched phenomenon is the amount of risk exposure individual investors and other financial investors subject themselves to whilst investing in cryptocurrencies. There are numerous risk factors that contribute to the level of investment return had cryptocurrencies been seen as financial assets for trading and investment purposes. For instance, many investors use cryptocurrency for hedging purposes. Cryptocurrencies offer a degree of diversification due to them possessing dissimilar tail risks as other global assets. Nonetheless, it does possess its own kind of tail risk that should be managed with caution. (Liu et al., 2019, 1138) In addition to the variables mentioned above, in term of the volatility in the market, individual cryptocurrencies are characterized by different natures of volatility. Each currency, and the market as a whole, develop over time and thus, offers a varying degree of risk to investment choices. (Liu et al., 2019, p.1173) Due to the speculative nature of the market, cryptocurrencies' risk factors have been heavily researched in order to provide the most efficient portfolio- and risk management whilst maximizing returns from the market.

1.2 Research Gap

Previous research has individually focused on one single determinant rather than combining all of the aforementioned variables to explain individual investors' investment behavior. Such as Al-Mansour (2020) investigated "... the effect of behavior finance factors on investment decisions in the cryptocurrency market (Al-Mansour, 2020, p.166)." Another study focused on interdependency as well as intradependency between sub-major cryptocurrencies and their effects on volatility; hence, risk levels of the market (Jalal et al., 2020, p.33). A significant amount of researchers have suggested further studies to measure the correlation between the effects of global financial market indices and cryptocurrencies. Essentially, Al-Mansour (2020) has investigated the internal effects of what causes volatility in the market and proposes further studies to examine the external effects of the causation. Furthermore, Park (2020) identified a lack of multidimensional studies in regard to the unstable nature of cryptocurrencies. To further dive into another branch of research areas in cryptocurrencies, many scholars have investigated investors' adoption intention whilst using technology acceptance models (Abroud et al., 2013). Many of these, focus solely on investors' attitudes rather than external variables that may influence adoption intention.

Considering minor disagreements between different works of literature, the following research aims to reexplore the fundamentals of the cryptocurrency market as a holistic concept of many smaller attributes. There are magnitude of research about varying factors that contribute to the unstable and immature environment of the cryptocurrency market. However, this particular research attempts to create a bridge between the most significant determinants that influence investment behavior in the market. Essentially, an extension of current works of literature in the same direction. In addition, the following paper aims to investigate what determinants drive investors' intention to adopt Bitcoin in order to gain a better understanding of the new addition to the financial market. In essence, the study aims to incorporate the determinants, that have been previously identified and investigated, and apply them to investors' adoption intentions.

1.3 Research Question

With that being said, previous papers have been able to identify various determinants that affect the volatility of the market. The intention of the following paper is to provide a more comprehensive understanding of individual investors' adoption intention and; therefore, investment decisions. These factors may vary from internal as well as external effects. Moreover, in order to understand the complexity of investment behavior in the respective financial market, examining different determinants in the macroenvironment is of great significance. The paper also attempts to offer a more multidimensional perception of the determinants. Thus, the following research is:

***RQ:** What market characteristic- and individual consumer determinants influence investors' intention to adopt Bitcoin in the cryptocurrency market?*

1.4 Research Purpose

The purpose of the research is to investigate what determinants affect investors' investment decisions and their willingness to adopt cryptocurrency. To narrow down the scope of the investigation, the following paper will solely focus on investors' adoption and investment choices in regard to Bitcoin. The choice is motivated due to Bitcoin being the first cryptocurrency introduced in the market as well as holding the majority percentage in the cryptocurrency market (Coinmarket, 2022). In addition, many smaller cryptocurrencies have been pegged to Bitcoin (CoinGecko, n.d); therefore, the researcher will assume that to the majority of the cryptocurrency market, Bitcoin is the most applicable currency to investigate in order to offer more generalizability for the entire market. As such, in the following study, the terms cryptocurrency and Bitcoin shall be used interchangeable in order to bring the study from more general to specific. Furthermore, the aim is to emphasize that Bitcoin is indeed to a great extent generalizable in the cryptocurrency market. Nonetheless, the author does acknowledge varying natures of different cryptocurrencies and; henceforth, study results may not be applicable to all currencies. The results act merely as a general trend of the market. The following data will be gathered in a quantitative manner through an online survey. Thereafter, a regression analysis, more specifically OLS, is examined through a series of responses based on the Likert scale in order to derive answers to the respective research question of the thesis. Moreover, the purpose is to differentiate between individual and institutional investors and generate results applicable for individual investors. Therefore, the study is directed at solely individual investors.

1.5 Limitations

Due to the scope of the study and time limitation, the research is limited only to one dimension of investigation. To elucidate, though the paper explores many dimensions of the investment behavior elements, unfortunately, it does not explore market- or economic forces in the depth. For instance, the study offers a generalization of individual investors as a whole. It does not account for private investors of varying cultures that may pose great significance to their investment behavior and choices. Consider those different countries that may view cryptocurrencies for varying purposes such as commodities or assets (Alfieri & Chokor, 2020, p.159). Let it be known, that this particular paper shall view cryptocurrencies as assets.

Another aspect that the paper will overlook is external factors beyond one's control, such as political landscapes and policies constituted for the respective market. Hence, the study

puts greater emphasis on the business environment variables that alter investment behavior. With that being said, due to the limited time available, more extensive research on external variables may fall short.

A further implication of the study concerns the applicability and replicability of the study. The results of the current study, as of 2022, might be greatly affected by the Covid-19 pandemic. Uncertainty and risk avoidance of private investors may have increased during the past years and therefore, have already modified private investors' behavior.

1.6 Disposition

The following thesis has thus far presented the research background and research gaps of previous studies. It has identified the importance of studying the respective topic in order to extend knowledge to the relevant fields of financial management and risk management for private individual investors. In addition, it will also contribute to the knowledge of financial markets and their fundamentals that affect the environment. Succeeding the introduction chapter, the paper will set the theoretical framework by describing and connecting relevant theories and concepts. Thereafter, I will identify the respective research paradigm for the dissertation and motivate varying methods and interpretations of the results by presenting the methodology chapter. The data and results will then be discussed in section 4. And 5. Following the results, I will present an analysis of the collection of the data and evaluate them in accordance with the theoretical framework. Lastly, a conclusion chapter will consist of the most important and interesting findings of the study. In addition, I will further discuss the limitation of the study and identify future research possibilities by using the quality criteria discussion.

2. Theoretical chapter

The aim of the theoretical chapter is to present and explain theories behind the problem background by constructing a theoretical framework. This is done by executing a literature review. Essentially exploring previous academic studies, and discussing concepts, and models within the theoretical field. The purpose is to select, evaluate, and compare the most relevant literature works to support and align in accordance with the following study.

Literature review

In the following chapter, past studies will be discussed that identify various determinants that affect private investors' investment decisions in the cryptocurrency market; hence, their intention to adopt Bitcoin. Thereafter, I will construct the theoretical framework for the following study by incorporating the most relevant theories and models applicable to the research. The determinants will be divided into two categories: (i) market characteristics and (ii) consumer characteristics. Market characteristics refer mainly to macroeconomic factors in the cryptocurrency market. Whereas, consumer characteristics refer to individual consumers' profiles such as risk preferences. The following chapter will provide an overview of market characteristics and will go in-depth in regard to consumer characteristics. Furthermore, the market characteristics will explore a variety of elements that affect cryptocurrency prices since it poses itself as a significant factor that affects consumers' behavior and investment perception.

2.1. Market Characteristics

The difficulty of assessing exact determinants that influence cryptocurrency prices is due to their complex and multi-faceted nature. As previously mentioned, the following research will consider cryptocurrencies as assets for investment purposes. Nonetheless, one cannot disregard that cryptocurrencies, more specifically Bitcoin, have similar characteristics to commodities such as gold or precious metals. The complex procedure of mining and adding nodes to blockchains come at a significant cost of electricity; hardware purchases & maintenance; and human resources (Li & Wang, 2016, p.52). However, since cryptocurrencies are affected by commodity prices and a variety of other factors they will thus be considered as assets in this particular research.

To elaborate on the nature of cryptocurrencies, scholars such as Delfabbro, King, and Williams (2021) would argue that cryptocurrencies operate similarly to derivatives rather than commodities. The underlying assets will vary depending on cryptocurrencies. For instance, considering Bitcoin as a financial asset, its main purpose would be to store value or act as a medium exchange. Thus, Bitcoin's underlying asset depends on commodities such as gold and other indices in the global financial market. In the following paragraphs, the paper will divide market characteristics into two varying categories that affect cryptocurrency prices namely, (i) technological factors and (ii) economic factors. In addition, it will also discuss briefly short- and long-term effects that affect the erratic prices in the market.

2.1.1 Technological Factors

One of the key factors that affect cryptocurrency prices and fluctuations within the market is the difficulty of the mining system blockchain technology is based on. As a decentralized institution, blockchain has been adopted in order to minimize counterfeits and offer a form of authentication. Respectively each transaction is added as a “block” to the ledger and verified by a public key and encrypted by a private key to identify the current owner of the transaction. To secure the ledger, each block is protected by a unique hash set by miners, and they are motivated to mine by receiving new Bitcoins. The only way to create new Bitcoin is by mining. The supply of Bitcoin is limited; thus, the mining difficulty will increase over time due to natural deflation. (Li & Wang, 2017, p.50)

Another technological aspect that fluctuates Bitcoin prices is public recognition and investors' technological acceptance. The main observation in any market goes as follows; price is determined by demand and supply, the same notion works in the cryptocurrency market. The trading volume is determined by the public recognition of consumers. If they perceive the operation as valuable investors are more likely to adopt cryptocurrencies and accept its technology. Individuals' adoption intention is based on their technological perception which is further shaped by social norms and information provision. (Li & Wang, 2017, p.52) To elucidate, social norms refer to other groups of people around the investor that may influence their investment choices. This factor may be loosely correlated to the herding factor, which will be elaborated on in the following paragraphs. Henceforth, acceptance and perception of the market play a crucial role in their decision.

Li and Wang (2017) argue that the difficulty of mining processes drives up prices in the early cryptocurrency market. As Bitcoin shares equivalent characteristics as commodities, mining is essentially a production cost of creating new Bitcoin. However, as the mining technology advances, this may counteract price fluctuations caused by mining difficulties by adopting more high-tech devices.

2.1.2 Economic Factors

One of the leading causes of price jumps in cryptocurrency can be explained by market conditions (Bouri et al., 2020, p.2). Both Huang et al. (2021) and Bouri et al. (2020) presented multiple factors that contribute to the price fluctuations of cryptocurrency. Namely, economic policy uncertainty, monetary policies, and macroeconomic news (Huang et al., 2021, p.2). Demir et al. (2018) further attested to the following argument by proposing price volatility of cryptocurrencies is heavily influenced by predictions in the economic policy uncertainty (EPU) index (Demir et al., 2018, p.146). Both positive and negative macroeconomic news is correlated to volatility spillover. To elaborate, Corbet et al. (2020) found empirical evidence that FOMC announcements cause volatility spillover between cryptocurrencies (Corbet et al., 2020, p.2). As one cryptocurrency may experience a bullish or bearish market others will often follow. These factors can be explained by the fact that cryptocurrencies are often seen as safe havens from conventional financial markets (Conrad et al., 2018, p.10).

Cryptocurrency prices, more specifically Bitcoin, experience price movements in response to many indices such as the US stock market index (Demir et al., 2018, p.147). In a recent study conducted by Conrad et al. (2018) the authors found empirical evidence that Bitcoin price volatility has a negative relationship with the US stock market index. In other words, as the US stock is expected to experience turbulences in near future, Bitcoin in return will enjoy a decrease in volatility (Conrad et al., 2018, p.7). Furthermore, the authors were able

to confirm with empirical evidence that VRP (Variance Risk Premium) had a significant positive effect on the long-term Bitcoin volatility which can also be associated with high economic uncertainty (Conrad et al., 2018, p.9). In addition, an important finding in Conrad et al. (2018) study is the positive correlation between the long-term volatility of Bitcoin and the Baltic dry index. The respective index acts as a prime indicator of activity within the economy due to reflecting the demand and supply of raw materials used in manufacturing (tradingeconomics, 2019). The results indicate that Bitcoin is highly procyclical (Conrad et al., 2018, p.9), in other words, its volatility is positively correlated to the state of the economy.

Additional explanatory variables for Bitcoin's price volatility is Google Trend measures (Li & Wang, 2016, p.51). Investors' attention will drive searches and in turn, will contribute to the erratic prices. In addition, as Bitcoin trading volumes in US dollars and Chinese yuan increase, Bitcoin's volatility decreases (Conrad et al., 2018, p.10). This could potentially indicate that the increased trading volume is due to growing trust in the cryptocurrency operations amongst investors. In turn, increasing trading volumes correlate to public recognition on investors' behalf. As Google searches progress, the public grows more aware of Bitcoin and its technology. Henceforth, the acceptance of cryptocurrency technology is favored to other financial intermediaries.

2.1.3 Short-term Factors

The short-term effects of price fluctuations are dependent on the cryptocurrencies' production cost. In other words, the mining difficulty and its technology dominate the price movements within the market. (Li & Wang, 2016, p.58) The most significant short-term factor that encourages volatility is investors' attention, social media culture, and search intensity (Chakraborty & Subramaniam, 2019, p.3). These factors contribute to the herding trend of consumers. This would suggest that the attention span of consumers and thus, market demand provide a great deal of volatility. Investors in the cryptocurrency market are trading in a speculative manner and do not heed the rational economic fundamentals (Li & Wang, 2016, p.53) but instead, based on noise and public recognition. Furthermore, irrational investor behavior, explained by behavioral finance factors, contributes to speculative trading and chartism. These variables inflate Bitcoin prices and contribute to the highly volatile market.

2.1.4 Long-term Factors

The most significant factor that contributes to the long-term factor affecting price fluctuations of Bitcoin is due to intrinsic value (Li & Wang, 2016, p.52). Trust, sentiment, and public recognition, to name a few, offer network externalities that increase Bitcoin's price (Nurbarani & Soepriyanto, 2021, p.256). In addition, as suggested earlier, Bitcoin's supply is fixed at 21 million Bitcoins. As miners reach closer to the end of the supply, scarcity will push up Bitcoin's value. The research proposes that Bitcoin is the most stable cryptocurrency in the market. (Li & Wang, 2016, p.55) Incorporating the idea of technological acceptance by consumers, as a leading cryptocurrency, investors may be more propelled to adopt Bitcoin as they are more familiar with its reputation and comfortable with the technology behind it.

2.2 Consumer Characteristics

Discussing and evaluating consumer characteristics within the cryptocurrency market refer to investigating specific individual traits that investors possess. These could range from their

preference to risk; attitude toward cryptocurrencies; behavioral responses to macroeconomic news; and personality traits such as impulsivity or novelty seeking. Market characteristics may provide investors indications and a degree of speculation about whether or not they should adopt Bitcoin at a given time period. Nonetheless, consumer characteristics as the aforementioned variables are equally of importance in the individuals' investment choice. Henceforth, I will assess and evaluate consumer characteristics through the lenses of behavioral finance theory whilst incorporating the respective factors into investors' intention to adopt cryptocurrency, more specifically Bitcoin.

Delfabbro et al. (2021) investigates the psychology of cryptocurrency markets and had intriguing remarks about consumer characteristics that affect individuals' investment choices. The authors propose that a majority of traders within the cryptocurrency markets are gamblers. Essentially, consumers who engage in betting and high-risk trading are more likely to adopt cryptocurrencies. Therefore, the research would characterize individuals that participate in cryptocurrency trading with impulsivity and novelty-seeking. In addition, the study found compelling evidence for an immoderate amount of trading activity within the market. Namely, overconfidence; fear of missing out (FOMO); and anticipated regret. (Delfabbro et al., 2021, p.203)

To elucidate, investors in the crypto market may have an illusion of control that is connected to one of the cognitive biases in behavioral finance. Essentially, investors overestimate their ability to make decisions. More often underestimate the risk associated with crypto-trading due to their perception of exerting control. Whereas, social learning and reinforcement stem from social media influencers' endorsing certain investment activities and advising their audience to follow a trend (Delfabbro et al., 2021, p.204). Speculative trading that is often associated with influencers advocating for crypto-trading leads their subscribers to act immediately on the promotion and cause fluctuations in the market. Hence, creating a herding trend amongst social media users. Furthermore, mutual social reinforcements would create a sense of "fear of missing out" feeling amongst investors which further increases volatility in the market and inflates cryptocurrency prices. The herding trend is also more evident during "green numbers", which refer to a bullish market (Delfabbro et al., 2021, p.204). Lastly, anticipated regret amongst investors refers to the action of investors engaging in trading in order to minimize "...feelings of regret than acts of omission" (Delfabbro et al., 2021, p.205). Fear of omission also refers to reluctance to sell. Investor sentiment to hold onto familiarity and safety and hopes to hold on to a better tomorrow (Delfabbro et al., 2021, p.193).

Thus, decentralized institutions such as the cryptocurrency market offers "gamblers" and novelty-seekers an ideal establishment to conduct their transactions. Henceforth, individuals that possess similar characteristics or in other words, people of the same demographics will be attracted to enter the same market which may cause bullish markets and inflated prices. Simultaneously, during bearish markets, the same herding trend may follow at a decreasing rate. In turn, during bullish market volatility increases and perceived risks associated with such volatilities. The phenomenon turns into an infinite spiral due to co-explosivity.

Nurbarani and Soepriyanto (2021) corroborate with Delfabbro et al. (2021) in regard to behavioral factors influencing investors' intention to adopt cryptocurrencies. Nonetheless, the authors propose, as investors gain more experience they will become more familiarized with the market and are not as susceptible to behavioral finance factors such as sentiment from emotional effect; overreaction to macroeconomic news; overconfidence; and herding behavior (Nurbarani & Soepriyanto, 2021, p. 255). One could describe early investors as

noise traders and as their knowledge progresses along with the information systems they will transform into sophisticated traders.

Nurbarani and Soepriyanto (2021) conducted a partial least square method in order to study behavioral factors that contribute to consumers' investment decisions. With empirical evidence, they found that 46.7% of the investment decisions can be explained by the aforementioned factors. Namely, overconfidence; subjective norms; awareness; and other demographic factors such as age and education (Nurbarani & Soepriyanto, 2021, p.263). Therefore, the rest of the variables that affect consumers' investment decisions must stem from external factors such as market conditions and other non-behavioral factors as listed in the market characteristic chapter above.

The authors also argue that herding behavior does not show a significant positive relationship in regard to investment decisions contrary to many other studies. However, a significant factor that plays a crucial role in individual investors' investment decisions is their attention. The study advocates for an efficient market hypothesis and proposes that consumers have the ability to make sound choices under the premise of rationally assessing sources of information gathered from social media and recommendations from friends and family. A noteworthy factor in the respective study is the varied environment. The study was conducted in the Jakarta area. Demographics of investors vary greatly from the one this following study will conduct. Henceforth, the significant deviations from other literature may stem from varying subjective norms or cultural differences in technological acceptance and other behavioral factors such as attitude toward cryptocurrency or digital currencies. To conclude, the study will nevertheless assume an inefficient market contrary to Nurbarani and Soepriyanto (2021).

Theoretical Framework and Hypotheses

2.3 The Efficient Market Hypothesis vs. Behavioral Finance

Fama introduced the *efficient market theory* (EMH) in the 1960s. The hypothesis state that stock prices always reflect a fair value since it contains all market information. Therefore, it is impossible for investors to outperform the market, in other words, they cannot regain any excess profit from trading. The theory disregards any cognitive biases from investors and suggests that individuals act rationally without any emotional interferences. Though it is a cornerstone of modern finance, it has faced much controversy and arguments from other modern financial theorists. Instead, these academics have proposed an alternative theory for individual investors' behavior called *behavioral finance theory*.

Contrary to classical finance theory, behavioral finance suggests the prices of assets are heavily influenced by behavioral finance factors (Al-Mansour, 2020, p.159). These factors refer to irregularities in the market that classical theories have not accounted for such as cognitive biases and individual perceptions of risk and reward. To elucidate, modern theorists claim that individuals are corrupted by their cognitive biases, resulting in "... market inefficiencies, fragility, and anomalies" (Al-Mansour, 2020, p.160). A key difference between the two theories stems from how they view market efficiencies. The efficient market theory assumes that all markets are efficient, whereas, the behavioral finance theory argues that markets are informationally inefficient (Ritter, 2003, p.430).

2.3.1 Heuristic

The two main concepts that branch out from behavioral finance theory are heuristics- and prospect theory. Heuristics are expressed as a set of rules individuals use under uncertain conditions to simplify investment decisions (Waweru et al., 2008). More specifically, the concept proposes that individuals do not adhere to the laws of probability rigorously. Instead, they use shortcuts in order to pave way for their preferences that overrule logical textbook calculations. (Baker & Nofsinger, 2010, p. 57) The cryptocurrency market, earlier identified as being extremely volatile, uncertain, and susceptible to speculation performs in an environment where private investors succumb to heuristics. In other words, individuals have a higher tendency to give in to systematic biases in their investment choices which could potentially be one of the leading causes of volatility in the market. One of the most common decision-making approaches is *herding behavior* (Al-Mansour, 2020, p.160).

Herding theory

Herding is a practice of imitating other individuals' behaviors whilst dismissing your own analytical strategies and private information collected (Calderón, 2018, p.11). Youssef (2020) demonstrates through their cross-sectional absolute deviation study that individuals show anti-herding and herding behavior at varying periods. The research observes herding behavior in major cryptocurrencies and the factors that determine such behavior namely, microstructure factors and general economic conditions. In addition, it argues for an inefficient market structure since the cryptocurrency market exhibits notable bubble behavior (Youssef, 2020, p.2). Essentially, herding behavior increases simultaneously as the market experiences a rise in volatility, S&P500, and the dollar index. Whereas individuals display anti-herding behavior as EPU, gold price, and trading volumes increase. (Youssef, 2020, p.8) The respective study would indicate that individuals utilize cryptocurrencies as assets, by trading them when there are indications of downfalls in the general economic conditions and hedge them against conventional financial assets such as gold (Youssef, 2020, p.7).

Contrary to the loss-aversion theory, the author proposes that herding behavior is more evident during the upmarket, with low volatility. (Youssef, 2020, p.4). In contrast, Jalal et al. (2020) attest to herding behavior in times of high volatility. The authors conducted a quantile regression analysis which indicated that individuals demonstrate herding behavior due to hedging against weak securities. The literateurs debate on two varying narratives that drive herding behavior: (i) psychological- and (ii) rational narratives. Respectively, they accentuate individuals thinking and behavioral patterns. Attention and reputation play a significant role in investment decisions rather than acquiring own information and making rational choices. Secondly, the rational narrative creates a bridge between investors' emotions and rationality. Individuals will draw on rationality and emotions depending on the availability of information. For instance, as private information becomes less accessible they will pursue their rationales. (Jalal et al., 2020, p.28) The investment behavior in the respective study is motivated by the enthusiasm and reactions of other investors in the market (Jalal et al., 2020, p.31).

Kumar (2020) has detected herding to increase in a downward market similarly to Jalal et al. (2020). Both authors also emphasize the lack of a legal framework that contributes to the volatility of the market (Kumar, 2020, p.300). The decentralized structure of the cryptocurrency market provides more responsibility to investors. Lack of regulations and consumer protection may contribute to impulsive and irrational decisions on behalf of individual investors. And thus, further advance the volatility in the market. Kumar (2020)

points out that cryptocurrency asset prices arise from investors' speculations rather than the fundamentals of the assets (Kumar, 2020, p.298). Furthermore, the lack of a legal framework promotes information asymmetry. Unsophisticated investors may be more prone to giving into heuristic decisions as suggested by Jalal et al., (2020). An important notion that the author observed is that the herding phenomenon is short-lived. Hence, it is of interest to further investigate what other determinants additionally affect private investors' investment decisions.

In another study, "noise" traders show significant herding behavior during high volatility periods (Calderón, 2018, p. 11). The author uses the concept of noise traders to describe how sophisticated traders can succumb to their cognitive biases and follow the "noise" in the market and forego their own rationality (Calderón, 2018, p.2). Contrary to Jalal et al. (2020), Calderón proposes four distinctive subcategories for the herding theory: (i) informational cascades, (ii) reputational herding, and (iii) investigative herding (Calderón, 2018, p.11). To elucidate, reputational herding and informational cascades occur due to mimicking previous individuals. In cases of a cascade, investors become overwhelmed by the amount of public information they receive, and instead as they obtain any private information it is not sufficient enough to overturn their decision to follow the noise in the market. Reputational herding develops due to positive reputational externalities. Whereas investigative herding refers to situations where the sole reason to examine an investment is that one believes the crowd will engage in it. (Kumar, 2020, p.240)

2.3.2 Prospect Theory

Addressing the other branch of behavioral finance, prospect theory suggests that individuals deviate from the conventional wisdom that efficient market theory advocates (Baker & Nofsinger, 2010, p.191). Using prospect theory in the thesis derives from the fact that it is the most appropriate theory that describes and predicts individuals' investment choices in an uncertain and risky environment (Baker & Nofsinger, 2010, p.196). Tversky and Kahneman (1979) that introduced the respective concept opposes the traditional financial theory of rational behavior by proposing that investors' choices are driven by their cognitive illusions and biases; thus, straying away from their neoclassical mental models (Baker & Nofsinger, 2010, p.198).

Loss-aversion theory & Regret theory

In particular, the prospect theory is of great significance for this study because it explains how irrational investors perceive gains and losses. It works under the premise of loss-aversion theory. Essentially, the theory states that investors weigh gains and losses to varying degrees as illustrated in Figure 1. More commonly, individuals experience losses more heavily than gains; therefore, investors will to a greater extent act irrationally under greater uncertainty. (Ricciardi & Simon, 2001, p.5) To elucidate, the loss-aversion of investors is based on the assumption that investors assign values to losses and gains rather than the final assets, and probability gains are replaced by decision weights (Sewell, 2007, p.2). In other words, it focuses on changes in wealth rather than levels of wealth as commonly rational investors would do (Ritter, 2003, p.436).

However, Al-Mansour (2020) challenges the idea of investors being loss-aversed in the cryptocurrency market. With empirical evidence, the author has found evidence of investors' loss-, as well as risk-aversion, is based on their previous investment outcomes. Nonetheless, they acknowledged that prospect theory was one of the key determinants of individuals' investment decisions. Investors based much on their intuition and instinct. (Al-

Mansour, 2020, p.165) Possibly indicating, that most investment decisions are based on investors' emotions about the transaction, and thus, the respective choices may be irrational based on their own market predictions and speculations.

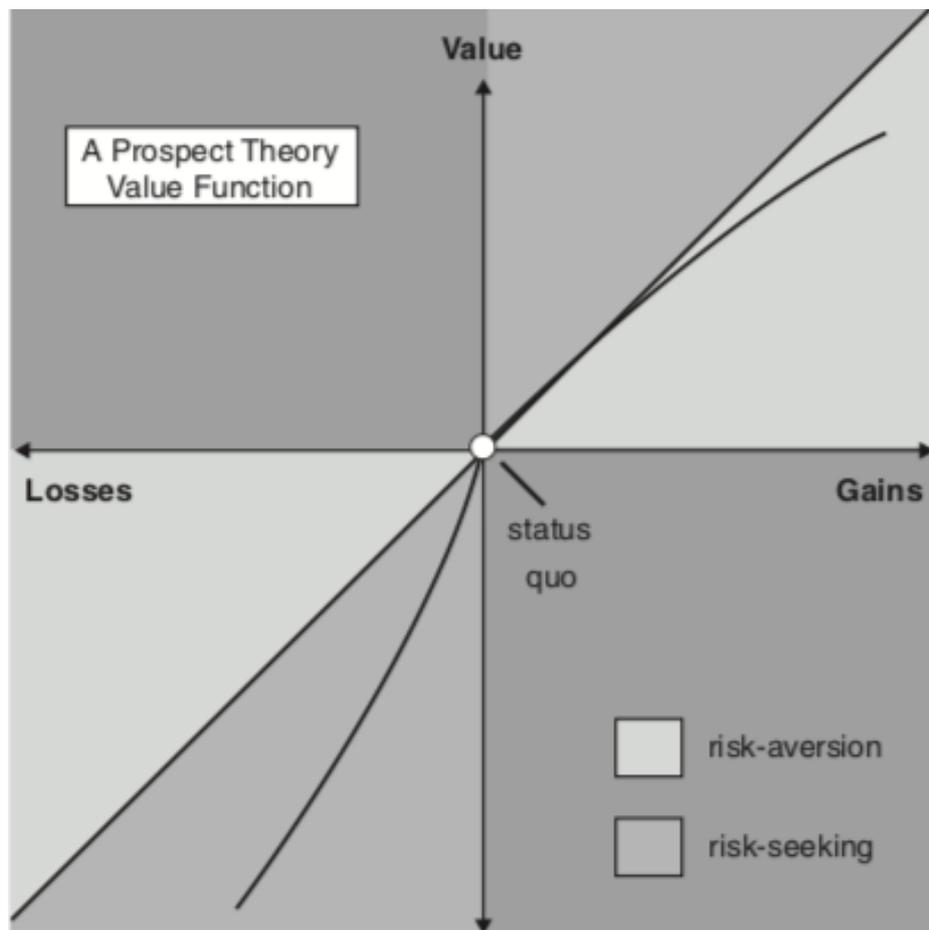


Figure 1 Hypothetical value function by Kahneman and Tversky (1979)

Henceforth, applying prospect theory and heuristics in the following study is suitable due to the unique nature of the cryptocurrency market. It is heavily characterized by herding behavior from investors which causes high levels of volatility in the environment. Prospect theory proposes that private investors would asymmetrically be affected more by losses than gains. Nonetheless, herding behavior contrarily theorizes that individual investors imitate one another; hence, does this contradict prospect theory. Provided that there is strong evidence of herding behavior in the cryptocurrency market the following study will assume an inefficient nature of the market. Implying that cryptocurrency prices fail to disclose all relevant information to investors as suggested in the efficient market theory. Instead, the market prices are determined by investors' emotions; information asymmetry; and speculation leading to highly volatile prices. Thus, the first hypothesis proposed goes as follows:

H1: Other investors' herding trend will lead to a higher propensity to adopt Bitcoin by individual investors.

2.4 Intrinsic motivation

Intrinsic motivation is derived from Deci and Ryan's (1985) theory of motivation. Essentially, the model predicts independent influences of both extrinsic and intrinsic

motivation to the continuance usage of technological applications. (Sällberg & Bengtsson, 2016, p.321) This particular research will solely focus on intrinsic motivation of investors. Sällberg and Bengtsson (2016) propose that there are only few works of literature that adopt the motivation theory. Furthermore, the authors attest that intrinsic and extrinsic motivations are one of the key predictors for technology adoption behavior. The underlying factors behind intrinsic motivation are individuals psychological need for autonomy and competence. To elaborate, as they perform in certain tasks they may have sense of autonomy and competence (Sällberg & Bengtsson, 2016, p.322). These feelings may explain and predict individual investors adoption intention as evidently, it is a driving force for attitude toward an action and thus, behavior.

The authors study results deviated from past literatures and found a direct effect of intrinsic motivation positively affecting the continuance use fo computer and smartphones (Sällberg & Bengtsson, 2016, p.325). The study proposes arguments behind the varying results by reasoning the difference between personal and professional usage. Intrinsic motivation is found to have strong correlations to direct behavior on leisure activities rather than in professional manner (Sällberg & Bengtsson, 2016, p.326). In terms of the conducted study, incorporating intrinsic motivation is reasoned under the basis to investigate the fundamentals of what drives investors behavior on an individual level.

2.5 Intention to Adopt

The theoretical framework of the research is comprised of investors' intention to adopt. Hence, the following study will incorporate the following models to assess and evaluate investors' intention to adopt Bitcoin. Namely, the technology acceptance model, theory of reasoned action, and behavioral intention model. Intention to adopt can be defined as "consumers' readiness to perform a given behavior" (IGI-global.com, n.d.). Respectively, behavioral intention refers to "a person's subjective probability that they will perform some behavior" (Fishbein and Ajzen, 1975). The authors further advocated that the theory of reasoned action is led by behavioral intention and will affect investors' willingness to accept and adopt new technology.

2.4.1 Behavioral Intention and Theory of Reasoned Action

Investors' behavioral intention (BI) is dependent on three factors. Namely, subjective norms, attitude toward the action (Fishbein & Azjen, 1975), and lastly their perception of control as depicted in Figure 2 . With the help of social psychology, it explores how one can predict consumers' behavioral intention based on their attitude (AT) and subjective norm (SN). Hence, the following formula has been introduced:

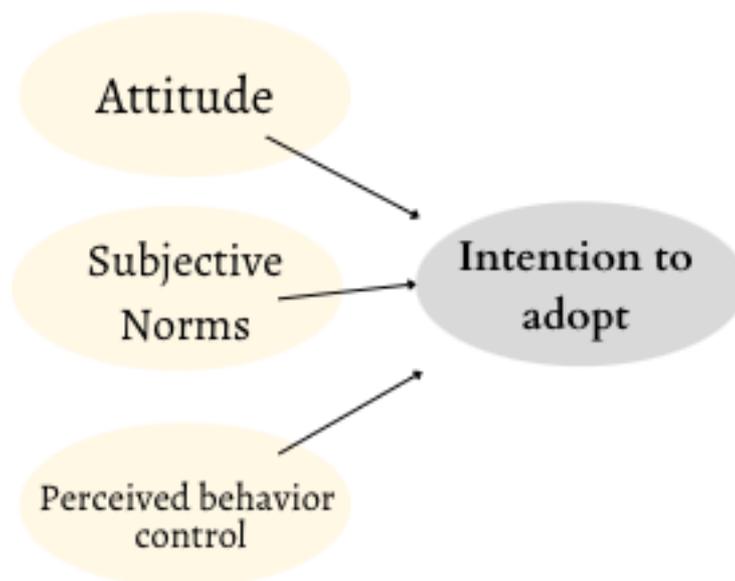


Figure 2: Determinants of intention to adopt (Schaupp, 2018)

To elaborate on attitude, consumers' attitude is further dependent on two variables (i) perceived usefulness of the system (PUS) and (ii) the perceived ease of use of the system (PEU). The perceived usefulness of the system is correlated to how the technology can advance or enhance investors' objectives. Whereas, perceived ease of use relies on the fact that investors find the application easy to adapt to their life. Lastly, external factors affect both PEU and PUS as shown in figure 3 down below. In this regard, we refer to external factors as one's demographic attributes such as social characteristics, training, and level of education. (Abroud et al., 2013, p.166)

Consumers' attitudes toward cryptocurrency may act as the strongest predictor to forecast consumers' intention to adopt the currency. Respectively, their attitude changes depending on individual investors' risk preferences. Had they perceived the market to pose an excessive risk, investors' intention to adopt will likely decrease. Similarly, had they perceived the market to be safe and are more risk-takers, intention adoption will increase. Subjective norms discuss how investors' family and friends' approval or disapproval of the respective problem will additionally influence their attitude and thus, behavior. (Schaupp, 2018, p.4)

Finally, Schaupp (2018) proposes that perceived behavioral control reflect directly investors' perception of the risk in the environment. Not only does it assess environmental factors, but under the premise of how consumers may perceive their own abilities to assess investment choices. In other words, investors' self-efficacy belief. The exterior factor is dependent on outside factors such as investors' financial situation, time frame, and technology (Schaupp, 2018, p.53) Perceived control can be correlated back to information availability. Google searches, reputation, and public recognition of Bitcoin in recent years may offer consumers more information about its technology; hence, their perception of making rational and sound investment choices.

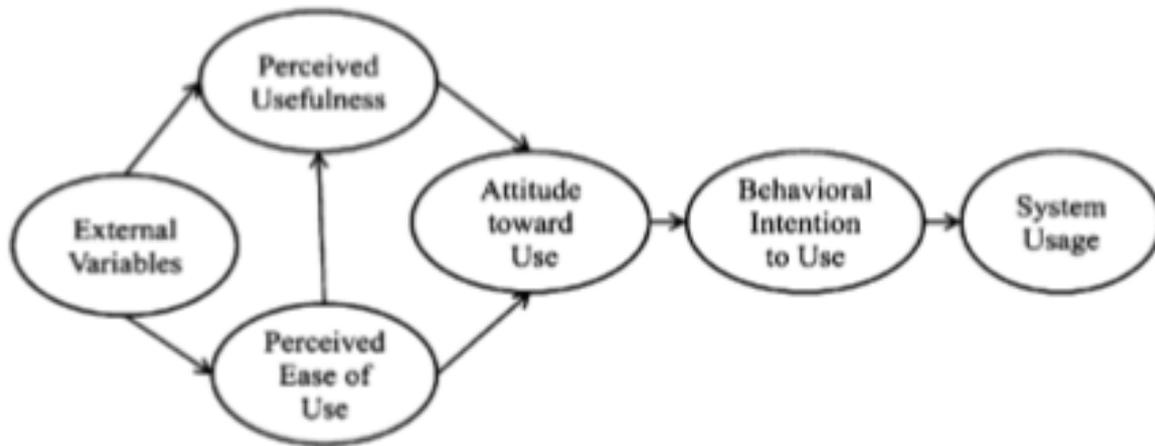


Figure 3 Technology acceptance model by Davis (1989)

2.4.1 Technology acceptance

As Figure 3 proposes and discussed above, technology acceptance is dependent on consumers' perception of usefulness (PUS) and perception of ease of use (PEU). Nonetheless, technological acceptance is additionally influenced by an entire society's intention to adopt a respective cryptocurrency. And thus, their perception of the difficulty of the technology and attitude towards it. Therefore, social norms will be incorporated as one of the deciding factors of technological acceptance. (Abroud et al., 2013, p.166) One could connect technological acceptance back to previous works of literature that discuss the significance of trust in the respective technology. Trust is thus, increased by public recognition and the reputation of the respective cryptocurrency. The second hypothesis proposed by this study is

H2: *The perception of usefulness and ease of use increases the likelihood of individual investors' intention to adopt Bitcoin.*

Individual characteristics will influence technological acceptance as the model has already been incorporated. Attitude, investors' perception of control, and usefulness are dependent on the volatility of the market and their risk preferences. Nonetheless, this research will argue that technological acceptance is dependent on a variety of other factors in addition to PUS and PEU. Firstly, environmental factors such as the aforementioned market characteristics. Namely, the supply and demand of cryptocurrency, mining- and technological difficulty. As these factors have been integrated into the previous hypothesis, our last hypothesis will investigate how investors view the cryptocurrency market as a safe haven from traditional financial instruments. Thus the last hypothesis of the research is

H3: *An increase in interest rates will positively affect investors' intention to adopt cryptocurrency.*

3. Methodology

The methodology chapter will argue for methodological choices by choosing and presenting an appropriate paradigm and assumptions about reality and knowledge. In addition, the following chapter will also provide reasonings for source criticism, ethical, and moral aspects of the conducted research

3.1 Research Paradigm

Choosing a suitable research paradigm reflects on how the respective research interprets the philosophy of science. Two pivotal philosophies explored are the ontological assumption and epistemological assumption which are elaborated on in the later paragraphs. The following assumptions offer insights into the chosen paradigm and thus, motivate the choice of the study.

The two main paradigms in academic research are positivism and interpretivism. The central thought of a positivist paradigm is that reality is independent of its subjective (Collis & Hussey, 2021, p.40). Researchers tend to be biased which contradicts the objective manner of a positivist paradigm. Therefore, the paradigm undermines the subjective point of view, which is more applicable in an interpretivism paradigm. The core idea behind an interpretive paradigm is that social reality is not objective but is shaped by the observer's perceptions and knowledge (Collis & Hussey, 2021, p. 41). Nonetheless, as the following research investigates relationships between variables a positivist paradigm is adopted. In addition, the study aims to examine a social phenomenon that is applicable to the respective paradigm. (Collis & Hussey, 2021, p.40) Due to the quantitative nature of the research, and interpretive paradigm was unsuitable. The paradigm emphasizes the varying collection of data that could potentially explain the complexity of the social phenomena (Collis & Hussey, 2021, p. 41). Quantitative research may lack the diversity qualitative research could offer for an interpretive paradigm. However, in order to convey an objective reality and offer more generalizability to the study, a positivist approach is favored.

3.2 Ontological Assumption

Ontological assumptions refer to the nature of reality. Under the positivist paradigm, the nature of reality is clear and concise (Bahari, 2010, p.23). The ontological assumption proposes that “social reality is objective and external to the researcher”. In other words, individuals will all share the same perception of reality no matter who observes it. (Collis & Hussey, 2021, p.42) Whereas, an interpretive paradigm would argue for a subjective reality where different observers can have multiple realities where one’s reality is a perception of one’s own imagination (Collis & Hussey, 2021, p.43).

The ontological philosophy under the positivist paradigm is closely related to quantitative research and the method of collection. The research will be investigated through a quantitative survey that is based on predetermined answers, eliminating the possibility for more interpretive observations. And hence, the possibility of multiple realities as suggested in the interpretive paradigm. An interpretive paradigm for the following research may have been applicable had the survey included a broader analysis of behavioral determinants by different demographics. That is, a longer more depth research could have incorporated varying realities between different demographics.

3.3 Epistemological Assumption

The different paradigms argue for varying views of how individuals perceive valid knowledge. The positivist paradigm argues under the premise that knowledge is created through objective and observable evidence that can be measured. In addition, the researcher is not biased and is independent of the phenomenon studied (Collis & Hussey, 2021, p.43). The interpretive paradigm would propose knowledge to be subjective. Therefore, researchers are part of the studied phenomenon and as such, interpret the evidence subjectively.

The clear distinction between the paradigms often guides different research methods. Respectively, a positivist paradigm is closely related to quantitative studies, whereas, an interpretive paradigm is often used in qualitative studies. It would be sensible that quantitative studies, a positivist paradigm, assume an objective reality where phenomena can be explained by rational reasoning, logically, and mathematically (Collis & Hussey, 2021, 40). On the contrary, qualitative studies rely on the researcher's interpretations. Whilst analyzing, they must incorporate their understanding and motivate for their interpretations; hence, the observed knowledge is subjective (Collis & Hussey, 2021, p.41).

Consequently, the method collection is in a quantitative manner. The collected data will be numerical and continued with statistical analysis. No matter the observer, the reality and interpretation of the data will be nearly identical, leaving no room for subjective interpretations. As such, as the researcher, I will not interact with nor persuade answers as the survey will be conducted in an objective manner.

3.4 Research Logic

This study utilized a deductive method of research. A deductive method refers to conceptualizing a theory through testing empirical observations (Collis & Hussey, 2021, p.7). Essentially, the production of extant knowledge is, for instance, derived from reading previous works of literature, researching and evaluating existing theories, and applying them to further studies. In other words, the research moves from general to particular (Collis & Hussey, 2021, p.7). To elaborate specifically on this study's deductive method, I have done a thorough literature search around the respective topic of the research and constructed a theoretical framework to test the aforementioned hypotheses. The purpose of the study is to investigate what determinants influence investors' intention to adopt Bitcoin. The research is accomplished through the help of the technology acceptance model and other statistical analyses in order to determine the underlying reasons behind consumers' adoption intention.

On the contrary, inductive research would work under the following premise. A researcher would develop a theory by observing empirical subjective reality (Collis & Hussey, 2021, p.7). Fundamentally, respective research that would follow an inductive method aims to create a theory, whereas, the deductive method's purpose is to generally prove existing theories. As the underlying purpose of inductive research is to observe patterns a larger sample size is required (Collis & Hussey, 2021, p.7). Due to the time limitations and the nature of the study, a deductive method is more appropriate in contrast to an inductive method.

3.5 Source Criticism

In order to provide validity and reliability in the study, a few criteria were made to criticize the suitability of sources. Firstly, the main platforms to substract sources were Google Scholar and the database in the library at Umeå University. In addition, the principal use of secondary sources was peer-reviewed scientific articles to develop a comprehensive understanding of the respective topic.

Henceforth, in the screening process to find appropriate articles, I used keywords such as “adoption intention”, “herding behavior”, “cryptocurrency market”, “behavioral finance”, and “investor behavior”. Thereafter, the aim was to use literature works of no articles later than 2015 to provide more up-to-date information and credibility. Nonetheless, there is a handful of sources that date back before 2015 due to the magnitude of impact it has provided to the field of finance. The aforementioned sources have generated the core theory that has been applied to the theoretical framework. Namely, behavioral finance by Baker & Nofsinger (2010); Waweru et al. (2008); Ricciardi & Simon (2001); and Sewell (2007). Adoption intention was proposed by Fishbein & Ajzen (1975). Lastly, herding theory from authors such as Graham (1999).

To present a more generalizable literature review, during the screening process, the intention was to provide sources from multiple different countries and continents. In this manner, the theoretical framework, conclusion, and results would be more applicable to the majority of the investor population. Thus, providing an objective view of one reality as suggested in the chosen research paradigm of a positivism approach.

4. Data and Methods

The data and methods chapter will discuss the practical methods applied in the study. The purpose of the method chapter is to motivate the chosen methods. Simultaneously evaluate the disadvantages and advantages of the applied methods. In addition, the chapter serves the purpose of presenting and assessing the relevance of the collected data

4.1 Population and Sample

4.1.1 Sample Selection

Acquiring the desired sample selection is relevant for the study due to a number of reasons. The participants of the survey must be representative of the investigated population in question to offer the study generalizability (Collis & Hussey, 2021, p.184). In accordance with the quantitative study method and a positivist paradigm, larger sample size is often required compared to a qualitative study (Collis & Hussey, 2021, p.46). As such, the study's sampling frame is targeted toward young adults ranging from 18 to 30-year-old who are simultaneously active investors. The motivation behind the age range was due to their familiarity technology. The choice is under the premise that 18-30-year-olds are living in a "social media era" where one experiences much change and new technology daily. Therefore, the researcher draws a presumption that as the younger generation experiences more technological changes, they are an appropriate audience for newly emerged cryptocurrency technology and thus, more accepting of the respective technology. Active investors would refer to a population of people that possess assets in the global stock exchange, own funds, bonds, or other traditional financial assets. The screening process of the chosen sample population is most appropriate for the study since it investigates investment behavior and investors' likelihood to adopt Bitcoin.

4.1.2 Size

As mentioned, the survey's sample size must be large enough to provide statistical accuracy and be generalizable for the population in question. The thesis adopts a cross-sectional study due to time constraints and limited resources. The particular method favors a large sample size collected once in a short period of time (Collis & Hussey, 2021, p.57). The targeted sample size to represent the population is a minimum of 100 responses. For the chosen statistical method, more than 30 responses should suffice. Nonetheless, to provide statistical accuracy that is significant for the chosen population responses anywhere from over 100 responses is appropriate (L. Muthén & B. Muthén, 2009, p.600).

4.1.3 Method

The primary use of a method applied for data collection is convenience sampling. As the name suggests, convenience sampling relies on the factor of being convenient. The survey reaches the eyes of the people I have had easy access to and further elaborates on the research design. (Collis & Hussey, 2021 p.119) Convenience sampling is not the most ideal method to apply as it counteracts the desire to provide a suitable representation of the chosen population. Nonetheless, due to the time limitation of the study, this factor overruled the general thumb of the rule and applies convenience sampling. The advantages of the method are that they are inexpensive, the survey reaches more individuals, and data gathering can

be obtained over a short period of time as suggested in many of the philosophies and methods under a positivist paradigm. (Etikan et al., 2016, p.2)

Another option for method collection could have been random sampling. A random sample refers to a sampling method where all individuals in the population have an equal chance to be chosen (Collis & Hussey, 2021, p.46). The advantage of the respective method is that the sample would be unbiased and more often the most accurate representation of the population. It removes all research biases and offers an objective sampling population. (Acharya et al., 2013, p.331) However, a downside for this method is the number of responses may drop significantly had the survey been sent out to a specific population. For instance, active investors of ages between 20-25 that hold a bachelor's degree or higher education. Instead, the study favored convenience sampling to hold a greater response size. Outliers will be removed in the later processes and further discussed in chapter 5.

4.2 Research Design

The research is conducted as a cross-sectional study. By definition, cross-sectional studies are researches that analyze the variables in different contexts under the same period of time (Collis & Hussey, 2021, p.56). To elaborate, this study will view differences in investors' attitudes and how varying factors affect their adoption intention. The study investigates the correlations between the independent variables (Collis & Hussey, 2021, p.57) in regard to the dependent variable, adoption intention. Whereas, independent variables are shown as the items listed in Table 1. The research design and research paradigm should be complementary to one another. Thus, the research instruments used are often related to a positivist paradigm.

Table 1: Survey items

Item	Questions
Demographics	1-3
Perceived Usefulness (PUS)	4-6
Perceive Ease of Use (PEU)	7-9
Macroeconomic Factors (MF)	10-12
Subjective Norms (SN)	13-15
Herding Factors (HF)	16-18
Intrinsic Motivation (IM)	19-21
Adoption Intention (AI) <i>(dependent variable)</i>	22-24

4.2.1 Research Instruments

The research instrument used to obtain data was an online survey produced as a questionnaire. The most significant factor that contributed to the choice of a questionnaire as a data collection method was its scalability. Geographical difficulties or time constraints

are eliminated and the number of responses will increase due to convenience for the respondents (Acharya et al., 2013, p.332). In addition, as I am conducting a quantitative study the data collected are easily comparable and transferred to visual aids, such as tables and graphs, for the reader. In regard to the ethical aspect of the study, online surveys offer the volunteers anonymity and confidentiality. It also removes the chances of any physical harm posed to the participants. Nonetheless, the limitations of the chosen instrument are that respondents may be dishonest as it provides complete anonymity. The interpretation of the questions can pose great difficulty whereas, in a qualitative research participants can elaborate on their attitudes and beliefs. To motivate the choice, let us refer back to the chosen research paradigm. Wherein, the philosophy is to convey one reality rather than a subjective perception of realities.

To capture investors' attitudes, which lacked and serve as a disadvantage of a questionnaire, a Likert scale is adopted, from 1 to 7 to measure the collected data. Where 1 stands for strongly disagree and 7 reflects strongly agree. The mentioned method is appropriate for the study since it offers the researcher to investigate the respondents' attitudes, behavior, and belief (Nemoto & Beglar, 2014, p.2). The implication of the chosen method is the assumption that Likert-scale would capture investors' behaviors. Since the method is designed to capture their attitude, one must acknowledge that it does not reflect directly to behavior. The advantage of a Likert scale is that it allows a researcher to analyze and evaluate data more easily rather than having "yes" and "no" questions. In order to avoid acquiescence bias, the survey provides an alternative to the use of the Likert scale. Nonetheless, the limitation of the method is acquiescence bias, referring to individuals showing agreement toward the researcher (Kuru & Pasek, 2016, p.83). In other words, choose a positive connotation in accordance with the study. In order to eliminate some acquiescence bias, the survey questions have been developed in as objective a manner as possible. In addition, respondents will have the opportunity to answer with a neutral opinion and perception of the matter.

In order to analyze data, I have decided to use Minitab to conduct statistical analysis. The chosen method was applied to provide the study robustness and accuracy. In addition, in a quantitative study, it is crucial to be able to provide empirical evidence with a high degree of validity (Collis & Hussey, 2021, p.43). Therefore, applying statistical analysis was favored. More specifically, the statistical analysis utilized in the study is the regression analysis. The disadvantage of statistical analysis, more specifically regression analysis, is that as much as it offers accuracy, any errors in the data collection will interfere with the analysis. To elaborate, poor data processing will lead to invalid regression models and thus, validity. To counteract the issue, outliers outside the desired population must be removed. Another implication of regression analysis is the collinearity problem. If the one's independent variables are strongly correlated coefficients may not be as rugged as desired. To address, the problem a robustness check will be conducted on the coefficients.

4.4 Limitations for Method

The main limitation of the method was the sample collection. The survey only incorporated three demographic questions regarding the participant's age, gender, and level of education. This will fall short on the analysis section about consumer characteristics and cannot provide an in-depth analysis of how their individual attributes affect their investment decisions. However, to compensate for the lack of demographic questions, the sample size is sufficient enough to provide statistical accuracy. Henceforth, the analysis can then be used as a common denominator for investors.

A further limitation regarding the sampling method is that previous research has been able to utilize more desirable sampling methods to provide a better representation of the chosen sampling population. Abroud et al. (2013) for instance apply stratified random sampling. As such, data was collected throughout the time period of two months. On the contrary, for the following study data was collected over the course of a couple of days. In addition, Abroud et al. (2013) use statistical analysis with the help of standard error of the mean, confirmatory factor analysis (CFA). Confirmatory factor analysis is used to forecast outcomes of possible scenarios. However, the method is often utilized if there is more than one dependent variable. For this reason, I have excluded the usage of the analysis though it has been used in previous studies (Abroud et al., 2013; Sharif & Raza, 2017; Kim & Shin, 2015).

Abroud et al. (2013) use both composite reliability (CR) and average variance extracted (AVE). Instead, the following study will utilize Cronbach's Alpha. Essentially, the objective of the two analyses is the same. However, Cronbach's Alpha measures the overall internal consistency of a statistical test, whereas, composite reliability measures the reliability of the given data (Tavakol & Dennick, 2011, p.53). The choice for Cronbach's Alpha is derived from its frequent uses in many works of literature and therefore, its validity. Additionally, Schaupp (2018) uses ordinary least square (OLS) regression that will also be applied to the following study.

4.5 Data Collection

The method behind data collection was a questionnaire survey sent to various social media platforms. Thereafter, many of my peers further the link to the survey on their social media platforms. The survey reached mainly undergraduates primarily in Sweden and Finland. The environment in which the data was collected posed some implications that will be further discussed in the following chapters. The survey was created through Google Forms and after closing the survey all data were transferred to Minitab for further analysis. The survey is comprised in a pre-determined manner and offers respondents to self-complete the questionnaire. The only open-ended question is to ask for the respondent's age. Otherwise, multiple-choice options are chosen for the rest of the demographic questions. And the Likert scale is utilized in the rest of the questions. This enhances the quantitative approach accordingly to the positivist paradigm of one reality and eliminates the ambiguity in responses.

A series of questions were constructed to screen out individuals that do not fit in the desired population investigated. At the very beginning of the survey, volunteers that are not active investors are asked to exit the survey and quit answering. The first part of the survey considers the participants' demographics. Subsequently, the second portion of the questionnaire will investigate the independent variables' relationship in correlation to our dependent variable. Respectively, the independent variables are (i) macroeconomic factors, technological acceptance factors; (ii) perception of usefulness, (iii) ease of use, and lastly, (iv) herding variable. Whereas, the dependent variable is adoption intention.

The questions were constructed with the help of previous pieces of literature and modified to cryptocurrency, or Bitcoin themes. Five questions were directly linked to the proposed hypotheses. Namely, Perceived usefulness, perceived ease of use, herding factors, macroeconomic factors, and adoption intention. Two additional construct items were introduced to support the discussion of the proposed hypotheses. Subjective norms are part of the technology acceptance model suggested by Davis (1986). It can also affect herding factors investors may convey. In addition, intrinsic motivation explains investors'

enjoyment and pleasure whilst using cryptocurrencies that could potentially drive their intention adoption (Sällberg & Bengtsson, 2016, p.321). All 24 questions presented in the survey are listed in table 2: Construct Items down below.

Table 2: Construct Items

Perceived Usefulness (PUS) (Abroud et al., 2013)

1. I am likely to use valuable Bitcoin technology as an alternative.
2. Using Bitcoin is more desirable than Fiat currencies because of the anonymity of its users.
3. Using Bitcoin for payments is time-saving and helps me to complete my tasks more rapidly.

Perceived Ease of Use (PEU) (Abroud et al., 2013)

4. I believe that interaction with Bitcoin is user-friendly and effortless.
5. It would be easy for me to become skillful using Bitcoin trading.
6. I am willing to learn Bitcoin trading because it is easy.

Macroeconomic factors (MF)

7. Macroeconomic news about increases and decreases in interest rates affects me greatly
8. An increase in interest rates will affect me to adopt cryptocurrencies. Namely Bitcoin.
9. Economic uncertainties, for instance, the Covid-19 pandemic, positively affect me to seek alternative investment choices such as assets in the cryptocurrency market

Subjective norms (SN) (Shcaupp, 2018)

10. People (peers and experts) important to me would support my use of Bitcoin
11. People who influence my behavior would support me using Bitcoin instead of alternative means.
12. People whose opinion I value prefer I use Bitcoin

Herding factors (HF) (Schaupp, 2018)

13. My adoption intention of Bitcoin increases if my peers also adopt the respective currency
14. People who support Bitcoin instead of alternative means influence my adoption intention
15. If my peers would prefer to use Bitcoin, I would likely adopt Bitcoin too.

Intrinsic motivation (IM) (Sällberg & Bengtsson, 2016)

16. I find trading cryptocurrency to be enjoyable

17. The actual process of trading cryptocurrency is pleasant
18. I have fun trading cryptocurrency

Adoption intention (AI) (Schaupp, 2018)

19. I intend to use Bitcoin at some point in the future
20. It is likely that I will use Bitcoin in the future
21. I expect to use Bitcoin in the future

4.6 Data Analysis on OLS Assumptions

4.6.1 Linear Regression

The study makes use of ordinary least square (OLS) regression that finds the simple linear regression of data. The method examines the relationship between independent variables, also known as explanatory variables, and a dependent variable. The choice for applying ordinary least squares as a statistical analysis method derived from the fact that the respective regression is the total squared error. The sum of square errors is the least in ordinary least squares and it refers to the difference between an observed value and a predicted value. The smaller the error value the more accurate is the prediction of the regression line. (Moutinho, 2011, p.227)

The equation of the general regression model is

$$Y = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \epsilon$$

The following seven assumptions (Chumney & Simpsons, 2006, p.101-103) should be fulfilled in order to ensure the coherence of the regression analysis:

1. The regression model is linear in the coefficients and the error term
2. The error term has a population mean of zero
3. All independent variables are uncorrelated with the error term
4. Observations of the error term are uncorrelated with each other
5. The error term has a constant variance
6. No independent variable is a perfect linear function of other explanatory variables
7. The independent variables are normally distributed

The estimated theoretical model is suggested as follows:

$$\text{Adoption Intention (AI)} = \text{Perceived Usefulness (PUS)} + \text{Perceived Ease of Use (PEU)} + \text{Macroeconomic Factors (MF)} + \text{Herding Factors (HF)} + \text{Intrinsic Motivation (IM)}$$

4.6.2 Assumption 1: Regression model is linear

The first assumption refers to if the dependent variable: adoption intention has a linear relationship with the independent variables. Namely, PEU, PUS, HF, MF, and IM. In order to evaluate the linearity between the respective variables. I applied the “Fit General Linear”

function to construct the graph. In addition, the residual plots were standardized in order to modify the mean of the residuals to zero in accordance with assumption 2. All of the graphs illustrated in Figure 4: Scatterplot of the independent and dependent variables, convey a positive linear relationship to the dependent variable: adoption intention. The linearity assumption is therefore fulfilled.

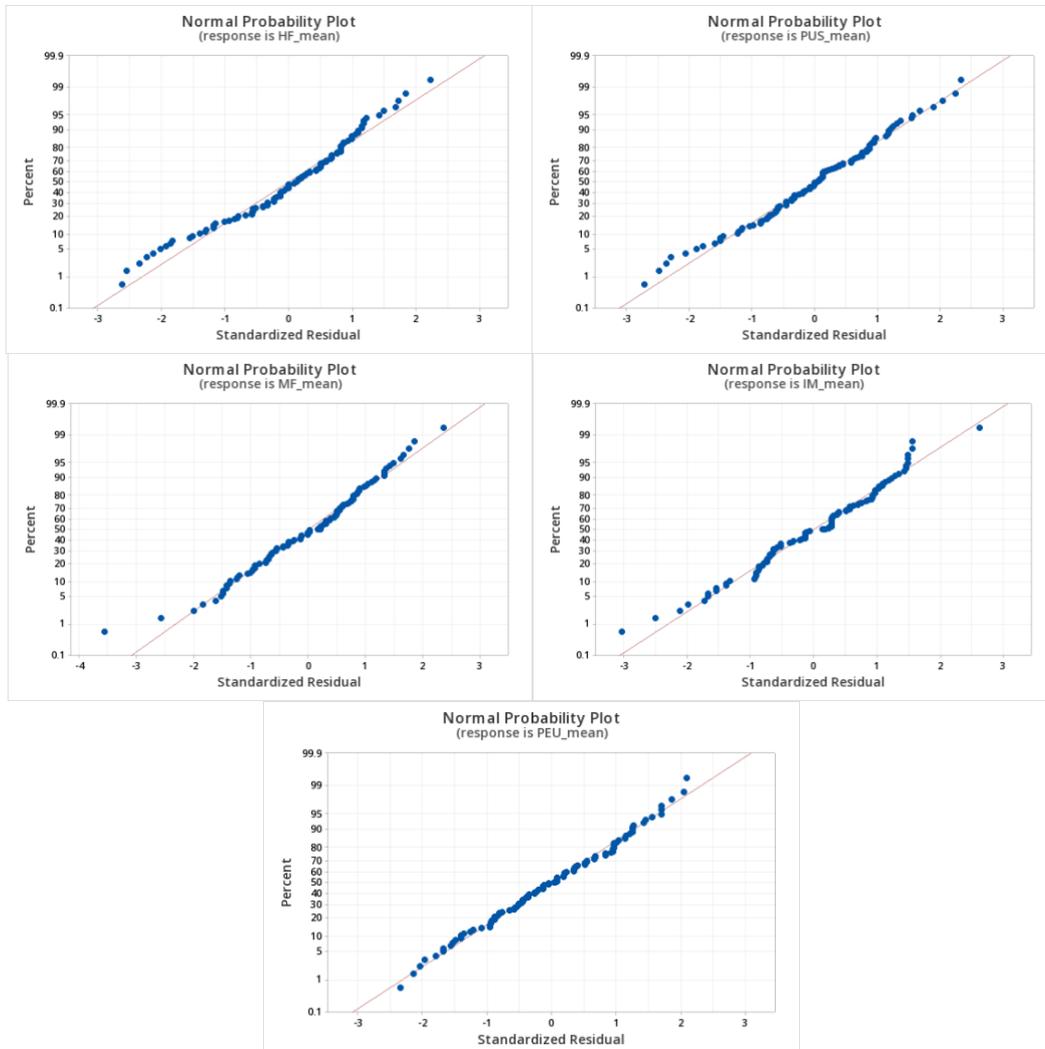


Figure 4 Scatterplot of the independent and dependent variables

4.6.3 Assumption 2: Residuals have a mean of zero

Assumption two is of importance due to the accuracy of the regression estimates in the results. Had the assumption not been fulfilled, estimates of β_0 and β_1 are inconsistent and biased (Hayes & Cai, 2007, p.709). Referring to figure 6: Residuals vs. Fitted Plots, the diagram shows that the majority of the residual population is close to the mean zero. Therefore, assumption 2 is fulfilled: in an ordinary least regression squares regression, residuals must have a mean of zero.

4.6.4 Assumption 3: Independent variables are not correlated to the error term

Assumption 3 refers to the exogeneity and endogeneity of a variable. Essentially, the OLS linear regression assumes that independent variables do not depend on the dependent variable; hence, the error term. Instead, the dependent variable (Y) is dependent on the

explanatory variables (X). If the assumption is failed, the coefficients in the regression are not consistent with OLS estimating regressions (Singh et al., 2017, p.3). In order to test if there are any endogeneity variables in the equation, a Housman test is conducted. The test is conducted in a hypothesis manner where:

H0: select random-effect model

Ha: select fixed-effect model

I conducted a mixed-effects model in order to test the hypothesis. With a 95 percent confidence interval, as exhibited in Table 3, the variables all possess a greater value of the chosen significant level of 0.05. Therefore, the null hypothesis is accepted and assumption 3 is fulfilled, the regression does not detect any endogenous variables.

Table 3: Mixed-effects model

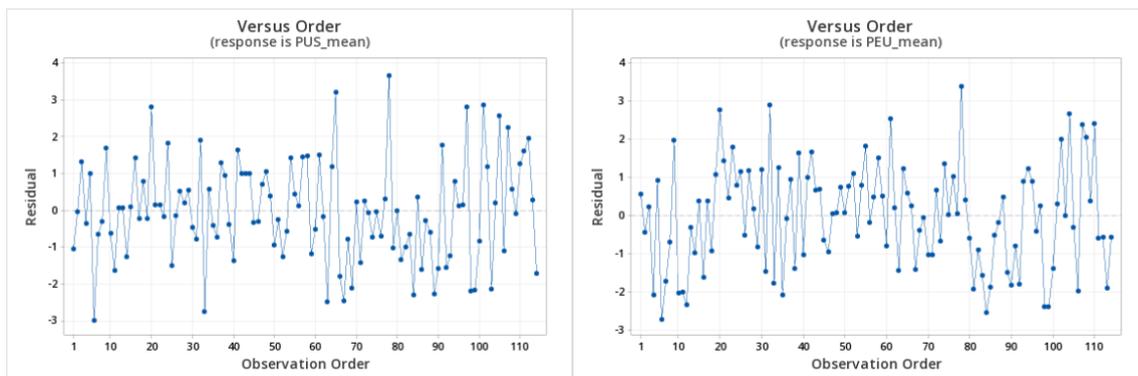
Variance Components

Source	Var	% of Total	SE Var	Z-Value	P-Value
PUS_mean	0.577377	21.40%	0.398506	1.448853	0.074
PEU_mean	0.279377	10.36%	0.227951	1.225600	0.110
MF_mean	0.000000	0.00%	*	*	*
SN_mean	0.292899	10.86%	0.411114	0.712452	0.238
HF_mean	0.252310	9.35%	0.230341	1.095376	0.137
IM_mean	0.000000	0.00%	*	*	*
Error	1.295843	48.03%	0.221333	5.854723	0.000
Total	2.697806				

-2 Log likelihood = 409.835085

4.6.5 Assumption 4: Observations of the error term are not correlated to one another

Assumption 4 refers to the data's autocorrelation. The limitation refers to the effects of errors in one period to be spilled over to future periods which would essentially mean that errors would be correlated to one another (Starnes et al., 2011 p.710). Through the residuals vs. order plot conveyed in Figure 5: Versus order, all six graphs show an inconsistent patterns. Evidently, a random trend would suggest that there is no autocorrelation between error terms. Henceforth, assumption 4 is fulfilled, the error terms are not correlated to each other.



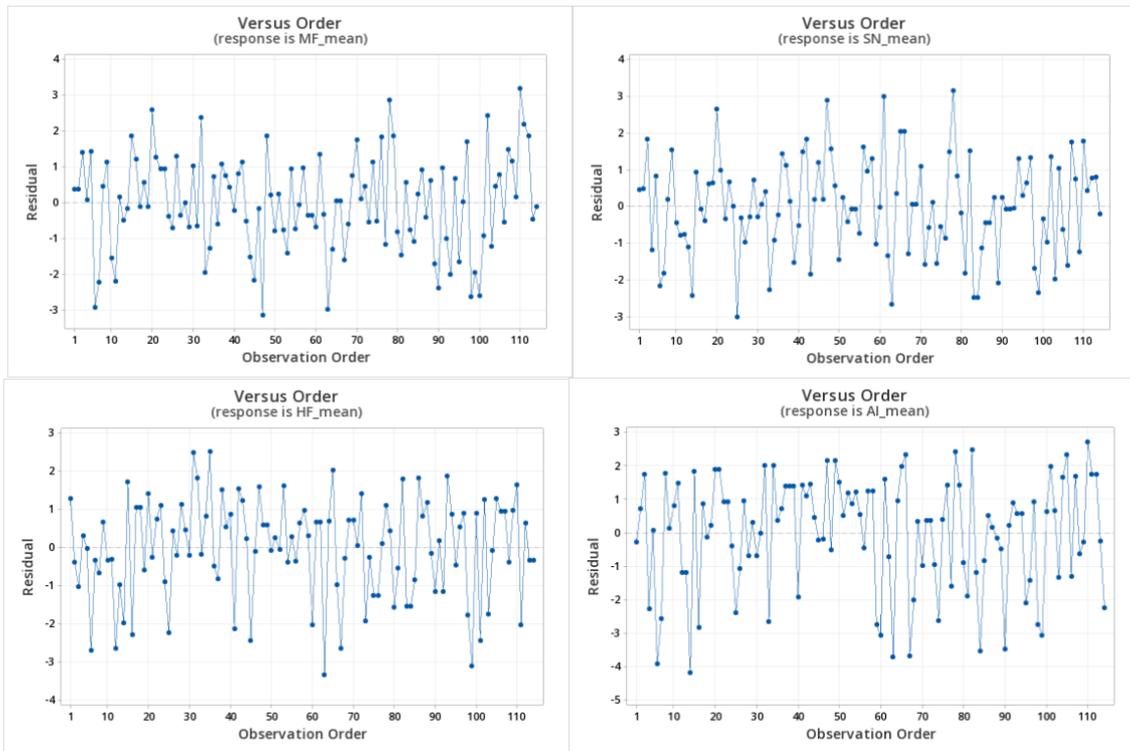


Figure 5: Versus order

4.6.6 Assumption 5: Heteroscedasticity

No heteroscedasticity refers to the fact that residuals do not follow a particular pattern or show any trends (Hayes & Cai, 2007, p.710). As one can see in Figure 6: Residuals vs. Fitted plots, the residuals are randomly distributed amongst the axis and do not show to follow any particular pattern. This would indicate that the errors have a constant variance. Thus, assumption 5 referring to homogenous variances with all error terms is fulfilled.

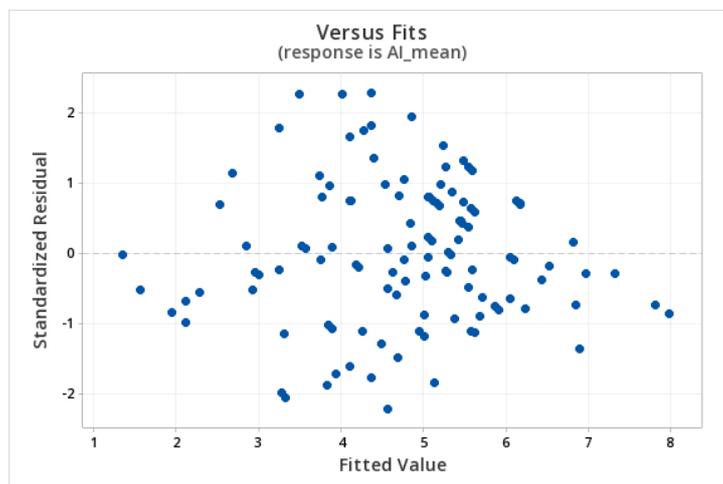


Figure 6: Residuals vs. Fitted plots

To confirm the lack of heteroscedasticity a Durbin-Watson test was conducted. The test varies from values zero to four. Where observed values closer to zero would indicate a positive autocorrelation. On the contrary, a value closer to four would signify a negative autocorrelation. (Savin & White, 1977, p.1991) Therefore, I will conduct a hypothesis testing:

H0: The sample does not convey autocorrelation

Ha: The sample conveys autocorrelation

The test statistic shows a value of 2.01204 as conveyed in Table 4; henceforth, the null hypothesis is accepted and assumption 5 is yet again fulfilled.

Table 4 Durbin-Watson Statistics

Durbin-Watson Statistic

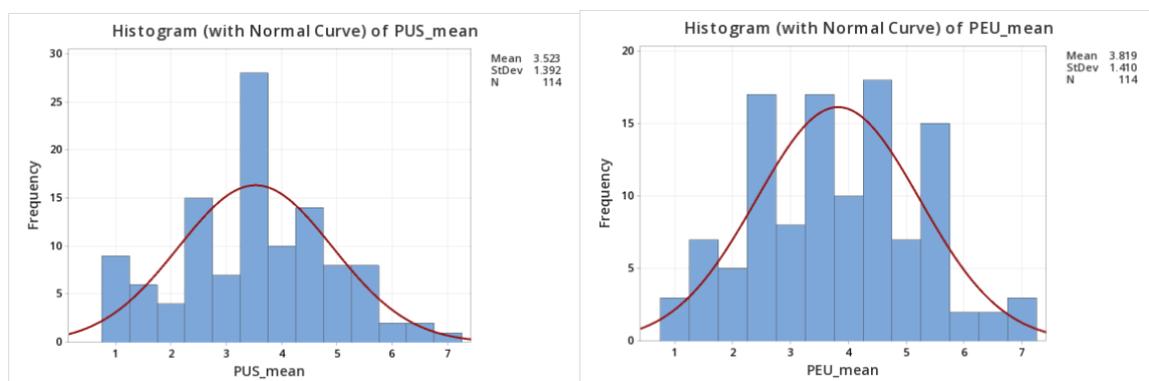
Durbin-Watson Statistic = 2.01204

4.6.7 Assumption 6: No independent variable is a perfect linear function of other explanatory variables

One can examine this assumption through the correlation matrix exhibited in Table 7 in chapter 4: Pearson's correlation: dependent variables. All of the respective independent variables possess a value lower than 1, the highest being value of 0.629 and the lowest at 0.323. Therefore, assumption 6 is fulfilled. None of the independent variables have a perfect linear function with any of the other explanatory variables. Since the variables show relatively low correlation, the regression analysis will eliminate any possibilities of multicollinearity further discussed in the analysis and discussion section.

4.6.8 Assumption 7: Independent variables are normally distributed

One can determine if the data is normally distributed in many different ways, I have chosen to illustrate it through histograms. Though assumption 7 is not mandatory Figure 7: Normal distribution curve conveys an acceptable normal distribution in the majority of the graphs. Two exceptions shown are perceived ease of use and the macroeconomic factors. Slight skewness in the aforementioned graphs may propose small insufficiency in data that will be discussed in the analysis section later. In addition, another measurement for normal distribution is the normality probability plot. Refer to Figure 4: Scatterplot of the independent and dependent variables. The linear lines would suggest that the data is normally distributed. Henceforth, the data is normally distributed since the histograms show that most residuals lie within the mean and smooth out from each end and are confirmed with the normal probability plot.



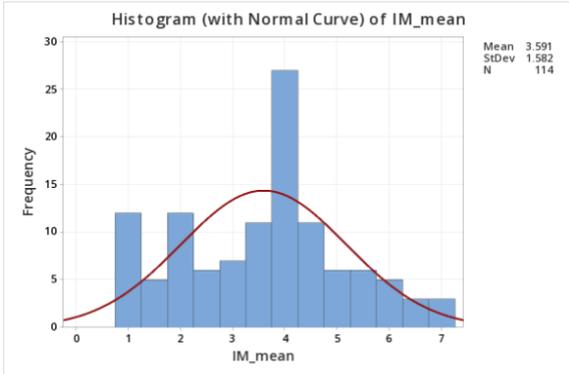
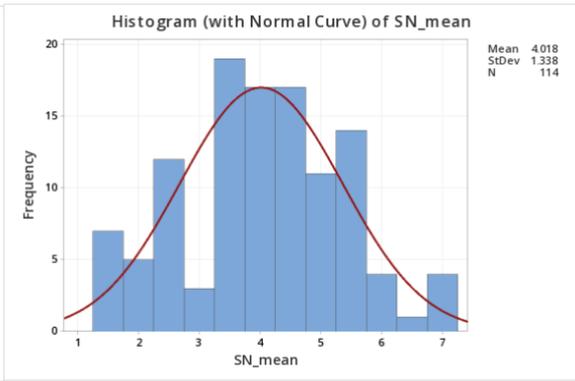
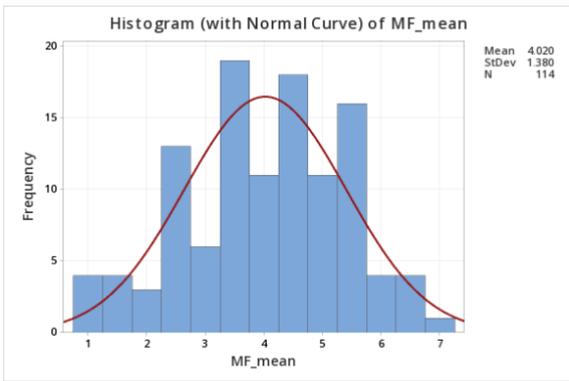


Figure 7 Normal distribution curve

5. Results

The purpose of the result chapter is to present all the data analysis and results from the survey. The ordinary least squares (OLS) regression is run and the results are presented. The statistical analysis is conducted in the following chapter and the proposed hypotheses are either rejected or accepted.

5.1 Demographics

5.1.1 Data Screening

The raw data collected ended with a sample size of 124 responses. With data screening, the investigated target population was young adults ranging from 18-30- year-olds. Thereafter, four responses were removed since they did not fall within the desired range. Furthermore, six more respondents were removed due to incomplete answers. Hence, the data sample size was reduced to 114 respondents which are nevertheless, well past the desired minimum responses of 100.

5.1.2 Demographic description

The received sample size was skewed to be male-dominated. A total of 114 respondents consisted of 41 (35.96%) females, male participants 70 (61.40%), and other gender 3 (0.026%). In regard to age, the dominant age group was 22-year-olds comprising 28.07% of the sample population shown in Figure 8: Age Histogram. The second-largest age groups were 23- and 21-year-olds combining 35.96%. Lastly, the sample population's education level was sampled in three varying levels: (i) secondary education, (ii) undergraduates, and (iii) postgraduates. In order to simplify the education histogram, I have re-coded the values of each variable into numerical values. Respectively, (i) secondary education equals 1, (ii) undergraduates equal 2, and (iii) postgraduates equals 3, refer to Figure 9. With the given sample population the results are most representative of a population in their early 20s, mainly males that are currently completing their Bachelor's degrees.

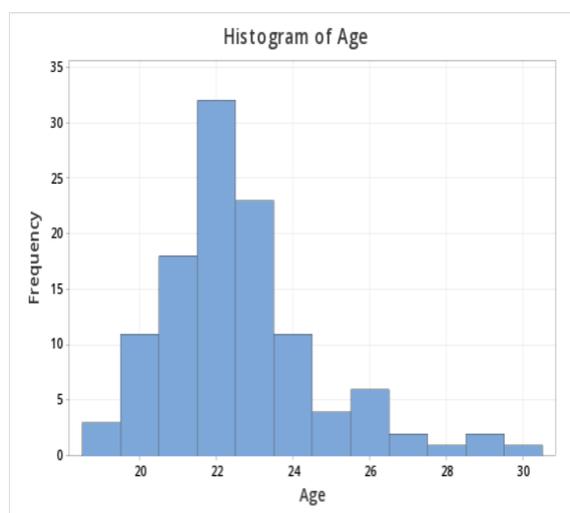


Figure 8 Age Histogram

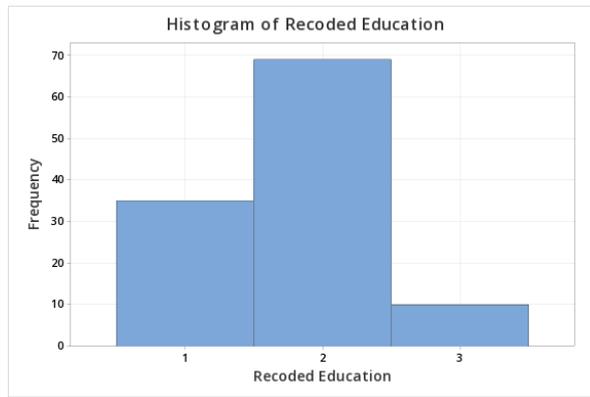


Figure 9 Education Histogram

5.2 Cronbach's Alpha

Lee Cronbach (1951) developed the Cronbach's Alpha equation to measure the internal consistency, also referred to as reliability, of the data set. The mathematical formula tests if the questions in the survey, conducted in a Likert scale manner, are reliable. Essentially, the test shows how closely each latent variable is as a group. To elucidate, each independent variable was presented with three different questions under the same thematic approach. The consistency is measured on a scale from 0 to 1. A sufficient value would range from 0.7 to 0.90. Had the alpha value been under 0,7, it would suggest that there are not enough questions on the test. Whereas, a high value closer to 1 for instance, indicates that the survey has proposed redundant questions for the variable. (Vaske et al., 2017, p.164)

Table 5: Cronbach's alpha summary

Construct Items	Cronbach's Alpha
Perceived Usefulness (PUS)	$\alpha = 0.7702$
Perceived Ease of Use (PEU)	$\alpha = 0.7879$
Macroeconomic Factors (MF)	$\alpha = 0.7113$
Subjective Norms (SN)	$\alpha = 0.8369$
Herding Factors (HF)	$\alpha = 0.7875$
Adoption Intention (AI)	$\alpha = 0.9631$

The reliability of each independent variable is significant. Each value is higher than 0.71. The highest value exhibited on the data is adoption intention with a value of 0.9631. And the lowest Cronbach's Alpha value is macroeconomic factors at 0.7113. The aforementioned values indicate that there is strong inter-relatedness between the internal consistency of the thematic questions. With positive and significant Cronbach's Alpha values, one can confidently continue with a regression analysis.

5.3 Descriptive statistics

The 7-point Likert scale can be described in descriptive statistics that would present the mean of each question under their respective themes and show the standard deviation of each variable. To repeat, '7' referred to strongly agree, '4' being neutral, and '1' strongly disagree. The respondents seem to appear relatively neutral on all independent determinants with slight skewness. However, the statistics show significant values of standard deviations, the lowest being subjective norms (1.338) and the highest adoption intention (1.713). A high standard deviation suggests a substantial spread amongst the data set. Essentially, many respondents have varying adoption intentions ranging from 3.036 to 6.462. Respectively, the most unanimous and neutral opinion of subjective norms ranged from 2.680 to 5.356.

Table 6 Descriptive Statistics

Construct Items	Mean	Standard Deviation
Perceived Usefulness	3.523	1.392
Perceived Ease of Use	3.819	1.410
Macroeconomic Factors	4.020	1.380
Subjective Norms	4.018	1.338
Intrinsic Motivation	3.591	1.582
Adoption Intention	4.749	1.713

The Pearson's correlation reflects the strength of a relationship between two variables. The scale between the matrix is -1 and 1. A negative value would mean a total negative linear relationship, with 0 being no correlation, and lastly, 1 indicating a perfectly linear relationship between the two variables. Essentially, if one variable would change, the relationship explains the magnitude of change on the other variable. Table 7: Pearson's Correlation Matrix: Independent Variables exhibits the relationship between all independent variables in correlation to one another. The highest correlation value is between perceived usefulness and subjective norms with a value of 0.629. Whereas, the lowest value is demonstrated between herding factors and intrinsic motivation at 0.323.

Table 7: Pearson's Correlation Matrix: Independent Variables

Correlations

	PUS_mean	PEU_mean	MF_mean	SN_mean	HF_mean
PEU_mean	0.572				
MF_mean	0.594	0.559			
SN_mean	0.629	0.535	0.524		
HF_mean	0.344	0.390	0.390	0.427	
IM_mean	0.583	0.577	0.488	0.582	0.323

5.4 Ordinary Least Squares (OLS) Regression

The study model of the following thesis is ordinary least squares regression. The regression analysis was run to examine whether the theoretical estimation model is statistically significant with a chosen 5% significance level. Therefore, the null hypothesis would refer that all five independent variables influence investors' adoption intention. For repetition, refer to the proposed theoretical estimation:

$$\text{Adoption Intention (AI)} = \text{Perceived Usefulness (PUS)} + \text{Perceived Ease of Use (PEU)} + \text{Macroeconomic Factors (MF)} + \text{Herding Factors (HF)} + \text{Intrinsic Motivation (IM)}$$

The regression derived from the data in terms of the theoretical estimation is exhibited in table 8: Coefficients of the theoretical estimation. The model would suggest a regression equation of:

$$\text{AI} = 0.075 + 0.245\text{PUS} + 0.169\text{PEU} + 0.002\text{MF} + 0.3620\text{HF} + 0.1868\text{IM}$$

Table 8 Coefficients of the theoretical estimation

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.075	0.455	0.16	0.870	
PUS_mean	0.245	0.119	2.06	0.042	2.19
PEU_mean	0.169	0.110	1.54	0.127	1.93
MF_mean	0.002	0.110	0.02	0.988	1.83
SN_mean	0.228	0.120	1.90	0.060	2.05
HF_mean	0.3620	0.0977	3.71	0.000	1.31
IM_mean	0.1868	0.0971	1.92	0.057	1.89

As shown in Table 8 above, the P-values of each coefficient are significantly high. This regression model shows that only two variables out of the predicted six indicate statistical significance between the dependent variable, adoption intention. Namely, Perceived usefulness and herding factor. In addition, the detected adjusted R-squared value was 51.93%. As the regression shows insignificant values, the researcher suspected that the regression had omitted variables. Essentially, the regression may have missed one or more highly significant variables. Or on the contrary, the regression equation has an insignificant variable (Singh et al., 2017, p.3).

Since there are no statistical measures to detect which variables are insignificant, instead they were manually removed insignificant variables to manufacture the most appropriate regression equation as follows:

$$\text{Adoption Intention (AI)} = \text{Perceived Usefulness (PUS)} + \text{Perceived Ease of Use (PEU)} + \text{Macroeconomic Factors (MF)} + \text{Herding Factors (HF)}$$

The new model, excluding intrinsic motivation exhibited in Table 9, shows more statistical significance between the beta and values and the dependent variable. The researcher acknowledges that intrinsic motivation's p-value is observed at 0.057, close to the chosen

significance level. As such, it would be more sensible to remove macroeconomic factor variable instead as it shows an abnormally high p-value. However, the motivation behind removing intrinsic motivation is that the variable acted as a supporting variable. Whereas, the researcher had the desire to leave macroeconomic factor variable as it supported the hypothesis of influence of market characteristics influencing individual investors' adoption intention to Bitcoin.

At a 5% significance level, there data shows empirical evidence of perceived usefulness ($\beta=0.245$; $p>0.014$), perceived ease of use ($\beta=0.169$; $p>0.037$), subjective norms ($\beta=0.228$; $p>0.017$), and herding factors ($\beta=0.362$; $p>0.000$) influencing investors' adoption intention in the cryptocurrency market. Henceforth, the new statistically significant regression model goes as follows:

$$AI = 0.071 + 0.292PUS + 0.226PEU + 0.015MF + 0.3627HF$$

Table 9 Coefficients of PUS, PEU, MF, SN, HF

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.071	0.460	0.15	0.879	
PUS_mean	0.292	0.118	2.49	0.014	2.09
PEU_mean	0.226	0.107	2.11	0.037	1.79
MF_mean	0.015	0.111	0.14	0.889	1.83
SN_mean	0.285	0.117	2.43	0.017	1.93
HF_mean	0.3627	0.0989	3.67	0.000	1.31

Nonetheless, the macroeconomic factor variable still shows an abnormally high p-level of 0.889. Therefore, in the final model, the researcher removed the macroeconomic variables and were left with four independent variables shown in Table 10. And the regression equation of:

$$AI = 0.083 + 0.297PUS + 0.230PEU + 0.287SN + 0.3647HF$$

The observed adjusted R-squared for the respective model is 51.18% that will be further discussed in the analysis and discussion section.

Table 10 Coefficients of final regression model

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.083	0.449	0.19	0.853	
PUS_mean	0.297	0.112	2.67	0.009	1.90
PEU_mean	0.230	0.103	2.23	0.028	1.67
SN_mean	0.287	0.116	2.48	0.015	1.89
HF_mean	0.3647	0.0974	3.74	0.000	1.28

Lastly, regression analyses were run with carrying control variables. Two separate regression analyses for gender and equation, refer to appendix 9.1 and 9.2. The purpose of running separate analyses on control variables is to increase internal validity and enhance the relationship between the variables and restrict extraneous influences (Hünermund & Louw, 2020, p.5). In regard to the gender regression equation, the data were recoded to numerical values. The regression equation ended with identical independent beta values, where each constant term varied depending on gender. Namely, female gender with a constant coefficient term of $\beta=0.046$ and male gender with a value of $\beta=0.142$. A noteworthy mention is that the other gender generated a negative constant beta value of $\beta=-0.126$. P-values were only significant for two variables: perceived usefulness ($\beta=0.239$; $p=0.059$) and herding factors ($\beta=0.3596$; $p>0.000$). In addition, the adjusted r-square value was observed at 51.14%.

The regression equation for varying education levels showed more significant p-values. Subsequently, perceived usefulness ($\beta=0.240$; $p>0.045$), subjective norms ($\beta=0.238$; $p>0.049$), herding factors ($\beta=0.3308$; $p>0.001$), and intrinsic motivation ($\beta=0.2082$; $p>0.037$) were observed as statistically significant. Similarly, independent coefficients were identical to each education level with varying values of constant beta value. Namely, recoded (i) secondary education (1), (ii) undergraduate (2), and postgraduates (3). Secondary education's constant variable is observed at $\beta=-0.242$. Whereas, both undergraduate and postgraduates generated a positive constant coefficient value of $\beta=0.145$ and $\beta=0.277$ respectively. Finally, an observed adjusted r-square value for the regression equation is 52.25%

Referring back to the proposed hypothesis. With a 95% confidence level, hypothesis 1 is supported: Other investors' herding trend will lead to a higher propensity to adopt Bitcoin by individual investors. With a 5% significance level, there is empirical evidence that: the perception of usefulness and ease of use increases the likelihood of individual investors' intention to adopt Bitcoin. Thus, hypothesis 2 is supported. However, hypothesis 3, which increases interest rates and positively affects investors' intention to adopt cryptocurrency, is rejected with a 95% confidence level.

6. Discussion and Analysis

The discussion and analysis chapter serves as a purpose to further explore the empirical findings in the previous chapter 5. Results. In addition, it will refer back to previous works of literature, compare and contrast results and attempt to explain the results with the help of the constructed theoretical framework in chapter 2.

The determinants of intention adoption of investors in the cryptocurrency market were investigated through the technology acceptance model and analyzed through behavioral finance theory. To conclude the results from the previous chapter and answer the research question proposed in the study, perceived usefulness; perceived ease of use; herding factors; and subjective norms are the determinants that affect investors' intention to adopt Bitcoin in the cryptocurrency market. These factors will be further elaborated and evaluated in the following paragraphs.

As such, the first proposed hypothesis, referring to the herding behavior of investors, the observed p-value is 0.000 which indicates a highly significant statistical correlation to investors' intention to adopt Bitcoin. Aligning with previous studies (Youssef, 2020; Jalal et al., 2020; Kumar, 2020; Calderón, 2018), the herding behavior of investors contributes to a chain reaction for other investors to follow the same trend and adopt a particular cryptocurrency. Since the regression model found herding factors to be significant in regard to investors' investment decisions on Bitcoin, it exhibits that consumers dismiss rational thinking and follow the noise in the market in accordance with Calderón's (2018) study. Furthermore, the result could potentially signify that the cryptocurrency market is inefficient and thus, reject the efficient market hypothesis as suggested by Nurbarani and Soepriyanto (2021). The theoretical framework suggested that the cryptocurrency market was inefficient and driven by behavioral finance factors. The aforementioned evidence supports this claim.

Scholars such as Youssef (2020) propose that investors utilize cryptocurrency, such as Bitcoin, as assets and hedge them against conventional financial assets. In a similar manner, Conrad et al. (2018) argue that the cryptocurrency market is seen as safe haven by consumers. Allegedly, investors find comfort in the decentralized market as economic conditions worsen in the traditional financial market. However, this particular study did not find empirical evidence that macroeconomic factors drive adoption intention amongst investors. Nonetheless, hypothesis three solely referred to conditions of interest rates. One possible counterproposal could be that interest rates in particular do not drive investors' adoption intention of Bitcoin. Previous studies have referred to economic conditions affecting the adoption of cryptocurrencies in general and have not specified Bitcoin. Varying cryptocurrencies have different natures. Therefore, higher interest rates could promote another cryptocurrency adoption rather than Bitcoin. For instance, Bitcoin can mainly be seen as an asset to store value, whereas, Ethereum could be seen more as a hedging instrument.

The motivation behind hypothesis three was derived from the speculation that volatility prices cause investors to engage in rapid sales and purchases. Hence, as prices decrease significantly, new investors might be encouraged to enter the market and vice versa. Academics such as Bouri et al. (2020), Huang et al. (2021), Demir et al. (2018), Conrad et al. (2018), and Corbet et al. (2020) attested that market conditions heavily influence the volatility of cryptocurrency prices. The authors suggested that market conditions cause a

spillover effect from one currency to others and thus, market prices are extremely sensitive to macroeconomic news. Namely, economic policy uncertainty and monetary policies. The highly insignificant values for macroeconomic news affecting adoption intention may only be speculative at this point. With no empirical evidence, the contradictory findings with past studies and the conducted one could potentially be due to a flawed survey questionnaire, further discussed in chapter 7 in theoretical implications. Different macroeconomic news such as regulations and news about indices, as proposed in past studies, may show statistical significance of investors' adoption intention.

As discussed briefly in the results chapter, hypothesis two is supported. In accordance with the chosen theoretical model, the technology acceptance model suggested by Davis (1989), investors' perception of technology's usefulness and ease of use influence their decision to adopt Bitcoin. In the first estimated regression model, including intrinsic motivation, macroeconomic variables, and perceived ease of use were not statistically correlated to investors' adoption intention. However, as intrinsic motivation was removed from the equation PEU became statistically significant with a 95% confidence level. The motivation behind this change can be due to multicollinearity. Though previous tests to examine the phenomenon did not convey a great deal of multicollinearity, the correlation matrix in Table 7 displayed a high correlation between the variables. The TAM model variables PUS & PEU, respectively had a correlation value of 0.583 & 0.577 to IM. The removal of intrinsic motivation enhances the significance of the two explanatory variables. One could argue that the intrinsic motivation of investors' have already to an extent been incorporated into the model. Referring to figure 3, PEU and PUS articulate investors' attitudes and behavioral intentions to use as suggested by Abroud (2013). Intrinsic motivation is driven by how rewarding individuals perceive performing a particular task (Sällberg & Bengtsson, 2016, p.321). Hence, one could propose that intrinsic motivation is a subcomponent of investors' attitudes. And nonetheless, still incorporated in the regression model though removed from the regression equation.

To continue on the correlation matrix, subjective norms exhibited the highest correlations to other independent variables. As discussed in the theoretical framework, subjective norms drive investors' intention to adopt. Moreover, it also influences investors' attitudes and behavior. Therefore, the high correlation values stem from the fact that the subjective norm element is a key component of both PEU and PUS. However, due to those exact same reasons subjective norms were treated as an independent variable rather than composed together with other explanatory variables. Subjective norms may influence herding factors in regard that investors may feel compelled to heed their peers' approval and avoid a sense of disapproval. In the same manner, one's family and friends' opinions can potentially affect how investors perceive what factors and tasks they find rewarding. Had their peers shown signs of disapproval, they may find the task less pleasurable. And lastly, with respect to macroeconomic factors, subjective norms can influence how investors perceive the threat of macroeconomic instabilities and risks; hence, supposedly driving them to take preventative measures to protect their assets. To summarize, since subjective norms affect each component in a different manner, it was of interest to examine the variable as an independent factor.

The study failed to incorporate more consumer characteristics that could have been investigated under these conditions. The theoretical framework suggests that much of investors' adoption intention is derived from investors' risk preferences and gambling predilections (Schaupp, 2018; Delfabbro et al., 2021). Though the survey lacked more consumer attribute questions some of the investors' attitudes and beliefs can be derived from the theoretical acceptance model (Davis, 1989) that indeed was incorporated into the

survey. In a conjectural manner, one could propose that investors that do not perceive the technology of Bitcoin, cryptocurrency as a whole, as useful or easy have a negative perception of the technology. Therefore, may perceive cryptocurrency adoption as a gamble and will avert to risk-aversion. Another pivotal element that persuades adoption intention is investors' perception of control (Schaupp, 2018). On a purely speculative basis, risk aversion and reluctance to cryptocurrency adoption could reflect investors' lack of self-efficacy. Perception of control directly reflects investors' perception of risk associated with the environment. As such, a lack of self-efficacy can stem from the belief that investors may not be capable enough to manage risk and uncertainty.

To further discuss, individual consumer characteristics, the regression analysis with the control variable education, was the only regression analysis that showed statistical significance for intrinsic motivation. The study does not align with Sällberg and Bengtsson's (2016) argument of intrinsic motivation showing positive significance for technological adoption had it been for personal use. On the contrary to the authors' findings, the study focused solely on individual investors rather than institutional investors, the argument is invalid in this particular study. Explanations must stem from individuals' education levels. For all education levels: secondary education; undergraduates; and postgraduates, the absolute value of the intrinsic motivation variable was high, meaning intrinsic motivation is an essential driver for their adoption intention of Bitcoin. Though a notable finding is that the regression analyses did not show variation between education level and the beta coefficient of intrinsic motivation. Introducing a control variable that regards education may convey that individuals' education is related to intrinsic motivation. Curiosity, challenge, and competition are closely associated with education that can, in turn, increase individuals' intrinsic motivation.

Circling back to the final regression model as conveyed in Table 10. The coefficient in the respective table conveys an abnormally high p-value for the constant variable. Technically, the constant variable is not statistically significant and ought to be removed. Nonetheless, the constant variable shows important information to the regression model as a whole and therefore, is not removed. An insignificant constant variable may indicate that the model has omitted a variable (Singh, 2007, p.3), . Though assumption 3 in the OLS regression analysis in chapter 4 ensured that the regression did not comprise of any endogenous variables. In other words, none of the explanatory variables were dependent on the dependent variable; hence, error term. This assumption may have been overturned by the regression missing significant variables. Align with the study lacking consumer attributes to attest to the adoption intention of Bitcoin, this could be a factor that contributed to a highly insignificant p-value.

To further confirm the argument. The observed adjusted R-squared value for the final regression model is 51.18%. The value signifies the goodness-of-fit of the chosen model in linear regression models. The value is a tad lower than what one would consider a strongly correlated R-square value. Nonetheless, in regard to predicting human behavior and psychology, typical R-squared values are approximately 0.5. (Ballard, 2019) The value signifies how strongly correlated all the independent variables are in terms of the dependent variable. However, a noteworthy factor is the more independent variables one should add that does not fit the mode, the lower the adjusted R-square value becomes. the dependent variable, adoption intention, is not entirely explained by all the chosen variables (Everitt & Skrondal, 2010). In other words, the model constructed for adoption intention can be for 51.18% explained by: perceived ease of use; perceived usefulness; subjective norms; and herding factors. Henceforth, there are other variables that the study did not examine that

could potentially explain the rest of the observed behaviors such as consumer characteristics.

7. Final remarks

The purpose of the conclusion chapter is to evaluate the purpose and research question of the study. These will be examined through quality criteria, generalizability, and reliability. In addition, the conclusion chapter will present the limitations of the conducted study and recommendations for future studies.

7.1 General Conclusion

Cryptocurrency market is a relatively new market introduced and as such, it is continuously developing. Some scholars argue that the respective market does not follow the same market fundamentals as other traditional financial markets. Thus, it was of great interest to investigate the underlying factors that drive the market. A vital component of the erratic price fluctuations is cryptocurrency investors. The “noise” and attention cryptocurrencies have received, lead investors to make erratic investment choices and adopt cryptocurrencies. The conducted study challenges the efficient market hypothesis and advocates for behavioral finance factors that navigate investors.

Henceforth, the purpose of the study was to investigate what drives individual investors' adoption intention of cryptocurrencies, more specifically Bitcoin. The objective was two-fold as constructed in the theoretical framework. Examine individual consumer characteristics as well as market determinants that drive investors' adoption intention and; therefore, investment behavior. Investors' attitudes' were observed through the help of the Likert-scale application in the online questionnaire. To revisit the study's research question:

RQ: *What market characteristic- and individual consumer determinants influence investors' intention to adopt Bitcoin in the cryptocurrency market?*

The study then proposed three hypotheses in regard to investors' herding behavior; perception of technological acceptance model variables; and macroeconomic news, in order to investigate the aforementioned research question. Adoption intention was used as a dependent variable and six more independent variables were introduced. Namely, perceived usefulness, perceived ease of use, macroeconomic factors, herding factors, intrinsic motivation, and subjective norms. Thereafter, results followed where herding behavior was detected among the observed investors. The p-value was highly significant (0,000). The collected data attested to the technology acceptance model suggested by Davis (1989), and found perceived usefulness and ease of use a significant determinant for investors' adoption intention. However, a notable exception amongst the results was a highly irregular value for macroeconomic determinants. The conducted study did not find macroeconomic factors a key determinant that drives investors' Bitcoin adoption intention. Lastly, two other regression analyses were run with control variables. The respective regression equations based on age and gender presented relatively similar observations.

To conclude, the conducted study found evidence with statistical significance there are four variables that contribute to investors' adoption intention. Their investment choices in regard to Bitcoin, to 52.90 % extent be explained by the following factors. Perceived ease of use and perceived usefulness as proposed in previous research. Subjective norms are a subcomponent of the technology acceptance model. And finally, herding behavior from other investors in the market.

7.2 Quality criteria

7.2.1 Reliability

Reliability refers to the consistency of the results (Leung, 2015, p.325). Therefore, it also refers to the credibility of the conducted study. Had the study been repeated, the results should show little deviation from the original conducted study. The statistical tests conducted through the survey responses should be stable in terms of time, items and groups. This is translated to, test-retest reliability, internal reliability, and measurement invariances. All of the aforementioned factors can be threatened by the choice of data collection. (Mellinger & Hanson, 2021, p.178) The chosen method to collect data was an online questionnaire sent to various social media channels. The survey itself can pose difficulties to reliability if constructed incorrectly. Internal consistency is ensured through Cronbach's Alpha test which will be discussed repeatedly in the following paragraphs. A second threat to reliability is due to ambiguity of language. Survey respondents may have varying interpretations. To overcome the implication, the questions were close-ended and language use was simple to eliminate ambiguity.

The study did not account for invariance measurement. This could be a potential threat to the reliability of the study. Since the survey reached young adult investors in Sweden and Finland with possibly varying ethnicities, respondents may have different interpretations of the questions in the survey. (Mellinger & Hanson, 2021, p.181) Hence, the reliability of the study can be compromised due to the uncontrolled testing environment (Mellinger & Hanson, p.180). In addition, due to the time limitation, the study neglected test-retest. Essentially, the test would account for varying time variations whilst still producing the same results regardless of the time frame (Mellinger & Hanson, 2021, p.179). The mentioned implication is briefly discussed in the introduction chapter. As the study is conducted during the Covid-19 pandemic time, the environmental factors of instability of the market and uncertainty may also contribute to investors' attitudes and behaviors. Thus, one cannot guarantee similar results from a different time period.

7.2.2 Validity

The validity of a study is to which extent is the results measured in an accurate and appropriate manner for a quantitative research design (Leung, 2015, p.324). The validity of research can be categorized into three different subcategories. Namely, content validity; construct validity; and predictive validity. Respectively, content validity refers to whether the survey items have covered the entire variable's domain. In relation to the following study, these would refer to the chosen explanatory variables and the survey questions established under each variable. (Heale & Twycross, 2015, p.66) The study has ensured content validity by utilizing previous research questions. As the survey was created with the help of the Likert scale, using appropriate questions from previous pieces of literature to cover the entire domain of each respective variable was most appropriate to conduct the survey. However, the macroeconomic factor variable was constructed by the author due to a lack of literature covering the survey questions. This will be further discussed in the limitations of the study.

The second validity refers to construct validity. According to Heale and Twycross (2015), there are three further pieces of evidence that can prove the construct validity of a study. Namely, homogeneity concerning that each construct instrument measures the appropriate

construct. Secondly, the convergence of a study, meaning that the chosen construct items are similar to one another. And lastly, theory evidence, by definition: "... behavior is similar to the theoretical proposition of the construct measured in the instrument.". (Heale & Twycross, 2015, p.66) The aforementioned evidence has been fulfilled during the assumption tests in chapter 3 as well as using previous research survey scales to ensure the validity of the measuring scales.

The last validity measure is criterion validity. This can be measured, yet again, in three different ways. First, convergent validity measures that the instruments are highly correlated to other items that measure homogenous variables (Heale & Twycross, 2015, p.66). As such, Cronbach's Alpha was run to each individual construct item and the three questions that regarded that specific construct item. All values exhibited a significant and appropriate Cronbach's alpha value. Secondly, divergent validity tests that carry construct items are negligibly correlated to one another (Heale & Twycross, 2015, p.66). Subsequently, a correlation matrix was constructed which showed no significant correlation between the independent variables. Explanatory variables that conveyed a slightly higher correlation value were evaluated and explained in the discussion and analysis chapter. Lastly, predictive validity refers to that the construct items ought to have a high correlation to future criteria (Heale & Twycross, 2015, p.66). The r-squared value of the final regression equation was observed at 52.90% for a behavioral study the respective percentage is appropriate. Essentially, the dependent can be explained by 52.90% by the explanatory variables.

7.2.3 Generalizability

Generalizability of a study refers to what extent the study results can be generalized from the chosen sample population to an entire population (Leung, 2015, p.327). The study was distributed on social media, one could not control the population the questionnaire reached. In addition, it utilized other methods than random sampling to receive as many respondents as possible, as such, the study results are not generalizable. Despite the fact that the study fulfilled the central limit theorem. The theory only refers to having normally distributed data. In order to have generalizable data results, Bryman et al. (2008) suggest that an appropriate response number ought to be at least 178 participants (Bryman et al., 2008, p. 265). Indeed, the conducted study did not fulfill, with only usable data of 114 respondents.

7.3 Ethical Aspects

The following research has been conducted in a professional manner that adheres to the regulations of my respective institution, Umeå University. All participants in the study have been shielded from any bodily or mental harm. The survey and research ensure anonymity for all participants and all participants have the opportunity to stop the survey at any given point. Furthermore, the study will guarantee that no confidential information will be revealed. Given that the significant use of secondary sources has been used in the literature review and construction theoretical framework, anonymity was forsaken.

The ethical standpoint of this research is to bring awareness to a newly emerging market of cryptocurrency. Ultimately, the aim of the study is to shed light on investors' behavior and what causes their adoption intention of Bitcoin. In hopes that the results of the investigation will provide investors themselves and policymakers with a comprehensive understanding of the volatile market and benefit both parties.

7.4 Theoretical and Practical Contributions

Aligned with the previous works of literature, the conducted study confirmed that herding behavior is the leading cause of investors' adoption intention. In addition, the technology acceptance model contributes greatly to investors' decision to adopt Bitcoin. The theoretical contribution of this study is the creation of a bridge between varying determinants that affect individual investors' adoption intention of Bitcoin. Previous studies have focused on single determinants that drive investment behavior. This particular study aimed to study determinants on a more comprehensive level and incorporate both markets- and individual consumer characteristics. It found that individual consumer characteristics significantly affect investors' adoption intention. These were further discussed with behavioral finance factors. The study; however, could not account for market characteristics affecting adoption intention for Bitcoin

7.5 Limitations and Future Research suggestions

The main implications of the study were in regard to the survey and data collection. Firstly, the macroeconomic factor questions were constructed by the author with the help of other pre-established questions formulated in a Likert scale manner. To elucidate, there were no ready questions in regard to macroeconomic variables in previous research. And thus, they were manufactured by reformulating questions about other construct items and modified in terms of fluctuating interest rates and negative macroeconomic news that convey instability and uncertainty. This could be a consequential explanation for why the variable did not exhibit any statistical significance and why it also showed an abnormally high p-value. Lastly, in terms of the questionnaire some questions referred to Bitcoin, and in others referred to cryptocurrency. The objective behind the word choices was to generalize the study results to other cryptocurrencies. However, since cryptocurrencies have varying natures, as established before, this poor choice could have tampered with the study results.

A second limitation of the study was the manner in which data was collected and the method chosen for data collection. As the survey was sent to many individuals and those individuals had the opportunity to send it further to other people, the study environment was not controlled. As discussed in the quality criteria paragraphs this factor can potentially threaten the validity and generalizability of the study.

Another important implication of the study is that the survey failed to incorporate important consumer characteristics mentioned in the theory chapter, more specifically, the literature review. These characteristics are important for the analysis in order to provide the reader with valid and coherent results. In addition, the lack of demographic distinction could potentially lead to an inaccurate representation of the investigated population. The study provides general trends that investors convey.

Nonetheless, future studies ought to focus more on individual attributes such as risk profile, and the distinction between sophisticated and unsophisticated traders to further invest consumer behavior in the cryptocurrency market. On the same note, future research should also put great emphasis on market characteristics that contribute to investors' investment behavior in the cryptocurrency market. To elaborate, future authors should investigate macroeconomic variables in a holistic matter and investigate their relationship to one another. Moreover, an interesting study could reflect on individual investors' adoption intentions of different cryptocurrencies.

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9. Appendices

9.1 Regression analysis with control variable: gender

Regression Equation

Recoded
Gender_1

1	AI_mean	=	0.046 + 0.239 PUS_mean + 0.177 PEU_mean + 0.004 MF_mean + 0.228 SN_mean + 0.3596 HF_mean + 0.176 IM_mean
2	AI_mean	=	0.142 + 0.239 PUS_mean + 0.177 PEU_mean + 0.004 MF_mean + 0.228 SN_mean + 0.3596 HF_mean + 0.176 IM_mean
3	AI_mean	=	-0.126 + 0.239 PUS_mean + 0.177 PEU_mean + 0.004 MF_mean + 0.228 SN_mean + 0.3596 HF_mean + 0.176 IM_mean

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.046	0.497	0.09	0.927	
PUS_mean	0.239	0.121	1.98	0.050	2.22
PEU_mean	0.177	0.112	1.58	0.118	1.98
MF_mean	0.004	0.111	0.04	0.968	1.84
SN_mean	0.228	0.121	1.89	0.061	2.05
HF_mean	0.3596	0.0992	3.63	0.000	1.33
IM_mean	0.176	0.101	1.74	0.084	2.01
Recoded Gender_1					
2	0.096	0.245	0.39	0.697	1.13
3	-0.172	0.735	-0.23	0.816	1.10

9.2 Regression analysis with control variable: education level

Regression Equation

Recoded
Education_1

1	AI_mean	=	-0.242 + 0.240 PUS_mean + 0.173 PEU_mean + 0.015 MF_mean + 0.238 SN_mean + 0.3308 HF_mean + 0.2082 IM_mean
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$$2 \quad AI_mean = 0.145 + 0.240 PUS_mean + 0.173 PEU_mean + 0.015 MF_mean + 0.238 SN_mean + 0.3308 HF_mean + 0.2082 IM_mean$$

$$3 \quad AI_mean = 0.277 + 0.240 PUS_mean + 0.173 PEU_mean + 0.015 MF_mean + 0.238 SN_mean + 0.3308 HF_mean + 0.2082 IM_mean$$

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-0.242	0.493	-0.49	0.624	
PUS_mean	0.240	0.118	2.03	0.045	2.19
PEU_mean	0.173	0.110	1.58	0.117	1.93
MF_mean	0.015	0.110	0.13	0.894	1.87
SN_mean	0.238	0.119	2.00	0.049	2.06
HF_mean	0.3308	0.0993	3.33	0.001	1.36
IM_mean	0.2082	0.0986	2.11	0.037	1.97
Recoded Education_1					
2	0.387	0.253	1.53	0.129	1.24
3	0.519	0.443	1.17	0.244	1.28

9.3 Re-coded values for demographic responses

Summary

	Original Value	Re-coded Value	Number of Rows
	Postgraduate	3	10
	Secondary education (Gymanisum /High School)	1	35
	Undergraduate	2	69

Source data column Education

Re-coded data column Recoded Education

Summary

Original Value	Recoded Value	Number of Rows
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Female	1	41
Male	2	70
Other	3	3

Source data column Gender

Recoded data column Recoded Gender



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