

Exploring the Innovation Decision Process of Merchant Bitcoin Adoption

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Abstract

The purpose of this study was to explore the process of bitcoin adoption among retail merchants. Using diffusion of innovation theory as a framework, 10 merchants participated in separate in-depth interviews each lasting approximately 45 minutes that explored their decision-making process for adopting bitcoin for business use. In addition, four bitcoin experts who have over two years of direct Bitcoin experience with merchants were interviewed separately as a triangulation measure. Using thematic analysis, interviews were analyzed deductively using Roger's 5 steps of the innovation-decision process and inductively for additional determinants for bitcoin adoption. Analysis revealed that participants decided to adopt bitcoin not only for financial advantages such as low fees, new customer growth, and fraud prevention, but for social purposes. In this regard, many participants were attracted to the idea that bitcoin was a "revolutionary technology" and were early adopters and advocates of the technology. Furthermore, participants viewed bitcoin as an artefact of a social movement. That is, bitcoin, with its blockchain technology, is part of the decentralization of power. As such, bitcoin was considered to have an important role in economic democratization in which marginal populations may become more active participants.

Keywords: *bitcoin, adoption, diffusion of innovation, innovation-decision process, electronic payments*

Table of Contents

Introduction	5
Background	5
History of Bitcoin	6
Theoretical Framework	12
Diffusion of Innovation	12
Technology Acceptance Model	15
Criticism of Diffusion of Innovation	16
Diffusion of Innovation, Payment Technology, and Bitcoin	17
Motivations for Adoption	18
Obstacles to Diffusion	20
Research Questions(s)	21
Methodology	23
Participants	23
Sampling and Recruitment	24
Data Collection	24
Data Analysis	25
Trustworthiness	27
Ethical Considerations	28
Findings	29
The Innovation-Decision Process	29
Knowledge Stage	31
Persuasion Stage	32
Attitude formation	32
Sources of uncertainty	33
Sources of reinforcement	33
Decision Stage	35
Trialing	35
Change agents	36
Independent research	36
Market demand	37
Implementation	38
Positive experiences	38
Negative experiences	39
Confirmation	40

Confirmed	40
Unconfirmed	41
Emergent Themes	42
Theme 1 – Financial advantage	43
Direct advantage	43
Indirect advantage	45
Theme 2 – More than just currency	46
Technological revolution	46
Social revolution	49
Summary	52
Conclusion	54
Research Question 1	54
Research Question 2	55
Theoretical Implications	56
Practical Implications	56
Study Limitations	57
Recommendations for Further Research	58
Summary	58
References	59
Appendix A - Pattern of Adoption (Rogers, 1962)	65
Appendix B - Interview Guide (Merchants)	66
Appendix C - Interview Guide (Experts)	67
Appendix D – Participant Demographic Table	68

Introduction

Mobile payment is estimated to grow 60.8% in 2015 (Capgemini, 2014) as Internet and mobile adoption rates continue to increase globally. According to the International Telecommunications Union (2014), there are now over 3 billion users on the Internet while mobile broadband penetration rates have increased from under 10% in 2009 to 32% in 2014. The adoption of Bitcoin, a cryptographic currency, has also picked up in recent years. Bitcoin brings about several advantages to users, including lower transaction fees, faster transactions, cannot be counterfeited, and avoids the need for a middleman. Bitcoin is also unique in that it has the potential to bring about economic democratization especially for marginal populations by providing them with access to banking and credit, and streamlining remittances and legacy payment systems. More importantly, the technology has the potential to disrupt our century-old banking and financial systems, challenge the economic status quo and bring about significant social change. As a result, Bitcoin makes for an intriguing unit of study for analysis.

Bitcoin appears to be no ordinary innovation. Its users might be politically and socially motivated. Since its origins are predicated in part on an ideology that challenges the status quo of centralized bank and government currencies worldwide, the adoption of this innovation may be more complex than other similar alternatives before it. If Bitcoin is to fulfill its mandate as a more trustworthy currency and achieve ubiquity, it must overcome obstacles like other payment technologies have.

Currently, the literature presents a lopsided account of Bitcoin, heavier in its theoretical pondering and comparatively light on actual empirical research on its use. In fact, very little research has been conducted on how users decide to adopt Bitcoin. Despite growing merchant adoption rates, Bitcoin adoption is poorly understood. Moreover, individual decision-making as part of its diffusion has yet to be examined in depth. The thesis question driving this investigation is, how do merchants decide to adopt bitcoin and do merchants consider political or social factors in the process? As a result, the purpose of this study is to describe the decision-making process of merchant bitcoin adoption and to determine motivation factors that influence this process.

Background

Bitcoin is an electronic payment network that is not governed by any central authority, but instead relies on a distributed peer-to-peer consensus mechanism to preserve the integrity of

the network. Bitcoin was designed in 2008 by Satoshi Nakamoto with the goal of solving some of the flaws of conventional fiat currency. Nakamoto (2009) highlighted that the root problem of fiat currency is that it fundamentally relies on trust. Meanwhile, central banks and other entities that control currencies have historically and repeatedly breached this trust, observable in the latest global economic downturn (Nakamoto, 2009). As a result, Nakamoto created a decentralized peer-to-peer electronic cash system which, by design, does not require interpersonal trust and relies on cryptographic proof to remove the need for a third party middleman. This innovation allows for secure, effortless, and fast transactions to anyone around the world with an Internet connection, changing how people participate in commerce.

History of Bitcoin

The history of crypto-currency does not begin with Bitcoin. Several pre-cryptocurrency events led to technological possibilities to create Bitcoin. For instance, in 1977, current MIT professor Ron Rivest created public key cryptography, vastly improving encryption and security of storing digital information. This made anonymous internet payment possible when the demand for e-payments surged in concert with the growth of the Internet in the 1990's. E-cash, e-gold, and hashcash are three examples of early electronic payment systems.

The downfall of Napster is commonly regarded as an exemplary case in the development of Bitcoin. The infrastructure used by Napster, a peer-to-peer file sharing company, is commonly cited as key architecture toward the current design of peer-to-peer mechanisms. Napster's demise was in how it centralized its files in one location, allowing for it to be equivocally shut down by regulators due to copyrights infringement on the music files being shared over the network. Since, Bitcoin is often referred to as the Napster of finance and the Internet of money with proponents contending that Bitcoin's decentralized nature poses an enormous threat to the financial and payment sectors, just like how Napster and Bittorrent threatened the music and copyright industries. To this end, Bitcoin has been dubbed a disruptive technology (Hurlburt & Bojanova, 2014).

While the general desire for crypto-currency has yet to reach the heights necessary for it to become widespread, its relatively slow pace of adoption has been arguably attributable to its imperfections which make it a risky venture to implement or adopt. Namely, issues surrounding theft and fraud have been too buoyant for any version to take root (Christopher, 2014; Dupont, 2014) leaving crypto-currencies stigmatized. It was not until the recent global recession did

crypto-currency regain attention. In fact, Nakamoto (2009) articulated that the distrust bred by the unethical and risky practices of corporations and sympathizing governments were key factors in the timing of his endeavor, citing that “the central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust.” Nakamoto (2009) posed that a centrally contained and controlled currency was susceptible to corruptive activities as seen in the economic downturn and, ultimately, cannot be trusted. The motivation to develop Bitcoin stemmed from the lack of neutrality surrounding money. The social context, including public distrust of financial institutions, created more open-mindedness to alternatives to the “unfair” status quo.

However, to achieve this, Nakamoto had to do more than point to the shortcomings of current monetary systems. There were serious practical issues in launching a crypto-currency. Learning from cases such as Napster, Bitcoin circumvented the main challenges faced by its inventive predecessors. Through better encryption, Bitcoin is arguably the least risky crypto-currency ever developed, using a distributed system with no single point of failure (Nakamoto, 2009).

Some of the main advantages to using Bitcoin for payment are that it is easy to accept and it has low transaction fees compared to current payment systems such as Visa, MasterCard, or bank transfers. Bitcoin enables merchants in one corner of the globe to accept payments from customers in another. Neither the merchant nor the customer need to have bank accounts, and the excessive fees typically paid to intermediaries in the traditional banking network are removed from the transaction process. In short, Bitcoin removes long-standing barriers, enabling the Internet to fulfill its potential as a medium of unrestricted global e-commerce.

The emergence of disruptive currencies has never occurred in isolation from certain catalytic political and economic conditions. The adoption of any technology for that matter cannot be ahead or behind its “time”. Bitcoin is not only alluring for its contemporary relevance but, being cryptocurrency, it appears positioned to be the first major adoption of an intangible currency that challenges a part of the economic status quo (Kostakis & Giotitsas, 2014).

Reitman (2014) established that to understand digital currency, recognition must be given to how money has undergone a fundamental historical shift from an anonymous system to one that is easily tracked, regulated, and controlled. Most people are handling hard cash less and less, and, at the same time, losing anonymity more and more. Reitman argued that without the

growing concerns about privacy loss, alternatives to current banking practices would likely go unexplored. This distrust is further exemplified by consternation over the confluence of financial institutions and politics. For instance, in the Wikileaks case, where secret military documents were made public online by Julian Assange, several institutions, including PayPal and Visa, exerted their political power by cutting off their services with the controversial website.

However, one of the most influential determinants of the current fertile conditions dates back over 20 years. Timothy May, a retired physicist, aggregated a collection of friends to form a group called “cypherpunks”. Their mandate was to defend privacy across the digital world. The cypherpunks personified the concerns held by many governments. May said:

“Just as the technology of printing altered and reduced the power of medieval guilds and the social power structure, so too will cryptologic methods fundamentally alter the nature of corporations and of government interference in economic transactions.” (Reitman, 2014, p. 1)

While the current debate proceeds over the necessity to relinquish some civil rights in exchange for public safety or national security, Bitcoin appears to be a cultural artifact of the desires embodied by groups like the cypherpunks (Peck, 2014). In general, cryptocurrencies offer a balance to the constant threat to privacy that the internet makes possible.

The cypherpunk anarchist ideology became more legitimate when one of its co-founders, Eric Hughes, programmed e-mail so that it was encrypted and anonymous. In fact, those using his new email service were confronted with messaging disparaging the government for its threat to civil liberties. The cypherpunks attention soon turned to the fact that, outside of cash transactions, no true private transaction could exist.

The motives of these early cryptocurrency enthusiasts appeared to dichotomize. On one side, the allure was to participate in economic activity anonymously. However, on the other side, a smaller, yet radically motivated group emerged. Jim Bell, a software engineer, took the ideology to the extreme and planned to use its clandestine nature to attack the government. Anonymous currency could allow him to use a bounty system in order to assassinate key political figures. His transgressions did not amount to any actual violence but he was eventually caught and then jailed for his efforts.

During this politically fervent time, engineers directed significant attention to designing legitimate digital currencies. None took root, plagued by one fundamental issue that all

currencies face - counterfeiting. Known as “double spending”, early cryptocurrencies such as *bit gold* and *b-money* faced this seemingly impossible obstacle (Peck, 2014). One way to solve this problem was to allow for oversight by a third-party, central authority. The maneuver was a direct compromise and a dissolution of any inherent sovereignty offered by the invention. The innovation stagnated under this dilemma as a result.

In 2007, the political, economic, and technological conditions shifted (Perez, 2002; 2009). Perez (2009) argued that the newer financial tools had been designed to yield more credit and not contribute value to the real economy. The NASDAQ tech bubble in 2000 and the financial crisis in 2007 are direct effects of these developments. Perez further identified that the financial crisis represented a structural economic change resulting from overreaching speculative behavior. Kostakis and Giotitsas (2014) posited that, “the desire for non-credit money through modern technological capabilities of global connectivity combined with cryptography has enabled several individuals and online communities to experiment with digital currencies.” (p. 432). These major events created enough distrust amongst influential hands that cryptocurrency motives were rekindled.

Shortly after this economic downturn, Satoshi Nakamoto proposed Bitcoin. For liberalists, these events reinforced the pitfalls of an economic system overcontrolled by central agencies. Although distrust in established authorities that control money is not new (Kinley, 2003), the conditions for cryptocurrency set the potential for their more serious consideration. While important, this sentiment could not be enough to push cryptocurrency forward unless the core problems encountered by its previous engineering attempts were addressed. The attraction of Bitcoin was that Nakamoto had actually solved the double spending issue that others before him¹ had yet to overcome. In turn, the integrity of Bitcoin was different than its predecessors and Nakamoto’s achievements eliminated significant barriers for adoption.

The history of cryptocurrency reveals its many obstacles. With the transcendence of these impediments, Bitcoin has gained modest yet unprecedented traction. In current studies about adoption of bitcoin, more is known about its politics (Brito & Castillo, 2013; De Filippi, 2014; Kostakis & Giotitsas, 2014) and engineering issues (Dupont, 2014; Hurlburt & Bojanova, 2014) than the psychology of its adoption. How do individuals make decisions, and take into account

¹ It is presumed Nakamoto is male although this has never been confirmed. In fact, Nakamoto may not be a singular person and could, instead, represent a group of people.

various aspects of the technology, as they go through the adoption process? There is a clear opportunity to explore the diffusion of this provocative currency into mainstream adoption in its current early stages.

Given this history, Bitcoin, as far as crypto-currencies are concerned, has been adopted at a significant, although still modest, rate. Through its early success, its disruptive nature has caught the attention of the public and academic researchers alike. Nearly 100 years ago, Keynes (1919) skillfully articulated a sentiment that appears to fit the current status of Bitcoin:

“There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.” (p. 71).

Whether or not Bitcoin is actually a currency is still highly debatable. Governments around the world are divided on this issue. For example, the United States defines Bitcoin as a “convertible virtual currency” that “either has an equivalent value in real currency, or acts as a substitute for real currency” (FinCEN, 2013). However, it is a fact that currently - Bitcoin can be exchanged for established currencies, commodities, goods and services, and more people all around the world are using it to pay for food, flights, cars, and various other services. This is particularly the case for the ‘unbanked’ fragment of the population.

Bitcoin’s popularity has grown exponentially over the last 5 years, and more notably, merchant adoption has also skyrocketed since 2013. For example, large online retailers such as Overstock.com and Shopify.com have made it available as a payment option (Ballve, 2013), dragging it from the fringes of mainstream consumer practices. In fact, Overstock.com has completed over \$1m worth of Bitcoin transactions in the first two months since it began accepting Bitcoin (Burns, 2014). Meanwhile, as of 8th March 2014, there were also a total of 3359 merchants worldwide who accepted Bitcoin as a form of payment at their store (Coinmap, 2014), and this number has nearly doubled to 6604 as of 12th June 2015.

In the following chapters, a theoretical framework will be presented that describes three relevant theories to the innovation adoption process. These theories will be used to frame the research questions for this study. Next, methodological approach will be described, including its suitability for the purpose of this research. In the findings chapter, the results of the deductive and inductive analyses will be presented to portray the decision-making process and to identify

emergent determinants affecting it. Finally, the conclusion chapter offers a synopsis of the findings and how they contribute to answering the original research questions for this study.

Theoretical Framework

The introduction of Bitcoin occurred under special conditions. However, more is known about these conditions than the psychology of its adoption. For example, some notable work include exploring the viability of Bitcoin as a competitor for money (Weber, 2014), examining its political alignment with libertarianism (De Filippi, 2014), and even attributing the popularity of Bitcoin adoption in part to the 2007 economic crisis (Nakamoto, 2009). This chapter reviews several key theories that pertain to the technology adoption behavior. These theories include the Diffusion of Innovation, the Technology Acceptance Model, and Social Shaping of Technology Theory. After, the proposed theoretical framework for this study will be introduced. The proposed framework applies the 5 stages of the Innovation-Decision process proposed by the DOI theory by Rogers (1962) to the interview guides which are used for conducting one-to-one interviews with Bitcoin merchants and experts. After applying pertinent technology adoption concepts to the adoption of payment technology, the most recent academic work on Bitcoin and payment technology adoption will be reviewed to position study in the current scholarship on adoption of new technologies.

Diffusion of Innovation

It is suitable to consider the innovation-decision process of Diffusion of Innovations Theory (DOI) as a framework to examine the process of adoption. The stages of decision making process are conducive to in-depth qualitative exploration because it exposes decision-making as an individual process. Overall, DOI (Rogers, 1962) seeks to describe how, why, and how quickly new technologies or ideas spread. In general, the process of diffusion occurs when an innovation is communicated among the members of a social system across a variety of channels or media. In order for diffusion to occur, certain conditions must be met. Foremost, there must be an innovation to spread. However, a communication channel, a social system, and time must also exist for it to diffuse. Mass media and interpersonal communication are two common communication channels whereby adopters first learn about or are exposed to an innovation. Rogers (2003) also emphasizes social systems as key elements in the diffusion process. He defined a social system as, “a set of interrelated units engaged in joint problem solving to accomplish a common goal” (p. 23).

According to Rogers, adoption process ultimately moves from awareness to adoption, and emphasizes the role of critical mass. Critical mass enables the sustainability of an innovation

to reside in a social system. In the process of reaching a critical mass, Roger distinguishes following groups: 1) innovators, 2) early adopters, 3) the early majority, 4) the late majority, and 5) laggards (see Appendix A). Rogers (2003) proposes that adoption of a new idea is caused by human interaction through interpersonal networks, resulting in a distribution that follows a binomial expansion, and follows a bell-shaped curve over time which is based on standard deviations from the mean of the normal curve.

Innovators, 2.5% of the population, are characterized by their willingness to experience new things. As a result, they are often willing to take on risks associated with unsuccessful innovations (e.g., profit loss). In addition, innovators tend to be comfortable with higher degrees of uncertainty surrounding a new innovation (Rogers, 2003). Early adopters, approximately 13.5% of the population, tend to have leadership roles within the overall social system that the innovation is diffusing through. Such leadership includes distributing advice about the innovation. Because of their status, their attitudes toward the innovation has an influential role in the attitude formation of others and decreasing uncertainty.

The majority of adopters fall into the early majority (34%) and late majority (34%) categories. The early majority do not have the same leadership role as early adopters. They tend to be more deliberate in their decision to adopt an innovation but are, nonetheless, embedded in a significant interpersonal network that influences the overall diffusion of the innovation. The late majority wait until most of their peers have adopted the innovation before making their commitment. They tend to be more skeptical and cautious than others, economic necessity and peer pressure funnel them into their decision.

Finally, laggards, 16% of the population, are the most skeptical and slowest to adopt any innovation. Rogers (2003) noted that a laggard's social system is comprised of mainly other laggards and they do not have leadership roles. As a result, they are not exposed to the same knowledge about innovations as the other groups. Laggards also take the longest to decide about adopting an innovation.

The concepts of diffusion and adoption are strongly linked. Straub (2009) noted that the complete adoption process is comprised of individual adoption decisions. In turn, consumer or user perception and attitude is vital to the DOI. To describe this process, Rogers (2003) articulated 5 stages which reflect the micro-process of adoption behavior on the individual level and labelled as the Innovation-Decision process.

Stage 1 (Knowledge) represents the first exposure to the innovation and coincides with a lack of information about it. During the Knowledge Stage, the individual seeks to answer questions such as “what?”, “how?”, and “why?” As a result, there are three types of knowledge obtained during this stage. (a) Awareness - knowledge represents the recognition of the existence of the innovation in question. The impression the innovation leaves as this stage can motivate the individual to ask additional questions. (b) How-to-Knowledge is information about how an innovation functions. The more an individual accumulates how-to knowledge, the higher chance of adoption to occur (Rogers, 2003). (c) Principles - knowledge pertains to the “why” of an innovation. Although an adoption may be adopted without this knowledge, the allure for many adopters lies in the principles behind the existence of the innovation in the first place.

Stage 2 (Persuasion) includes the individual taking interest in the innovation and actively seeking related innovation evaluation information. During Persuasion, individuals develop a negative or positive attitude toward the innovation. Rogers (2003) dubbed that this stage is more affective in nature while the Knowledge Stage is more cognitive. As a result, this stage is influenced by social reinforcement from others. Seeking confirmation in this way is an attempt to reduce any doubts about the use or value of the innovation.

Stage 3 (Decision) represents the process of weighing the advantages and disadvantages of taking on the innovation leading to the outcome of accepting or rejecting it. Trying the innovation has a key role during this stage. Rogers (2003) described that innovations are adopted most rapidly when they are put through a trial. Regardless, acceptance of the innovation leads to the next stage while rejection can be active, whereby an individual tries the innovation and deliberately rejects it, or passive, whereby no such contemplation takes place and the innovation is not adopted.

Stage 4 (Implementation) occurs when the individual uses the innovation to varying degrees. Although a decision has been made and this decision might have resulted from a trial run, implementation can still include a degree of uncertainty. Rogers (2003) highlighted that this stage can include input from change agents, those who expose innovations to or across a community. Often, change agents offer technical assistance. Implementation, Rogers stated, is signified by when the innovation “loses its distinctive quality as the separate identity of the new idea disappears” (p. 180).

Finally, Stage 5 (Confirmation) is represented by the continuance of use of the innovation which indicates the completion of the decision-making process. To this end, the Confirmation Stage includes support-seeking behavior on behalf of adopters. In fact, adopters tend to seek confirmation of their decision to adopt an innovation and avoid conflicting messages about it (Rogers, 2003). Individuals may discontinue use of the innovation if a better innovation is available to replace it or they are unsatisfied with its performance.

Adoption is also strongly influenced by attributes of the innovation. Rogers (2003) explained that there are five characteristics of a particular innovation which determine its movement across the preceding 5 stages and its ultimate adoption rate. These include its relative advantage, complexity, compatibility, trialability, and observability. Relative advantage is the degree to which an innovation is deemed better than its substitutes or competitors. Meanwhile, compatibility is the extent to which an innovation is consistent with past experiences, existing values, and current desires of possible adopters. Next, trialability refers to the degree to which an innovation could be tested by people. Finally, observability is the degree to which the result of using an innovation is visible to others. Following Roger's classification, various empirical studies have used these determinants as indicators for adoption behavior. For example for innovations such as online shopping (Vijayasathy, 2004), internet banking (Nor et al., 2010), and mobile payment usage (Kim, Mirusmonov, & Lee, 2010).

Technology Acceptance Model

Similar to DOI, the Technology Acceptance Model (TAM) assumes that potential users of technology make choices based on cost-benefit considerations (Compeau, Higgins, & Huff, 1999). TAM purports that perceived usefulness (PU) and perceived ease of use (PEU) determine technology acceptance and are important for understanding the intention to use a technology. PU represents the belief that the technology in question enhances performance while PEU represents a possible adopter's belief about its ease of use (Davis et al., 1989). The Technology Acceptance Model (TAM) has quantitatively explained certain adoption more robustly, particularly in information system research (Alshare, Grandon, & Miller, 2004).

DOI and TAM are similar because of their overlapping components. DOI's relative advantage construct is similar to PU while its complexity element is representative of PEU. The theories are further bound together because of their inherent belief that user intention to adopt is

determined by the difficulty of use of the technology in question (Rogers, 2003). Critics of TAM argue that, although it is coherent, it lacks the ability to envelop a wide range of technologies (Carter & Belanger, 2005). Lee et al. (2011) argued that the strength of the relationship between TAM and DOI is created by establishing that DOI's five elements (compatibility, complexity, relative advantage, ability to try, and observe) directly impact both PU and PEU from TAM. In Lee et al.'s research on e-learning technology, they concluded that unifying the two theories significantly strengthens the overall explanatory power of adoption behavior, a sentiment shared by others (Oliveira & Martins, 2011).

Criticism of Diffusion of Innovation

Despite being popular models to study adoption of various technologies including renewable energy (Swaminathan & Tarun, 2012), Twitter (Mandy & Clark, 2014), and even new counseling techniques (Murray, 2009), it is worth noting that both models have been partially criticized as limited by proponents of another theory called Social Shaping Theory (SST). Although there are still similarities between DOI/TAM and SST, such as their attention to decision-making behavior and the consequences of adoption, their fundamental perspectives remain distinct (Lievrouw, 2006; Williams & Edge, 1996). TAM and DOI focus primarily on individual characteristics of the adopter and do not consider the broader socio-political factors which may influence decision-making. For example, SST would likely be concerned with the social conditions surrounding the proliferation of technology and less likely to take the position that the quality or usefulness of the technologies are the primary determinants for its adoption. Williams and Edge (1996) explained this in noting that "SST is seen as playing a positive role in integrating natural and social science concerns; in offering a greater understanding of the relationship between scientific excellent, technological innovation, and economic and social well-being..." (p. 865).

SST indeed appears most useful in sociological accounts of adoption which differentiates between different groups and forces that influence development and adoption of technologies, whereas TAM and DOI put emphasis on the individual decision maker, treating all innovations as following the same process. TAM and parts of the DOI typically fall short of this and concentrate on arguably the less complex psychological principles at the individual level with little interest in greater social outcomes. However, it has been noted the 5 stages of the

innovation-decision process is still very useful in analyzing the decision-making of individuals on well-defined technologies (Lyytinent & Damsgaard, 2001). As a result, the SST deserves notice for its important role in understanding how technologies are shaped by various groups and forces, but for the purpose of study, which is to examine how individuals (merchants) decide to adopt Bitcoin or not, DOI has been chosen as applicable and better suited. However, due to the background of Bitcoin, the emergence of social factors contributing to the adoption process was an inherent part of the inductive analysis (described in Chapter 3 – Methodology).

Diffusion of Innovation, Payment Technology, and Bitcoin

Overall, mobile payment and mobile banking have been widely discussed and researched over the past decade (Yuan, Liu, Yao & Liu, 2014; Baptista & Oliveira, 2015). For merchants, the benefits of mobile payments lie in “higher throughput at the point-of-sale (POS); the ability to send real-time messaging to consumers; and the education of service costs through unmanned or remote POS locations” (Dennehy & Sammon, 2015, p. 52). However, many mobile payment options have encountered disappointing adoption rates despite high expectations (Al-Jabri & Sohail, 2012). Nonetheless, this may soon change as innovations gather pace, driven by developments such as the widening availability of near field communications-enabled handsets, growing usage of mobile wallets, and hardware- and app-based innovations from the likes of Square and PayPal. Yuan et al. (2014) identified that the main factors influencing the intention of adopters to continue using innovative mobile payment technology included its perceived usefulness, perceived risk, and the task-technology fit. Most conclusions, however, are biased towards populations that are ‘banked’. That is, the growth of mobile payment technology is discussed through the lens of enhancing the financial activities of those who do not necessarily need another payment option like Bitcoin. Therefore, it is interesting to consider how those who have options at their disposal, like retail merchants, decide to adopt a payment technology that could be deemed superfluous in many ways.

DOI theory is a popular theory that has been used to explain a host of technological adoptions. Of particular relevance, DOI has been applied to the process of adoption for e-commerce technology. For example, Sangwan & Pau (2005) found that the sporadic diffusion of mobile payment terminals in China can be addressed with better mobile phone marketing and operator training. Jamshidi, Hussin, Jafarian, & Wan (2014) studied the factors influencing the

acceptance of a niche Islamic credit card. Inspired by the relatively low adoption rates, they used DOI theory to examine the obstacles preventing its wider acceptance. In addition, Kim, Mirusmonov, & Lee (2010) also examined the intention to use mobile payment by applying a model that considered user-centric factors like m-payment knowledge and personal innovativeness and payment system characteristics (e.g., compatibility, convenience, and mobility). Kim et al. (2010) found that ease-of-use and perceived usefulness were the strongest determinants of intention to use. Of note, they cited that early adopters of mobile payment technology differ from late adopters in that early adopters are more confident in relying on their own mobile payment knowledge while later adopters place more value on convenience. This study particularly shows how early adopters might engage with an innovation at an intellectual level more independently, an endorsement of the importance of the complexity of the Bitcoin concept as a possible barrier to adoption.

In all, DOI has been an effective explanatory framework for understanding the adoptive behavior towards payment technology. Comparatively, Bitcoin has also received much less attention than other payment options, likely for its short time at market. A trend suggests that this is quickly changing. Peer-reviewed research on Bitcoin has accelerated in the past two years. Since its original launch, the amount of published research has nearly tripled each year. There were 8 periodicals in 2010, 21 in 2012, 63 in 2013, and 208 in 2014. This parabolic growth has included a variety of academic disciplines. Some notable work includes exploring the viability of Bitcoin as a competitor for money (Weber, 2014), examining its political alignment with libertarianism (De Filippi, 2014), and even assessing its legality (Boehm & Pesch, 2014).

Motivations for Adoption

Christopher (2014) sought to understand the reasons people still use Bitcoin under such esotericism. She hypothesized that Bitcoin users are motivated in several ways. To begin, some may use Bitcoin as a speculative investment, assuming the risk in its volatile tendencies and overlooking its complexity. In addition, users use Bitcoin because they inherently trust algorithms, speaking to the contrasting lack of trust in central banking institutions. Like Nakamoto predicted, Bitcoin filled an emergent need offered by the 2007 global financial crisis whereby trust had faltered. Another reason for using Bitcoin is that, in places, it extends buying power. Its anonymous nature makes the purchasing of illegal items like guns possible since the

transactions are untraceable. However, its power is still limited to the existing state of adoption. Christopher cites that although some goods are purchasable with Bitcoin, rent is not. Of course, another reason for using Bitcoin is to launder money. In fact, laundering money can be conducted without physical impediments, making it an attractive option to criminals.

The reasons described by Christopher are not without merit, however they only address the appeal of Bitcoin users and do not speak specifically to merchant populations, a prominent group in the proliferation of Bitcoin across the globe.

As an alternative electronic and mobile payment system, Bitcoin has several advantages compared to its competitors which include credit cards, PayPal, Western Union, and M-Pesa (Grinberg, 2011). Coupled with an increasingly slim profit margin in the retail sector, the drastically lower transaction fees that Bitcoin offers can be potentially beneficial to merchants in improving their bottom line and profitability. It opens up new possibilities for micropayments (Shire, 2014). However, despite these potential benefits and possibilities, a majority of merchants are still reluctant to accept Bitcoin as an additional and alternative method to supplement current point-of-sale transactions systems.

The nexus between Bitcoin and payment technology goes beyond Bitcoin's place as just another payment option. A collection of metrics illustrate that Bitcoin is as socially driven as it is financial. It was predicted that seventy percent of mobile payment users will be under the age of 40 by the end of 2015 (Dennehy & Sammon, 2015). Most importantly, the latest estimates indicate that of the population of 7 billion, 4.9 billion had phone subscriptions. Of this number, 79% were in the developing world where the majority of occupants are still 'unbanked'. Meanwhile, it has been reported that 28% of US households are also unbanked or under-banked (FDIC, 2012). A 2009 FDIC study determined that 9 million people did not have a checking or savings account. The most popular financial service purchased by this segment of the population is money orders (Pflaum & Hateley, 2014). These numbers indicate that billions of people are not engaging in the established banking system but they have the technological capability via mobile phones of participating in the economy in ways that could improve their quality of life. It is likely that the motives between banked and unbanked Bitcoin adopters may differ with Westerners attracted for its social or political advantages over its relative advantage over other available payment options (Vigna & Casey, 2015).

Obstacles to Diffusion

Merchant hesitation could be related to the documented and speculated disadvantages of the adoption and spread of Bitcoin use. Depending on the source, Bitcoin can be described as a threat to the need for regulation (Tucker, 2009) or the solution to the politics of regulation (Christopher, 2013). While Bitcoin has been linked to criminal activity such as the purchasing of illegal drugs and money laundering, Christopher (2013) and Brito and Castillo (2013) posit that this behavior is a case of “criminals being criminals” rather than a flaw with Bitcoin itself. Regardless, given that Bitcoin is still arguably in the early stages of adoption, a drawback is that the vast majority of transactions by consumers are unable to be processed using this option. As Kostakis and Giotitsas (2014) write, Bitcoin is mired in a value vacuum:

“Like all objects that have been occasionally used as coin, from gold and cigarettes to the dollar and the euro, the Bitcoin is valuable as long as there are people who agree to use it. However, the Bitcoin itself has no real value. One can smoke cigarettes or use gold in jewelry while the dollar represents a relationship with the Federal Reserve (...) Bitcoin has absolutely zero value in itself. (p. 435).”

This intangible nature also makes it susceptible to a common plight of the digital era – data loss. A hard drive failure or computer virus can cause the loss of a digital wallet and, like with any digital engineering, coding imperfections (i.e. “bugs”) can still emerge to create vulnerabilities that create unique risks (Dorit & Shamir, 2013). Finally, speculative investing contributes to a high degree of price volatility of Bitcoin. Long-term, this may magnify in severity because there is a finite number of Bitcoin available (i.e., to be “mined”). This has led to worries of significant deflation². In the short-term, the value of Bitcoin is unstable and speculators can observe large swings in the value of Bitcoin compared to fiat currency. Owning Bitcoin as an investment is currently not for the faint of heart.

In general, it is fair to state that mobile payments have faced diffusion obstacles. The process of adoption, including the examination of obstacles, has been mostly studied via quantitative methods (Al-Jabri & Sohail, 2012; Dash, Bhusan, & Samal, 2014; Yuan et al., 2014). Using qualitative methods to explore this area, Mallat (2007) investigated the process of mobile payment adoption. Mallat’s focus group work examined the perceived advantages and

² According to Bitcoin Wiki, the last coins should be generated around the year 2140. Then, the number of Bitcoins will remain static at 21 million total.

disadvantages of mobile payment use. Most responses focused on issues of practicality and financial cost. For instance, the advantages of mobile payment systems were its convenience and availability, queue avoidance, and the possibility for remote purchase. Meanwhile, the barriers to adoption included the cost per transaction, the complexity of the payment process, a lack of merchant acceptance, and perceived risks. Risk was associated with a lack of trust. This lack of trust emanated from the perceived threat of someone hacking or stealing their phone, unfavourable payment errors, and compromises to privacy. Mallat (2007) noted that the lack of trust appeared to be remedied by the establishment of trust in the mobile payment service providers like established banks and credit card companies. Ironically, it is this relationship between consumer and third party that has attracted people to Bitcoin. Bitcoin does not have such affiliations. Trust by association, in this regard, is likely derived from the companies (i.e., merchants) that have chosen to accept it.

Prior to the publication spurt of Bitcoin articles, the popular press had been informing the public and pontificating about Bitcoin since its inception. For instance, a 2011 article written by Joshua Davis in *New Yorker* magazine shared the story of its “mysterious” inventor, symbolizing its ascension into public consciousness. Other than Nakamoto’s (2009) original white paper introducing Bitcoin to the world, there had been relatively few reputable sources for potential users to draw upon to make an informed decision for adopting Bitcoin. For the innovators and early adopters, the luxury of evidence-based decision-making has been unavailable, making way for more misinformed and, in turn, speculative commitments.

The economic risk is, indeed, real. In its short history, Bitcoin has been an extremely volatile currency (Sapuric & Kokkinaki, 2014). However, this has not stopped it from accruing users and growing in popularity. Given that Nakamoto himself said “(Bitcoin is) very attractive to the libertarian viewpoint if we can explain it properly. I’m better with code than with words though”, navigating and making sense of the concept of Bitcoin is a challenge for the average person without an education in either economics or software engineering.

Research Questions(s)

To date, no qualitative studies have been conducted on Bitcoin using the innovation-decision process of DOI theory. Few studies, even those deploying quantitative methods, have used DOI to explore adoption. Further, while much of the research focuses on its inherent economic and political

characteristics, there has yet to be an examination of the impressions, perceptions, and attitudes of actual merchants who have weighed the costs and benefits of a seemingly controversial and complex payment alternative. Finally, as Dennehy and Sammon (2015) found, research on payment technology as a whole is heavily over-weighted in favour of consumers over merchants (Dennehy & Sammon, 2015).

Consequently, an opportunity is presented in the lack of understanding in the process of Bitcoin adoption in retail merchants.

As a result of the current state of the peer-reviewed literature on Bitcoin, answers will be sought in response to the following specific research questions.

- 1) How do retail merchants experience the decision-making process of adopting Bitcoin as a new payment method?
- 2) How do Bitcoin experts and merchant adopters perceive Bitcoin to differ from other payment innovations?

Methodology

A qualitative design was used to answer the research questions for this study. Qualitative research is characterized by its objectives, which include the ambition to understand some part of social life, and its methods, which aim to produce data out of words, not numbers (Bricki, 2007). In essence, qualitative research is well suited for developing explanations of social phenomena (Denzin & Lincoln, 2005). In this instance, the social phenomena of Bitcoin adoption was the focal point of this approach.

In-depth interviews were chosen as an appropriate data collection method because they allow for intensive interaction with people who have intimate experiences with the phenomena in question and can capture rich perspectives about an experience due to its focus on relatively few people. Interviews generate detailed information and can explore unexplored issues or phenomena in depth (Boyce & Neal, 2006). Because this study did not focus on the degree, quantity, or speed of adoption and, instead, sought to understand the decision-making process of the process of adoption, qualitative methods, in particular in-depth interviews were selected as best suited for the purpose of this research.

Participants

Merchants who have implemented Bitcoin in their business, whether this business was conducted primarily online or offline, were recruited. This group was selected as the unit of analysis because, to have adopted Bitcoin as part of their business practice, they had already completed the decision-making process. In addition, it can be argued that merchants would have a deeper knowledge about Bitcoin as the decision to adopt would require a variety of unique considerations that customers are unlikely to face. This includes understanding the transaction costs, the general technology, and contact with change agents like point-of-sale representatives. These merchant participants could be loosely categorized as innovators or early adopters (Rogers, 2003). In order to meet data trustworthiness in qualitative interviewing (Shenton, 2004), 10 merchant participants were recruited.

Secondly, for triangulation purposes, four Bitcoin experts were included as participants. These experts were recruited based on their experience working with Bitcoin merchant adoption. Expert status was determined based on a minimum of 2 years of experience directly working with Bitcoin as a part of their occupation and their self-reported early adoption of Bitcoin for

business and/or personal use. A demographic table of all participants can be found in Appendix D.

Sampling and Recruitment

Study participants were recruited using purposeful sampling. Purposive sampling is a strategic, non-random form of selection that is aligned with a study's objectives (Given, 2008). Purposive sampling is common in qualitative research. In particular, a variation of purposive sampling, theory-guided sampling was implemented since recruitment was based on finding individuals who had adopted Bitcoin for their business (hence moving from the decision-making stage (Stage 3) and were in either the implementation (Stage 4) or confirmation stage (Stage 5) of their engagement with this technology at the time of data collection.

Merchants were recruited after conducting a web search (via www.coinmap.org) for companies that offer Bitcoin as a payment option. Each company was contacted via e-mail. The primary inclusion criteria for participation was that interviewees must have been the primary decision-maker responsible for adopting Bitcoin for their business. Meanwhile, expert interviewees were recruited via Bitcoin discussion groups.

After fulfilling the inclusion criteria and agreeing to participate, a copy of the interview guide was sent to prospective participants and an invitation to participate in an online research interview via Skype was extended. When accepted, an interview time was scheduled and the interview performed at a mutually convenient time. Consent was obtained via email reply.

Data Collection

In-depth interviews of approximately 45 to 60 minutes were conducted with retail merchants and Bitcoin experts. Each interview followed a semi-structured interview guide. The merchant guide (Appendix B) included several main questions which gathered relevant contextual information for each participant and then explored the stages of decision-making for the adoption of innovative technology. The expert interview guide (Appendix C) gathered perspectives about the history, adoptive appeal, current success, and the possible future for Bitcoin. Both guides were semi-structured in that they allowed the interviewer to ask a range of follow-up and probing questions in response to the answers provided to the core main questions (Rubin & Rubin, 2012).

The interview guide was associated with the concepts described in the theoretical framework through its creation and categorization of questions as they pertain to the 5 stages of

the innovation-decision process. Each participant was able to discuss how they perceived the costs and benefits of Bitcoin adoption (e.g., Did you ever have doubts about using Bitcoin? What were the key considerations for making your decision?). In order to understand how merchants experienced the process of adoption, Research Question #1, the Merchant Interview Guide was explicitly organized by the 5 stages of the innovation-decision process. Asking questions of Bitcoin merchants in the sequential order of these 5 stages created the opportunity for a more coherent account of the experience of Bitcoin adoption. Lastly, to answer Research Question #2, both merchants and experts were asked about how Bitcoin compared to other payment systems.

Data Analysis

The role of the researcher in this process of data analysis is to understand the possibilities that can be revealed by the data. Thematic analysis was used to help interpret the transcribed text, and the human actions and situations that were observed. According to Mills, Durepos, & Wiebe (2010), thematic analysis is an analytical approach used to help create meaning from qualitative data. Its purpose can be to create a means of 1) seeing, 2) finding relationships, 3) analyzing, 4) observing, and 5) quantifying qualitative data (Boyatzis, 1998). It is also a tactic for keeping data well-organized and well-prepared for interpretation.

Thematic analysis is characterized by a process called coding and the pursuit of identifying recurring themes or relationships within text (Mills et al., 2010). A code is defined as “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (p. 3, Saldana, 2009). Meanwhile, a theme is explained as “a meaningful essence that runs through the data... It is the basic topic that the narrative is about...” (p. 727, Morse, 2008). This process can embody deductive or inductive reasoning. Deductive approaches to thematic analysis entail the use of prescribed categories in an a priori fashion derived from known theory (e.g., Diffusion of Innovation Theory) or from the topics covered by interview questions. By contrast, an inductive approach can be taken through thematic analysis by allowing themes to emerge from the data. Data analysis for this study dualistically examined the data deductively through an a priori category structure based on its theoretical framework, yet remained open to the inductive emergence of new themes. Of note, an important advantage of taking a deductive approach using a priori themes is to enhance the possibility of replication (Mills et al., 2010).

As described in Braun and Clarke (2006), there are six phases of conducting thematic analysis, which consist of (1) becoming familiar with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and finally, (6) producing the research thesis. In Phase 1 of thematic analysis, after having interviews transcribed, all interview transcripts were read several times to achieve a richer understanding of the collective data set. Successive readings allowed for deeper familiarization with the text which assisted in identifying nuance within and across interviews. This familiarization helps prepare the second phase. In Phase 2, using Microsoft Word software, the researcher read the transcripts to generate initial codes (i.e., open codes) and begin to identify noteworthy statements. According to Lewins, Taylor & Gibbs (2005), codes can be applied to a type of state a person is in (e.g., indecisive), an event (e.g., having Bitcoin stolen), behavior (e.g., first Bitcoin purchase), an activity (e.g., attending a Bitcoin lecture), relationships (e.g., brother uses Bitcoin) or collections of meanings (e.g., reflections and interpretations on the course of one's actions). In Phases 3 and 4, using Microsoft Excel software, the researcher clustered these significant statements into themes and then iteratively reviewed them by referring back to the initial transcripts to identify additional instances in the data. In Phase 5, the researcher further defined and named the themes by identifying recurrences, reflecting on common meanings, and identifying emergent relationships among the open codes (i.e., creating axial codes). Finally, in Phase 6, the researcher produced a report by presenting a final synthesis and explanation of the themes that emerged from the narrative data (Braun & Clarke, 2006).

Supporting evidence used to make inferences and conclusions pertaining to this study's research questions began by selecting coded citations from the in-depth interviews that represented themes or tendencies that occurred across the data set. See Table 1 for a summary of what data qualified for the a priori, theory-led categories of the stages of the innovation-decision process.

Table 1

Criteria for Data Classification of 5 Stages of the Innovation-Decision Process

Stage	Stage manifestation criteria
<i>Knowledge</i>	Descriptions of initial introduction to, and/or interaction with, Bitcoin.
<i>Persuasion</i>	Descriptions of reflections about the benefits and/or risks of Bitcoin.

<i>Decision</i>	Descriptions of cognitive deliberation over deciding to use Bitcoin.
<i>Implementation</i>	Descriptions of Bitcoin perceptions post-decision.
<i>Confirmation</i>	Descriptions of experiences that support or do not support the value of Bitcoin after implementation.

In the Results chapter, evidence will be presented as a result of the deductive analysis using innovation-decision process. Then, a series of emergent themes will be described which are also linked to the study's original research questions.

Trustworthiness

According to Shenton (2004), although validity and reliability are quantitative concepts that are often set upon qualitative research by positivists, there are measures a researcher can take to ensure the integrity of the research process and the study results and interpretation. Shenton identifies that credibility, transferability, and dependability are the major criteria for trustworthy qualitative research. Informed by Shenton, below are the measures taken to attempt to establish these elements for this research.

Credibility. Credibility is concerned with how aligned the research findings are with reality. In order to establish credibility, this study 1) used research methods (i.e., in-depth interviews) and an analytical approach (i.e., thematic analysis) that have been previously established in the literature, 2) was conducted with a researcher familiar with Bitcoin technology, 3) asked clarifying questions to ensure participant responses were consistent and, 4) provides thick descriptions of the phenomenon in question by presenting excerpts that provide a sense of context.

Transferability. Transferability is the qualitative equivalent of generalizability in quantitative research. Although the intention of qualitative research is not to generalize results, results must still be understood within or across the context it is investigating (e.g., Bitcoin using merchants). In an attempt to establish transferability, a detailed description of the background of the emergence and growth of Bitcoin technology has been established. This helps set the parameters of the context in which the phenomenon of adoption has been examined.

Dependability. For a qualitative study to be dependable, it must be described in-depth and with adequate enough detail that it can achieve a form of transparency and enable the reader to understand it enough to assess its procedures, findings, and interpretations. Dependability has

been sought through a rich description of the methods used to collect the data to answer the research questions for this study.

Ethical Considerations

Informed consent. During the initial email exchange between the potential participant and researcher, the prospective participant had the opportunity to ask questions to ensure that they understands the aim of the study. At this time the researcher obtained written consent from the candidate to participate in the study. The researcher informed the potential participant that the study was voluntary and that at any time during the research process he could withdraw. Next, the researcher reviewed the consent process and provided the opportunity to give consent as well as ask further questions.

Confidentiality. Once the participant met the inclusion criteria and agreed to take part in the study, the researcher explained their right to confidentiality. The researcher protected privacy by using initials along with an assigned number to identify each participant. Thus, the participants' information will be safe and will not be released to any person or organization without their consent. The researcher and research advisor will be the only individuals who will have access to the data unless the researcher committee members need to review the collected information.

Findings

Interviews with Bitcoin merchants and Bitcoin experts contributed to a data set that allowed for a) the descriptive account of the process of Bitcoin adoption, and b) an interpretive account of the factors influencing Bitcoin adoption. Both of these perspectives will be presented in this chapter. To begin, the process of adoption will be displayed by deductively applying the Diffusion of Innovation Theory framework. Each stage of the DOI theory will constitute a data category, important for determining “what” is in the data (Morse, 2008). This will be followed by the presentation of themes that inductively emerged from interviews. These themes attempt to capture the essence or meaning of the Bitcoin adoption experience. The latter is a result of attempting to make sense of adoption beyond the pre-determined innovation-decision process framework.

The Innovation-Decision Process

To begin, retail merchant participants were asked to account for their personal process of taking interest in, and consequent adoption of Bitcoin as a payment option for their business. As per the interview guide, each interviewee was asked questions directly linked to the 5 stages of innovation-decision (Knowledge, Persuasion, Decision, Implementation, and Confirmation). This section is organized by each stage of adoption and describes details of how merchants experience them. Table 2 shows all *a priori* categories and sub-categories included in questions where, for transparency, representative exemplary quotes are showcased. Stage by stage participant perceptions of the process of adoption follow.

Table 2

Coding exemplars of stages of the innovation-decision process

Category	Sub-category	Coded exemplar
Knowledge	<i>Awareness</i>	<i>“There was a mention in the magazine of it.”</i>
	<i>How-to</i>	<i>“I learned about Bitcoin in 2013 (or possibly 2012) from a friend. I was attracted to it because of its ability to remove many of the costs and inefficiencies of accepting payments from customers. In particular, customers located in other countries.”</i>
	<i>Principles</i>	<i>“I discovered the Satoshi white paper, I realized that this is going to be a revolution, and started to get deep in the ecosystem.”</i>
Persuasion	<i>Attitude formation</i>	<i>“After reading the white paper I started to understand the decentralization concept and everything changed in my mind.”</i>
	<i>Sources of uncertainty</i>	<i>“I had doubts with bitcoin when Austrian colleagues of mine disrespectfully attacked the technology...”</i>
	<i>Sources of reinforcement</i>	<i>“Also, there is no middle agent involved except the address being transferred, which I think is much more effective than the normal transfer”</i>
Decision	<i>Trial</i>	<i>“For example BitPay... I just wanted to test it out.”</i>
	<i>Change agent</i>	<i>“Bitstraat approached us, I met with them briefly, and we implemented the payment system”</i>
	<i>Independent research</i>	<i>“I finally got around to reading Satoshi's white paper”</i>
	<i>Market demand</i>	<i>“...a relatively big group of regular applicants like to pay with them”</i>
Implementation	<i>Positive</i>	<i>“It seems to work really well for Africa trade.”</i>
	<i>Negative</i>	<i>“The process of accepting and getting settlements are still not being addressed well by the current providers.”</i>
Confirmation	<i>Confirmed</i>	<i>“I only get a handful of customers using it per month.”</i>
	<i>Unconfirmed</i>	<i>“The only missing piece at this point is mass consumer adoption.”</i>

Knowledge Stage

The Knowledge Stage is fundamental to any decision-making process. In fact, an “incomplete” knowledge stage whereby potential adopters become exposed to a technology and engage no further, is a significant barrier to the diffusion process (Neo & Calvert, 2012). In this study, merchant adopters first heard about Bitcoin from a variety of sources. However, a common trend among their responses pertained to the nature of the sources. 8 of 10 participants alluded to their introduction to Bitcoin resulting from communication with the tech community. Interactions occurred via tech websites or online forums, tech magazines (e.g., Wired), friends, and customers.

For instance, Merchant C, an events agency manager using Bitcoin for online transactions, explained that his introduction came from print media. Meanwhile, Merchant E, a guitar teacher, read about it online on a popular technology blog in his spare time. Other participants described their first encounter as a result of interpersonal encounters. Merchant B, for example, heard about it through his customers, whereas Merchant I cited exposure via a conversation with a friend.

Merchant F, an enthusiastic Bitcoin supporter, describes how knowledge stage transitioned to persuasion as a result of his exposure to a key online document, the Satoshi white paper:

“As any other technology enthusiast, I spend hours reading forums and technological breakthroughs. So in any given moment, I read something about Bitcoin. I didn’t pay much attention at first. That was around mid-2012. Then, when I discovered the Satoshi white paper, I realized that this is going to be a revolution, and started to get deep in the ecosystem.”

It was clear that participants were unified by their close connections to, or involvement in, the technology community. This came in the form of people in their social circle such as friends, customers of their businesses, or through the tech media. These findings were consistent with Rogers (2003) who identified that diffusion can and will occur across a variety of communication channels. Interpersonal communication between friends and with customers represents one channel while mass media represent another. Rogers also postulated that mass media, a cosmopolite channel, is the most significant channel in the Knowledge Stage. Cosmopolite sources are defined by being external to a person’s social system as an outside

source of information. It was clear that the media, including the Satoshi white paper, played a heavily influential role in the early stages of adoption.

Furthermore, the three types of knowledge (awareness, how-to, and principle) were present in the data set. That is, by default, all participants became aware of Bitcoin and learned about how it worked. Most participants showed an interest in principles knowledge, the “why” behind Bitcoin. In fact, as will be examined later in the chapter, the propensity of many participants to seek principles knowledge may have links to the recognition that Bitcoin is a unique payment option beyond its functionality (or “how to” knowledge).

These findings are logical due to the fact that communication, technology, and the Internet are in a symbiotic relationship. Technologically motivated individuals, such as Bitcoin adopters, are likely to consume significant amounts of information online. In addition, given the well-documented history of Bitcoin and the availability of the landmark white paper by its inventor, it could be argued that principles-knowledge was more accessible than in the case of other innovations.

Persuasion Stage

The stage that follows Knowledge is Persuasion. This stage is represented by the formation of an attitude towards the innovation. Although this attitude may not necessarily be the lynchpin for adoption or rejection, Rogers (2003) stated that it has an important role because it signifies a movement from an intellectual relationship with the innovation to a more emotional one. After their introduction through their ties with the technology community, merchant participants showed that they spent time researching Bitcoin and considering its potential place in their business and even personally as consumers.

Attitude formation – The four attitudes that participants exhibited included *curiosity, enthusiasm, skepticism, and indifference*. For example, Merchant A revealed how he started out confused about the concept of Bitcoin but grew curious during this stage for personal reasons before adopting it for use in his hostel business.

“I was confused about how it worked, but when I read about it a little bit I could understand the concept and I thought it made sense to have this type of currency available. My initial interest was personal. I bought some BitCoin as well. I liked the concept, and that is not tied to a government. I do not mean I am anti-government, but it's fascinating how this came into existence on its own.”

Meanwhile, Merchant H's attitude was highly enthusiastic, and he became more passionate about the technology after he did more research on it. On the other hand, skepticism was exhibited by Merchant E. Although initially intrigued by the concept during the Knowledge stage, he shared that he read several negative portrayals of the technology online, which ironically made him more interested in it. Merchant J was a curious skeptic, finding value but not feeling confident about adopting Bitcoin for either business or personal use, citing the limited supply of Bitcoin as a value proposition.

Sources of uncertainty – Participants provided further depth into their contemplative process. 5 of the 10 merchants shared at least one doubt about the use of Bitcoin as a payment option. Merchant A described his doubts as they originated from his initial personal use, pointing out how he felt it was unnecessary to have additional payment options on top of cash and credit cards. Merchant B's doubts focused on the potential worry of currency and volatility risk, but overcame this by hedging it with a preventative approach of converting bitcoins immediately into his local currency.

Merchant I showed uncertainty, even as an economics instructor:

"I was skeptical, because I teach Praxeology (Austrian Economics) for a living, and I know that money cannot just be created by decree, or even democratically, but it must evolve out of a good that a had a previous use-value."

Merchant D identified the most significant barrier to the succession from the Persuasion Stage to the Decision Stage. He described his initial lack of knowledge and his worry about the efficacy of the general concept of cryptocurrency:

"At first, I didn't fully understand the cryptography behind it all. I have lost a little money because of a hard drive failure. Now I don't save my Bitcoin balance. I spend it soon after receiving it."

Merchant D's insight is an example of the level of perceived complexity of Bitcoin. Merchant D, a hostel owner, shared light on how early adopters of Bitcoin may be technologically savvy enough to understand Bitcoin to begin. Rogers (2003) stated that complexity is negatively correlated with adoption.

Sources of reinforcement – As Merchant E, A, and B described above, there were specific sources of information that contributed to the uncertainty that led to a negative attitude toward Bitcoin adoption. Similarly, there were several reinforcing qualities cited. In fact, all

participants cited a clear reinforcing factor that contributed to their attitude formation. Merchant C cited his initial interest was strictly for financial gain.

Meanwhile, Merchant D, after conducting his research on Bitcoin, saw it as an opportunity to connect to this customer base and forgo the operational problems he experienced with other payment alternatives:

“Credit cards and credit card merchant accounts frustrate me to no end. It's impossible to reconcile credit card transactions with my bank statement because of bank imposed delays that are inexcusable in this day in age. Likewise, chargebacks and credit card fraud are rampant and banks have done little to get to the root of the problem. Instead they just pass the costs for these problems to cardholders and merchants, and to me this is unacceptable ... Finally, as a small business owner I'm continually looking for ways to attract new demographics of customers. Bitcoin has the potential to attract new customers to my business and I like that.”

After showing doubt, even with a strong educational background in economics, Merchant I became fascinated with the process of Bitcoin mining. This triggered his eventual decision to adopt the technology.

“The mining part was what hooked me up and the possibilities of earning the Bitcoin enticed me to go into this so that I can earn extra passive income. Moreover, I was really interested to understand more of how the Bitcoin's blockchain technology works as I am always curious about new technologies.”

Rogers (2003) alluded to the value of an innovations relative advantage over alternatives as a key source in its diffusion. Merchant D noted fraud protection as one advantage. The most popular relative advantages of Bitcoin described by participants included its low cost and speed. Four merchants alluded to speed and low fees as an important feature. Of note, although Merchant D developed a favourable attitude toward Bitcoin, he earlier noted a struggle with its complexity. Because he tried it, he was able to understand it more clearly, showing the important relationship between Rogers' different attributes of innovations and adoption. In fact, he wrote that the decision-making was “an uncertainty reduction process” (p. 232). Indeed, those who showed uncertainty initially benefited greatly from experimentation either on their own personally or through trialing a Bitcoin payment system.

The persuasion stage represented a new level of depth in the merchant participant's engagement with Bitcoin. Research deepened and the adoption experience became richer in information. In addition, participants described more interpersonal interactions during Persuasion. It appeared that although mass-media played a key role in their initial exposure, specific details about Bitcoin were often drawn from peers or colleagues. This observation confirmed the research which suggests people tend to seek the opinions and evaluations from valued people around them after initial exposure (Sherry, 1997; Hammed, Counsell, & Swift, 2012).

In general, these experiences signified a deeper investment in learning about Bitcoin and led to attitude formation. Above all, the persuasion stage did not lead to the rejection of Bitcoin for these participants. Although there was indifference and doubt, Bitcoin had a variety of qualities which kept the attention of these merchants and, in all instances, led to some form of trial or experimentation. It was the process of increasing knowledge about the technology through information gathering and interpersonal interactions that led to a decision being made.

Decision Stage

Since all participants ended up implementing Bitcoin, they all eventually formed favorable attitudes towards it during the Persuasion Stage. This section includes participant reflections on the steps or key events that led to their decision to use Bitcoin in their respective businesses. The Decision Stage was influenced by four main factors. These were the key factors in making the decision to implement Bitcoin and included trialing, change agents, research, and demand.

Trialing – Testing the innovation out can lead to an innovation being adopted more rapidly. After their introduction and subsequent research and consideration of Bitcoin use, participants then experimented. For example, Merchant E represented a fairly typical scenario. Below, he describes how he embraced using Bitcoin in his day-to-day business and took responsibility for any issues that emerged in this early stage:

“As someone that's somewhat confident with using new technology I would say it's fairly easy to use. Maybe not so easy to secure. The infrastructure is not as good as with fiat currency. But payment processors are getting better. For example BitPay... I just wanted to test it out. Some customers wanted to try it, I think for the novelty factor. If something went wrong I would refund the customer in fiat money if necessary.”

Change agents – Merchant A’s decision to adopt Bitcoin resulted from dealings with a payment system representative. After testing it out during the sales process, he integrated Bitcoin into his business as well, attributing his decision to the riskless and cost-free process of accepting the new payment option, no transaction fees and commissions, and being able to receive bitcoin payments converted into local currency within the same day. The sales representative minimized a financial barrier for Merchant A, reducing his deliberation over adoption. Experimentation was also instrumental in Merchant E’s decision. In the process, he learned one valuable benefit to Bitcoin use in retail.

“I started with some small transactions on Reddit. Just tipping small amounts back and forth. When I saw how easy it was I set up some donation addresses. When I learned about Bitpay I used them to set up a payment processor. (A key consideration was) I wanted to test the technology and support the ecosystem. To have more services that can be bought with bitcoin. (Most importantly, transactions were) very fast. The idea of money not transferring through a 3rd party (except in the case of using Bitpay).”

Independent research – Although it was prominent among participant responses, experimentation was not the only contributor to Bitcoin adoption. Merchant F shared that his deliberation was short and his decision a relatively easy one. After conducting due diligence and forming a positive attitude, he decided promptly without much experimentation:

“The decision was fast. I started to accept Bitcoin in my business immediately after I learned enough about it. It’s so easy to do, that I had no conflicts. Moreover, I started to accept Bitcoin payments even before the payment processors came to existence. I took the payments directly to my personal wallet. Now I work with a payment processor (BitPagos) that make things even easier. My decision to take Bitcoin was more personal than financial. I am a true believer, so I never hesitated. Anyway, the ecosystem is still so small that it has no financial impact on my business. I receive no more than three Bitcoin payments a week. So I don’t have to worry about liquidity. I just keep the bitcoins. I hardly change them for fiat. I use them as a kind of savings.”

Merchant C, a travel agency owner, had a similar experience to Merchant F. Two merchants indicated that the most important factor in their decision to adopt Bitcoin was reading the original Satoshi white paper. In his case, Merchant C’s experience included experimentation

after the review of key Bitcoin literature (the Satoshi white paper). Merchant F said this about this same white paper:

“I first didn’t give much importance to the issue. I thought it was just another digital currency as I knew E-gold or the like. Then, after reading the white paper I started to understand the decentralization concept and everything changed in my mind.”

Market demand – Meanwhile, Merchant B cited a completely different decision-making factor. After conducting organized research, his decision to accept Bitcoin was made based on customer demand.

“After all the requests we received to accept Bitcoins, we did some research if there will be enough transactions with Bitcoins when we introduce them. It appeared that a relatively big group of regular applicants like to pay with them. So we decided to accept them. Between this decision and the implementation of the currency there was a timespan of one month. We launched the currency on the 5th of November 2013 in the Netherlands, Germany and Austria. Six days later it was also possible to pay for your pizza, burgers or other take away food with Bitcoins at the food ordering sites of Belgium, France, The United Kingdom and Switzerland. It gave more options to our customers and broaden our customer reach in other segments and a relatively big group of regular consumers like to pay with them.”

Merchant I listed his top two reasons to be “potential customers” and “gaining market advantage” as key elements to his adoption. At the same time, Merchant B’s decision was much more deliberate and multi-factorial than the other participants. In fact, Bitcoin appeared at the right time and under the right conditions for him, citing frustration with current financial systems, gaining access to a new demographic of customers, and the lower transaction costs.

Recent research suggests that increasing trialability is crucial to decision-making during the adoption process (Hayes, Eljz, Dadich, Fitzgerald, & Sloan, 2015). While these findings strongly support the value of testing, concentrated and thorough information in the form of the Satoshi white paper was close in importance. It is possible that the Satoshi paper, a primary source of information during the research process, allows for an unfiltered analysis of the value of Bitcoin. Although this white paper is certainly technical, these merchant adopters, by all accounts, are technical themselves. As a result, it served an important catalyst to adopt Bitcoin

even with little or no experimentation on behalf of some participants. However, earlier adopters, especially innovators, tend to take more risks in adoption (Rogers, 2003).

Implementation

The implementation stage of DOI is when the innovation is used rather than simply trialed. After the decision to adopt Bitcoin had been made, participants shared a variety of differing perceptions of the experience of implementation. This stage is signified by the integration of an innovation into daily merchant practices. Overall, the reflections on implementation appeared mixed with two participants taking a neutral stance on the success of its implementation. Each other interviewee identified a pro and con for its use.

Positive experiences – 7 of 10 participants identified a positive element of Bitcoin implementation in their business. Reasons for positive experiences included the extension of customer bases and the circumvention of banks. Merchant B, for instance, was also satisfied with the use of Bitcoin in his online restaurant business. He described that, “There has been a great response to the implementation of bitcoins not only by existing customers but also other bitcoin users who are now exposed to thousands of restaurants across Europe”. This sentiment was similarly shared by Merchant F:

“It is almost three years now. I’ve always had satisfactory experiences. Even with Bitcoin going down I never had a transactional problem at all. I cannot say the same with credit cards and bank accounts. Every Bitcoin transaction is a positive experience. The fact that you can see the payment coming in the same moment the customer sends it, it’s almost like a science fiction movie experience.”

Of all participants, Merchant C showed the most enthused reflection on Bitcoin implementation stating, “I have been using it since the day after I read the white paper. So far, the experience has been probably the most amazing roller coaster ride I have ever been on”. Upon further elaboration, implementation revealed several key advantages for adopting Bitcoin. He further described a clear situation where Bitcoin solves a common problem for his business.

“I think the most positive part about my experience is the ease of use. With our business we are sometimes required to wire money internationally to pay for an apartment or villa rental. Those transactions take 10 minutes to enter into the bank's website, another 5 days to process and cost \$35. Not with Bitcoin.”

The longest user of Bitcoin, Merchant J, a Bitcoin ATM representative, shared the most enthusiasm for using Bitcoin in commerce, calling Bitcoin the “greatest technology put forth in recent years” and sharing that he has made significant financial gain from providing the service of affordable bitcoins to people without a bank account.

It was clear that there were direct impacts on the day-to-day operations of the merchant’s business due to the speed with which normal transactions could take place, a product of the absence of banks. Merchant D articulated saying, “I mostly like Bitcoin because I can have a direct financial transaction with my customer without fees, interference, or delays from banks”.

Implementation crystalized the relative advantage of Bitcoin. Although some participants experienced more Bitcoin transactions than others, 7 of 10 noted either the speed and cost advantages of this innovation.

Negative experiences – At the same time, the implementation stage was not without obstacles and frustrations. The more interactions participants had with Bitcoin, the more insight they developed into the opinions and experiences of others they digested during the knowledge and persuasion stages. For example, Merchant A identified one of Bitcoin’s current pitfalls in the following account:

“There are constantly people trying to scam others, which I think is a big turn off to many potential new Bitcoiners. Companies like Coinbase are bridging that gap and doing a really good job at it, so I think the adoption gap for the typical consumer is narrowing quickly.”

Merchant D noted that including Bitcoin as a payment option has attracted new customers as current Bitcoin enthusiasts look for merchants with which to do business. However, adopting Bitcoin at this early stage revealed a second important negative quality of Bitcoin. Both Merchant D and Merchant F noted it, respectively:

“Negative experiences are the lost Bitcoin (about \$40) and the fact less people are using Bitcoin for everyday transactions. It seems like everyone is now holding onto it and speculating. I’m only interested in it as currency. The only negative experience is seeing the bitcoin price going down and down (laughs). But this is just a correction of the last bubble occurred on November 2013.”

This speculation is unnerving for businesses. Merchant B learned to circumvent this problem. “Bitcoins take along a big currency risk. It doesn’t have to be bad, as long as [we’re] taking the right prevention measures. We don’t speculate on rates, we change bitcoins directly to euros.”

Finally, one participant, Merchant J, became tangled in the complexity of Bitcoin in his early stages of implementation. Although a proponent of its adoption 5 years later, he had this early experience:

“Negatively, it was rather easy once to accidentally send someone a large amount of coins by mistake, and even though I kind of knew the person, I never got my bitcoins back. Since the ledger is public, I was able to see the moment he spent them.”

An interesting element of Merchant J’s frustrating error was that it led to an observation of one of the key advantages Bitcoin holds over other alternatives – the public ledger.

Due to the current lack of wide scale adoption, two participants noted that they were underwhelmed by the role it has in the day-to-day operations of their business after implementation. For instance, Merchant I said, “I’ve been using for around 3 months. Volume of transaction is low though. So it is not easy to say yet”, hesitant to determine Bitcoin as a success for his restaurant. At this stage of Bitcoin use, the volatility of its value, while noted by three of the ten participants, and scam threats (noted by 3 of 10) were not a strong deterrent to rejecting adoption after implementation.

Confirmation

At the Confirmation Stage, the decision to adopt has been made and this decision is further galvanized during confirmation. This stage is also reflected by identifying the supporting evidence for their ongoing use of the innovation (Rogers, 2003). Overall, the positive attitudes maintained during the implementation stage drive continued use although new experiences. Alternatively, a better innovation may arise that could usurp the original adoption. Findings suggest that 7 of 10 participants positively reinforced their decision to adopt Bitcoin. Although no participant discontinued their Bitcoin system, three participants displayed a skeptical or cautious attitude towards continuance.

Confirmed – Overall, the sentiment toward Bitcoin was favourable. In fact, some participants, like Merchant C, maintained a consistent level of enthusiasm towards Bitcoin since their initial introduction. Merchant C was such a proponent of Bitcoin that he considered himself a type of advocate or ambassador for the technology.

“I have no complaints whatsoever. My only wish would be that everyone would pay in Bitcoin and all of our vendors would accept Bitcoin. We will continue to embrace it as a payment option and will continue to promote its usage. We are going to start running Bitcoin only discounts going into the end of this year. My hope is that we can significantly increase the amount of business volume we conduct in Bitcoin. So, the future looks bright. The only missing piece at this point is mass consumer adoption. We do our part to increase that as much as possible.”

Merchant B was much more pragmatic than Merchant C, who assumed that bitcoin usage among his customers will continue to increase in line with the growth of the business. He also cited customer demand as a driving factor for adoption, and expressed enthusiasm in being an innovative early adopter. Merchant B’s attitude was similar to Merchant I’s. Merchant I shared how Bitcoin had been validated as a viable payment option. He said, “From my point of view, it is just another way of payment and if it takes off we would hope that we contribute to the success of Bitcoin adoption in the country.”

Finally, Merchant F began his relationship with Bitcoin in a state of indifference. After conducting additional research after his initial encounter with the innovation, his attitude became more positive, growing in strength. This is evident in the broad perspective he takes on the role of Bitcoin going forward:

“I feel really good doing it. I feel kind of forerunner. My club was the first of its type to accept Bitcoin payments, and that is a marketing advantage too. I had a lot of interviews by the media because of that.”

It appeared that he wished to leverage the leadership status garnered through his encounters of the media to grow his business. Similar to Merchant F, Merchant J was zealous over the future of Bitcoin with the following attitude:

“I will continue to use Bitcoin moving forward. I feel confident that Bitcoin is the most radical of technologies, aimed at scooping up fiat leak (wasteful money and value created out of nowhere) unlike any other technology before it.”

Unconfirmed— Meanwhile, three participants appeared less committed to Bitcoin. Although all were currently using it, their loyalty could be questioned. For example, Merchant A maintained his indifference across all stages of adoption, staying emotionally divested from any

symbolism that Bitcoin could exhibit as a revolutionary innovation. In understated fashion, he said:

“If nothing changes with our Bitstraat agreement, we will continue to use their system to accept Bitcoin payments. If they start charging money for it, we will stop accepting Bitcoin as a payment option.”

Another unconfirmed participant, Merchant E, still shared doubts after implementation. His reflection on Bitcoin maintained a degree of skepticism throughout, evident below in the following account:

“I think it's still very early days. Most people are paying for the novelty of buying something with bitcoin. I only get a handful of customers using it per month. As a payment method it may not be significantly easier from normal methods of payment for it to achieve mainstream adoption.”

Finally, Merchant G, was the least convinced of the use of Bitcoin in his business going forward. Perhaps the nature of his work was a determining factor. Regardless, he represented a hopeful curiosity toward Bitcoin saying, “Since I'm a research lab, I don't know what it will be. I know that bitcoin is going to be useful for something, and I want to be the first to find out for what”.

Although no merchant appeared to be near discontinuance of Bitcoin in the business activities, attitudes varied. The process of Bitcoin adoption for these ten merchants followed similar paths. However, due to a variety of factors which could include the nature of their business (e.g., offline vs. online), the biases inherent in the media during the knowledge stage, and the quality of the payment system selected for implementation, each participant followed their own path to adoption.

Emergent Themes

Although the above offer exemplars of *how* merchant Bitcoin adopters experience decision-making process, there is a deeper interpretive level available to explain some of the deeper reasons as to *why* they made their decisions (Braun & Clark, 2006). These reasons are expressed in themes (Table 3). These themes reflect the most prevalent attitudes toward Bitcoin adoption, including triangulated insights offered by Bitcoin experts, and are reflective of the general perceptions of the participants as a collective.

Table 3

Final coding for thematic analysis

Main Theme	Sub-themes
Financial advantage	Direct advantage Indirect advantage
More than currency	Technological revolution Social revolution

Theme 1 – Financial advantage

The first emergent theme which formed reoccurring motive for merchants to adopt Bitcoin for business use was financial advantage. The perceptions of the adoption process were frequently supported by the monetary advantages gained through the features of Bitcoin including the avoidance of banks and third parties, the reduction in transaction costs, and even the accumulation of new customers.

Direct advantage – Accordingly, as a Bitcoin payment processing manager, Expert A provided an astute reflection into a few important advantages that early adopters benefit from. He best summarized the advantages experienced by the merchants in the following:

“It opens up an opportunity to reach international companies worldwide with only 1 payment system. Bitcoin payments have no transactions fees. In the US, 80% of the people pay with credit cards and PayPal and get charged at least 3% fees. Bitcoin provides new revenue to merchants, as bitcoiners will spend their bitcoin at another merchant if you do not accept it (this is from our statistics). Lastly there are no chargebacks in Bitcoin; in the US on average a merchant calculates 1 to 2% loss per year on chargebacks and fraud. Due the irreversible nature of a bitcoin transaction, it means that when the customer paid, the merchant will not have to worry about a chargeback and saves money.”

Among others, Barber et al. (2012) extolled the advantage of irreversible transactions as well. Once a transaction is registered in the blockchain, it cannot be reversed. As a result, those plagued by credit card fraud find refuge with Bitcoin. Barbet et al. noted that countries with high rates of credit card counterfeiting or hacking seek to gain even more.

In support of Expert A's analysis above, Merchant C, an events agency owner, shared a recent account of how Bitcoin provided his business a financial advantage.

"For example, we are working on an event in Detroit next month and have to process a significant amount of credit cards. The fees are over 3% which comes out of our profit. It would be great to save that 3% and pass on half of that as savings to the customer and make a little bit more profit. This is especially important in businesses with low margins. And that is just for domestic payments, international are significantly easier and cheaper with Bitcoin."

Merchant F not only saw financial advantages to Bitcoin adoption for his business but also as a consumer:

"I see Bitcoin growing in a global level, not just particularly for my business. And its adoption grows, more customers will come to test it in the real field. What I really hope is that more merchants also adopt it so I can start using it for my own purchases."

Merchant C provided a clear example of this sentiment.

"We have had situations where a transaction has been held for over a week and we had to send evidence of the rental, rental contracts, and jump through a million hoops just to send money for an apartment we were trying to rent. This entire process took hours of time, and delayed the transfer by over a week. With the money stuck in purgatory, the property owner needed some sort of payment so we ended up charging the rental on our credit card which had international fees of around 7% which they made us pay for. After about a week, the money was released to the owners and they reversed the credit card transaction for us, but the entire process was a major pain. With my Bitcoins, I log in, paste a wallet address, enter an amount, enter my 2fa (safer than banks in my opinion) and click send."

For Merchant C, freedom came in the form of fee relief but he conveyed that other payment options frustratingly waste time. However, Expert B, a Bitcoin author and speaker, shared other sources of burden that was a common motive for adoption:

"Bitcoin offers better security for merchants and significantly reduces the cost of transactions. Bitcoin has fixed fees, not percentage fees. In addition, bitcoin transactions cannot be "charged back". Finally, bitcoin resolves many of the security challenges posed by credit cards. Websites accepting bitcoin do not need to take extreme measures

to handle credit cards, as required by the payment industry. Bitcoin transactions do not need to be encrypted and do not need to be stored securely. A website accepting bitcoin does not need to maintain access to the private keys and therefore has no information that can be hacked. This significantly reduces the operating cost of payment systems for merchants.”

Indirect advantage – Three of 10 participants indicated that there were indirect financial advantages of Bitcoin which aided in their decision-making. An indirect advantage was represented by anything beyond the reduction in operating costs (direct advantage). To illustrate, Expert A outlined both the direct and indirect financial gains he observed in working with Bitcoin merchants as a Bitcoin processing manager. He said:

“Most merchants cite interest in accepting Bitcoin because it brings new revenue, PR and marketing attention, and that it gives worldwide access to everyone, without transaction fees, and only 1 payment method needed.”

Bitcoin’s cryptography and integrated security measures result in less hassles for merchants. With such measures, the security processes and infrastructure of the traditional banking system is not required. Although participants voiced their concerns about possible scams, experts claimed that Bitcoin can be much more secure due to the lack of a need for storing sensitive information.

Scholars have projected that financial gain would be a primary attraction to those who adopt Bitcoin. Grinberg (2011) had outlined that low transaction charges would be a significant part of the initial appeal. Grinberg also described how Bitcoin and the Internet are an excellent match in this regard. Furthermore, a few participants were drawn to Bitcoin as a speculative investment. Grinberg noted that Bitcoin is a good fit for “gold bugs” that prefer currency that is attached to hard assets.

Freedom from the profit stripping banking complex appeared to be a significant element of the appeal of Bitcoin for merchants. Historical context is certainly relevant to this transcendent theme. The last global recession likely opened up the possibility of Bitcoin adoption to a fair degree. The liberties that many banks, particularly in the United States took with the financial well-being of billions of individuals created a critical gaze on the financial industry. Although Bitcoin has been described as particularly advantageous for the “unbanked” segment, who as some of the poorest citizens pay higher fees than anyone through the use of money

wiring or moneygrams, it is fair to say that the intolerance of participants towards traditional payment methods of banks is partly attributable to frustration with the status quo.

Overall, although 8 of 10 participants recognized the financial advantages that Bitcoin adoption could give merchants, it appeared that half (4) identified this benefit as a key feature of Bitcoin. Although this study was not interested in the ranking of motives, it was clear that a collection of participants saw Bitcoin as more than a cost-effective payment option that could help them grow the profitability of their business. These more philosophical motives are described in Theme 2.

Theme 2 – More than just currency

A prevalent theme shared by participants is that part of the attraction of Bitcoin is its role beyond being another currency or payment option. In particular, there were two subthemes that reflected the deeper meaning participants attributed to Bitcoin or being Bitcoin adopters. These subthemes were a) technological revolution, and b) social revolution.

Technological revolution – Bitcoin created fewer hassles for these merchants. It offers a way around the traditional banking system. Although participants cited that there were several practical conveniences offered by Bitcoin, they referred to its technology in much grander terms. In all, 8 of the 14 total participants (experts included), referred to its cryptography as potentially life changing in some way. Several Bitcoin experts and merchants believed that the diffusion of Bitcoin will be a form of technological revolution. Merchant C captures the revolutionary aspects of cryptocurrency in the following:

“I also think that the technological aspect of Bitcoin is something that is unmatched elsewhere... I guess the technological aspect of crypto currencies in general. The idea of automating transactions, smart contracts, multi signature, (just to name a few off the top of my head) really outpaces what the traditional financial world has to offer today. The ability to send money over the internet with such ease and low fees is another really important difference. You and I are talking right now for this interview for free, but if I wanted to send you a small amount of money without Bitcoin it would be difficult.”

Merchant C captured how fundamentally elegant the function of Bitcoin can be. Most of the participants were explicitly adamant about the meaningfulness of the technology underlying Bitcoin, the blockchain. Each Expert participant also alluded to this feature of Bitcoin as the difference maker. Merchant F perceived the blockchain as follows:

“When I discovered the Satoshi white paper, I realized that this is going to be a revolution, and started to get deep in the ecosystem (...) When I finally got the concept, I understood that this was going to be a change of paradigm. As the steam machine was to the industrial revolution. The way Bitcoin cuts through the friction problems of today international transactions, and do it in seconds, gives me an idea of what is coming.”

It did not take long for Merchant F to theorize on the future of Bitcoin, citing its next directions:

“Then I learned about the other applications of Bitcoin can be used for. As smart contracts, chronological registering of documents, and so on. As a payment method, it has great advantages compared to credit cards or even cash. Bitcoin cannot be counterfeited. That’s very important in countries like mine where counterfeited bills are an everyday issue. Also. When you receive a Bitcoin payment, you got the money directly to your wallet. No delays, no commissions, no intermediates. That’s a great value.”

As mentioned, the nature of this revolution rests in the blockchain. In fact, Expert A, a Bitcoin payment processing manager, was adamant about looking past the face of Bitcoin to its underlying technology. He said:

“It’s much more than a monetary system. This is important to stress. A lot of people see bitcoin still as a currency, but its potential is much bigger than that. The blockchain technology, the possibility to decentralise ownership through a central ledger, can be applied to much more than only currency.”

To emphasize its magnitude, Expert A focused on two other disruptive technologies as a comparative to the role blockchain technology could play in the future.

“Currently we are in a 2.0 phase, where companies are trying to build on top of the bitcoin technology to use it for smart contracting. In Laymen’s terms this means that people are building applications on top of the blockchain technology. Just like Email was the first application on internet. Bitcoin as a currency is the first application on blockchain technology. There is much more possible... blockchain technology is going to revolutionise the world of payments and property, just like internet did for basically the entire world. It’s very likely that this blockchain technology is even bigger than internet.”

Earlier, several merchants described how the concept of Bitcoin required extra research to understand. Innovation complexity can be one of the most significant barriers to adoption (Rogers, 2003). Although several participants viewed blockchain technology as transformative,

they noted that diffusion would require addressing this issue. Merchant E believed that the laggards will have a completely different aesthetic experience with Bitcoin. That is, usability will continue to improve and the mechanics of Bitcoin will fade behind user-friendly interfaces.

“I think that Bitcoin's real value in the long run will be in backend systems. The average person won't know they are using bitcoin but it will be facilitating large cross border transactions, micropayments. Also the blockchain will be used in a more general way to secure digital scarcity and contracts. Using Bitcoin as a payment is the first step.”

Expert A concurred saying, “In the short run it will benefit the early adopters but in the long run it will benefit everybody. I predict that in the near future people will be using applications that are making use of the blockchain technology without knowing it.” The complexity that a few participants noted in the knowledge and persuasion stages of adoption will be inoculated as adoption proceeds. In this vein, one tech writer for The Wall Street Journal captured this sentiment best by saying, “You don’t know every nut and bolt on your car, but you can still drive” (Sidel, 2014). In fact, at the time of print, Sidel claimed that 2014 would be the start of an “industrial revolution for bitcoin”.

This theme is evident in the academic literature as well. For example, Smith and Weismann (2014) argue that a revolution is on a cusp. They write, “Market participants will have to decide if they are risk averse or ready to venture into yet another new and mostly hidden black box...” (p. 20). By the account of the participants, this is already occurring amongst the early adopters. When asked if Bitcoin would be a success, Expert B, a Bitcoin author, responded as follows:

“Bitcoin is already succeeding. It solves real problems for people, by making it possible to deliver banking and financial services over the Internet at a fraction of the cost of the existing banking system and without many of the security headaches.”

Meanwhile, Expert C, the owner of a blockchain telecom company, exceeded the parameters inherent to “paradigm shifts”, “disruptions”, and “revolutions”. Instead, at risk of hyperbolizing, he elevated his perceived importance of the blockchain.

“(It will be) absolutely part of the internet and become our Proof of History. It will be THE Fintech infrastructure that will be baked in permanence and part of the plumbing for all topologies of the future way money and assets are traded / handled / secured.”

Similarly, Merchant J, the most passionate merchant about Bitcoin, portrayed the revolution as follows:

“I’ve now been using Bitcoin for 5 years. I am convinced that it is by far, the greatest technology put forth in recent years. In my opinion, it is actually more important than the internet. I will continue to use Bitcoin moving forward. I feel confident that Bitcoin is the most radical of technologies, aimed at scooping up fiat leak (wasteful money and value created out of nowhere) unlike any other technology before it.”

When provided the opportunity, both merchant and expert participants framed Bitcoin as a type of technological marvel that would change the world in a significant manner.

It must be noted that the unanimous belief that Bitcoin will bring about a technological revolution is not necessarily reflected by academic thought leaders. Although participants were excited about the potential for ubiquity and for the blockchain to become part of the digital infrastructure of daily life, academics note that the finite amount of Bitcoin available could pose problems in the future. For instance Kostakis & and Giotitsas (2014) point out that Nakamoto “has inadvertently created a condition in which the more popular Bitcoin becomes, the higher its price gets, making it more and more difficult to use” (p. 437). The price, as it approaches its limit, will be high, rewarding the earliest adopters.

In recognition of this flaw, Expert A made an important distinction about the technological revolution behind Bitcoin. He noted that the enthusiasm over Bitcoin is less about Bitcoin itself than it is blockchain technology. In the exchange below, he identifies that the failure of Bitcoin would not be the end of its technology:

“There is no doubt that blockchain technology is here to stay. In order for blockchain technology to exist you need a token to reward the miners that keep the technology secure and decentralised, Therefore the chance that bitcoin will ever go to 0 is very unlikely, because the reward for mining will be better if more and more people drop out. It won’t (fail). Blockchain technology will succeed. There may be chance that there will be another crypto currency that works even better, but it will be based on the blockchain technology. However, I do believe that bitcoin will be the one.”

Social revolution – The second prevalent subtheme that emerged highlights the meaningfulness of Bitcoin beyond its technology or function. Graeber (2011) astutely wrote that the current financial system unabashedly incorporates debt into the ways money is planned and

distributed. In turn, disempowerment is fundamentally baked into the economy, creating unsustainable structures (Kostakis & Giotitsas, 2014). These conditions can create snags for the banked and create disadvantages for the unbanked who do not have the chance to access credit. Several participants alluded to the role that Bitcoin plays in empowering particular groups of people marginalized by unwieldy political or social forces in their home countries. Expert B explained this as follows:

“I think bitcoin will revolutionize international finance and create a new global economic infrastructure that is open to all and can reach populations that have never before had access to global finance. It can empower some 6 billion people to have the kind of banking that only a small minority in the developed world currently enjoy (...) Furthermore, bitcoin puts power in the hands of the people to control their own money and not rely on intermediaries and government institutions, which in most cases have no interest in consumer protection but instead are defrauding consumers for their own benefit.”

Merchant F, a club manager, also showed an awareness of the social impact of Bitcoin. He referred to the social redistribution of power achieved through decentralization.

“... if we see Bitcoin only as a payment method or just as another currency, we are committing a great error. Bitcoin opens the doors for a brave new global society. It is a paradigm changer. We will assist to a new era starting right now.”

In part, this notion is reflected in previous merchant commentary on accessing new customers or markets. Bitcoin adopters in developing countries can have access to new goods. Expert B expanded on this notion:

“With the right tools, such as the ability to use bitcoin on a simple feature-phone like a Nokia 1000, it could radically transform their lives. A cell phone could suddenly become a complete banking system, giving access to international wire transfers at very low cost, international lending and credit, international markets, import/export, services and outsourcing, commerce, aid, charity etc.”

This transformation could signify a lurch in social progress for large segments of the world’s population. Mobile phones, for example, have already shown to be influential for the adoption of other mobile payment options in the unbanked (Dennehy & Sammon, 2015). The virtual ubiquity of this device indicates that the infrastructure is already in place for diffusion.

Accordingly, Expert B also shared why the adoption process will continue to progress. He describes the interaction between finance, technology, and social forces as the main factors in its growth. He stated:

“Whether “bitcoin” as a currency and a brand continues to exist, in the next 20 years the technology of cryptographic decentralized blockchain-based currencies and payments will completely transform international finance. Bitcoin the currency, may suffer from price volatility and reputation damage, as it challenges many very powerful institutions that will certainly try to fight it. Nevertheless, bitcoin has already achieved a level of adoption that will make it very difficult for it to actually fail. Too many people find it useful and will continue to use it at any price. Depending on how you define “fail”, the question itself may be moot. There is no final “fail”.”

Expert B further added that Bitcoin helps those in locations where the national currency is weak, hyper-inflated, and where the ability to access international capital is severely limited.

Similar to the sentiment on the technological impact of bitcoin, participants, particularly experts, recognized the social change that coincides with Bitcoin adoption. In fact, this sentiment is captured by several scholars as well. Brito and Castillo (2013) wrote that “Bitcoin is an exciting innovation that has the potential to greatly improve human welfare and jump-start beneficial and potentially revolutionary developments in payments, communications, and business” (p. 190). More specifically, Bauwens and Kostakis (2013) claim that Bitcoin reflects a new type of capitalism. “Distributed capitalism”, they note, achieves capital accumulation through peer-to-peer infrastructures. In short, this fundamental change in economic activity means that “everyone can become an independent capitalist” (Kostakis & Bauwens, 2014). This social shift is a circumvention of the state, disrupting the concentration of capital.

Kostakis and Giotitsas (2014) summarize the recent techno-economic history as short-sighted. Citing the work of Perez (2002; 2009), they argue that new financial tools create more credit than value to the economy. As a result, the recent “financial crisis” is more like a process of structural change. The new structures, of which Bitcoin (or at least blockchain technology) is a part, will use new technology and presumably create more peer-to-peer economic activity. Essentially, the global economy could become much more participatory and democratized.

In light of these reflections, it would be remiss to overlook the barriers preventing diffusion of bitcoin adoption as they apply to underdeveloped and unbanked segments of society.

Lessons from this small collection of merchant bitcoin adopters show that bitcoin can be a complex innovation that requires trialing as part of its adoption process. As it currently stands, if the Satoshi white paper is as important to the attitude formation required to move along a pathway to adoption (or at least an interpretation of it via other media), then education could be a significant barrier. This includes developing countries but certainly applies to the unbanked and uneducated. This emphasizes the importance of the emergence of usability. As Merchant E identified previously, the sophistication of Bitcoin must be overtaken by simplicity and elegance for it to have such reach.

These findings have showed that Bitcoin can have financial value (and risk) but that value might be disproportionately realized by early adopters. Although the social advantages gained by disadvantaged segments of the global population appear, in theory, to be significant, some academics are more cautious about its impact. Kostakis and Giotitsas (2014) hedge the enthusiasm by identifying a potentially inescapable flaw:

“Coin accumulation in the hands of a few enhances the danger of fluctuations through deliberate withholding or trading large sums in order to manipulate its price. Currently, approximately 20% of the total Bitcoins mined are owned by the 100 richest users. For a currency that is supposed to bring change to the credit system this condition seems awfully familiar. (p. 436).”

Summary

This chapter presented the study findings by using two approaches. First, a deductive analysis was conducted using a priori categories as guided by the innovation-decision framework of Diffusion of Innovation Theory. This process led to a nuanced showcase of how Bitcoin merchants experience the adoption process as individuals. It was clear that there are key information sources that exist (i.e., Satoshi white paper) that early adopters cite as persuasive in making their decisions.

Out of the five stages of the innovation-decision process, the persuasion stage is arguably the most impactful stage leading up to a merchant’s adoption of Bitcoin. The process of knowledge seeking and interpersonal interactions during this stage significantly reduced barriers to entry and adoption, by providing merchants with adequate knowledge to make the decision to adopt or not. In this sense, the persuasion stage was an important supplement to the knowledge stage, without which the decision to adopt during the next stages would have been much more

difficult. In addition, trialing the new payment system was an important step for merchants which greatly reduced doubts about the technology, allowing them to see first-hand the benefits of using Bitcoin such as quick transaction times and lower costs.

This chapter also presented themes resulting from an inductive analysis of the data set. This analysis led to two main themes which served as deeper determinants of Bitcoin adoption. Insights provided by merchants were supported by the analysis of Bitcoin experts. In all, they describe that, for early adopters, Bitcoin is much more than a new, cost-effective manner to pay for goods and services. Rather, it is symbolic of the democratization of currency which, in many ways, serves the greater good.

Conclusion

The purpose of this study was to describe the decision-making process of individuals who have adopted Bitcoin using the innovation-decision process theory and to explore the main factors influencing this process. Using qualitative methods, the 5 stage innovation-decision process (Rogers, 2003) was used as a framework with which to analyze the experiences of these merchants from their early awareness of the cryptocurrency through to their confirmation of adoption. In the process, the factors influencing their decision to adopt Bitcoin were examined using thematic analysis. This chapter expounds upon the results presented in the previous chapter and discusses the findings in reference to the two research questions driving this research. In addition, limitations of this study will be examined and recommendations for further research will be proposed.

Research Question 1

How do retail merchants experience the decision-making process of adopting Bitcoin as a new payment method?

In order to provide an organized and structured account of the process of Bitcoin adoption by merchants, the deductive analysis of interviews using the innovation-decision process component of DOI theory was deployed. This process was selected for its ability to account for the decision-making process from first learning about the technology up until full implementation and confirmation of adoption. This allows for the ability to observe nuances in the data set that might not be accounted for by other theories. Applying the innovation-decision process in the analysis was an important step for examining the first research question.

There are several observations that provide a response to this research question. The first is that early merchant adopters of Bitcoin appear to successfully understand the complexity of the technology during the knowledge stage. This allows them to see the pros and cons of the technology which is subsequently aided by trialing it either on their own first or with their business. During the persuasion stage, merchants largely developed four attitudes towards Bitcoin, including curiosity, enthusiasm, skepticism, and among few a sense of indifference. Further research on the technology and interpersonal interaction with various sources helped merchants overcome doubts about using Bitcoin, and enhanced their propensity to adopt. During the decision stage, trialing the new payment system was an important step in reducing barriers to adoption, as merchants were able to see first-hand the benefits of the technology. In the

implementation stage, merchants largely portrayed positive experiences with using Bitcoin such as access a larger demographic of customers, fast transactions, and lower costs. On the other hand, only three merchants cited negative experiences relating to the volatility of its value and prevalence of scams and theft, although these were not strong deterrents to rejecting adoption. Lastly, positive attitudes shown during the implementation stage were maintained through the confirmation stage, and none of the participants discontinued their use of Bitcoin payment.

The motives behind adoption may be diverse at the micro-level but most participants cited the financial advantages of using a Bitcoin payment scheme as important. It is fair to say that without these advantages, the allure of participating in a paradigm shift onto itself would be less appealing. That is, the revolutionary elements of blockchain technology, while most astutely articulated by the expert participants, was not as much of a merchant determinant as expected. Instead, merchants gravitated towards freeing themselves from the pains of traditional payment systems which, when probed, could elicit anti-establishment sentiment. This is not to say that the merchant participants did place value on the social role of Bitcoin but the topic of the interviews was biased towards the role of Bitcoin in business and not the socio-historical value of the technology. As such, the process of adoption emerged clearly under the innovation-decision framework.

Research Question 2

How do Bitcoin experts and merchant adopters perceive Bitcoin to differ from other payment innovations?

The deductive approach used for answering Research Question 1 was subsequently complemented by an inductive analysis. This analysis allowed for the emergence of prevalent themes in the data that spanned across all participants. The emergent themes presented in the finding chapter represent the key determinants of Bitcoin adoption for retail merchants. At the time of this study, no research had methodically explored the key factors driving Bitcoin adoption.

The findings presented a symbiotic balance between expert analysis and merchant adoption experience. That is, the sentiments shared by the merchants were commonly validated by expert insight into the role of Bitcoin beyond daily business operations. Overall, Bitcoin was perceived a type of game changer. Phrases such as “paradigm shift”, “revolution”, “not just a

currency” and “proof of history” were used to describe Bitcoin. The value of the expert participants revealed itself to this end. Their knowledge of the blockchain and their ability to relate it to other important disruptive technology like email crystalized how significant this innovation could be.

While merchants could generally recognize that Bitcoin changes some financial activity in positive ways, some did not view Bitcoin as a social or even a technological marvel. This is indicated by the three participants who took a “wait and see” position on the matter after implementing Bitcoin in their respective businesses. However, the experts who have extensive experience working with Bitcoin and Bitcoin payment systems could see its value in this regard. The sum of their perspectives illustrated that Bitcoin has a social utility that other payment innovations do not. These insights are directly or indirectly linked to decentralization. As such, the experts viewed Bitcoin as economic democratization, allowing for marginalized segments of the population to have access opportunities and privileges they could not have under the current dominant financial system. In this sense, the prevailing view is that Bitcoin is “already succeeding” because the blockchain exists and it works. The merchant adopters provided evidence in this regard.

Theoretical Implications

One significant theoretical contribution of this study is that no other study has explored Bitcoin adoption using the innovation-decision process or similar theories from the merchant perspective before. As a result, this study contributes to the rapidly growing literature based on Bitcoin and cryptocurrency. In addition, qualitative research methods were deployed to explore an area light in empirical evidence. No studies have qualitatively investigated Bitcoin adoption in this way. No study has also been conducted using a thematic analysis of the possible determinants of Bitcoin adoption. The final findings depict *how* merchant come to adopt bitcoin through the deductive application of the 5 stages of the innovation-decision process and *why* they adopt, as portrayed in the two main emergent themes (i.e., financial advantage, more than a currency).

Practical Implications

The practical implications could lie in the Bitcoin/blockchain education. If the perspectives of the participants in this study are evidence, then it is quite likely that Bitcoin awareness will accelerate. These findings could be useful in developing more persuasive

arguments to encourage Bitcoin adoption or, at a minimum, destigmatize it. It is clear that perceived barriers (e.g., volatility and scam threats) are formidable. Although volatility appears to be part of the organic growth of a new currency, addressing scam threats to educating merchants the truth and how to protect themselves might instill more trust in those contemplating exploring it as a merchant or even as a consumer. Merchants are key cogs in the growth of Bitcoin whether they are online or offline. Without merchant adoption, Bitcoin growth will stagnate. This study shows the advantages of Bitcoin adoption, including the addition of Bitcoin users to one's customer base. Given that, in some industries, significant masses of Bitcoin users are looking for merchants to purchase goods or services from and sometimes failing to accomplish this objective, it is the interest of the Bitcoin economy to help persuade more merchants to implement Bitcoin as a payment option.

Study Limitations

Although the selected method for this research generated enough data to provide trustworthy responses to its research questions, this study had several noteworthy limitations. These limitations are important to identify in order to suggest recommendations for additional research. Overall, three limitations have been identified.

First, although this study was exploratory which often entails the general navigation of a phenomenon, it is clear that richer data could have been produced from a narrower focus on one type of participant. While the insights provided by merchant and expert participants were valuable, this study may have lacked the depth necessary to capture secondary patterns or themes in the data.

Secondly, there are several limitations to conducting in-depth interviews over Skype chat than over the telephone or in person. While the convenience of doing so allowed for easier participant recruitment, the loss of non-verbal communication in the interview process can detract from the interpretation of the responses. Picking up on hesitation, emotion, and body language is extremely difficult (if not impossible in certain cases) using this forum.

Thirdly, although the DOI theory is a well-tested framework with decades of application, the themes that emerged from this study cannot be generalized like its components. Qualitative research relies on small sample sizes and is ideal for exploring relatively unknown phenomena. The results of this study is the first step in exploring the merchant adoption of Bitcoin, hence generalization of this one interpretation of the data set must be done so with caution.

Recommendations for Further Research

Based on the developments of this study, several opportunities to explore Bitcoin adoption have become clearer. Although the scope of this research provided some new and useful insights into the specific process of merchant Bitcoin adoption, it could have been enhanced by conducting a similar quantity of interviews with merchants who rejected it during the decision phase or discontinued it during the implementation stage. There is little doubt that a comparative qualitative analysis could reveal specific facilitating or preventive factors in the Bitcoin adoption. Are there certain personal or socio-political factors that assist with adoption decisions? Are adopters more "tech literate" than non-adopters? Do those rejecting Bitcoin have different negative experiences? This different approach might help in understanding the barriers to adoption that could not emerge in a collection of participant who are, relatively speaking, using Bitcoin.

Summary

This study sought to describe the decision-making process of merchant Bitcoin adopters and explore factors influencing this process. The results showed that merchant participants experience the process of adoption uniquely at the individual level but collectively share common experiences of the advantages and disadvantages of this innovation. This study offers a foundation from which to understand merchant adoption, an important area of research that can possibly help contribute to the proliferation of adoption of this potentially revolutionary and socially impactful technology.

References

- Al-Jabri, I., & Sohail, M. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research, 13*, 379-397.
- Alshare, K., Grandon, E., & Miller, D. (2004). Antecedents of computer technology usage: Considerations of the technology acceptance model in the academic environment. *Journal of Computing Services in Colleges, 19*, 164-180.
- Archibald, M., & Clark, A. (2014). Twitter and nursing research: how diffusion of innovation theory can help intake. *Journal of Advanced Nursing, 70*, e3-e5.
- Au, Y. A., & Kauffman, R. J. (2008). The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application. *Electronic Commerce Research and Applications, 7*(2), 141-164.
- Ballve, M. (2013). Retailers Of All Sizes Are Warming Up To Bitcoin. Retrieved March 8, 2014, from <http://www.businessinsider.com/retailers-warm-up-to-bitcoin-2013-12>
- Barber, S., Boyen, X., Elaine, S., & Ersin, U. (2012). Bitter to better – How to make bitcoin a better currency. In *Proceedings of financial cryptography. Lecture notes in computer science*. 399-414.
- Baptista, G., & Oliveira, T. (2015). Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators. *Computers in Human Behavior, 50*, 418-430.
- Blöchlinger, M. (2012). Mobile Payment Systems. *Internet Economics VI, 41*.
- Boehm, F., & Pesch, P. (2014). Bitcoin: A first legal analysis. *Financial Cryptography and Data Security, 43-54*.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.
- Boyce, C., & Neale, P. (2006). *Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation output*. Watertown, MA: Pathfinder.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101.
- Bricki, N. (2007). *A guide to using qualitative research methodology*. London, Medecins San Frontiers.

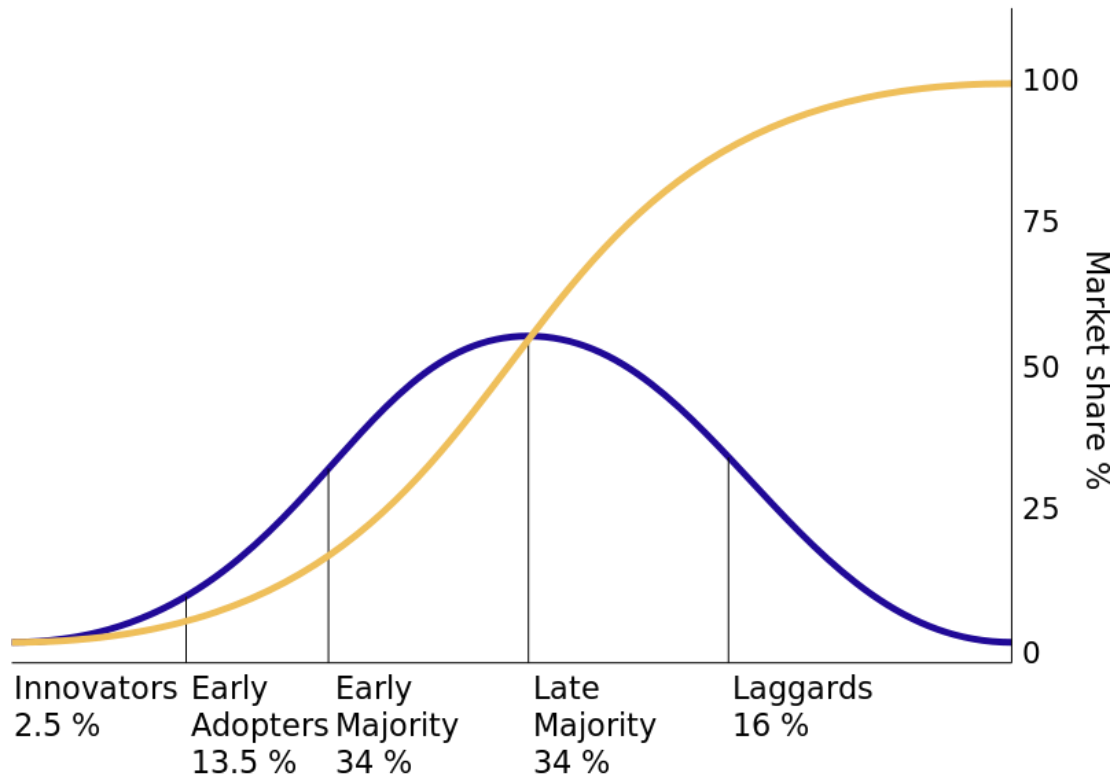
- Brito, J., & Castillo, A. (2013). *Bitcoin: A primer for policy makers*. Arlington, VA: George Mason University – Mercatus Center.
- Burns, M. (2014). Overstock.com Exceeds \$1M In Bitcoin Transactions In Two Months. Retrieved March 8, 2014, from <http://techcrunch.com/2014/03/04/overstock-com-exceeds-1m-in-bitcoin-transactions-in-two-months/>
- Capgemini (2014). World Payments Report 2014. Retrieved from <http://www.worldpaymentsreport.com>
- Carter, L., & Belanger, F. (2005). The utilization of e-government services: Citizen trust, innovation and acceptance factors. *Information Systems Journal*, 15(1), 5-25.
- Coinmap (2014). Retrieved June 12, 2015, from <http://coinmap.org/>
- Compeau, D. R., Higgins, C. A., & Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS Quarterly*, 23, 2, 145 –158.
- Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications*, 7(2), 165-181.
- Dash, M., Bhusan, P., & Samal, S. (2014). Determinants of customer’s adoption of mobile banking: An empirical study by integrating diffusion of innovation with attitude. *Journal of Internet Banking and Commerce*, 17, 1-21.
- Davis, J. (2011, October 10). The crypto-currency: Bitcoin and its mysterious inventor. <http://www.newyorker.com/magazine/2011/10/10/the-crypto-currency>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical model. *Management Science*, 35(8), 982-1003.
- Dennehy, D., & Sammon, D. (2015). Trends in mobile payments research: A literature review. *Journal of Innovation Management*, 3, 49-61.
- Denzin, N., & Lincoln, Y. (2005). *The Sage Handbook of Qualitative Research*. Sage: Thousand Oaks.
- Dorit, R., & Shamir, A. (2012). Quantitative analysis of the full bitcoin transaction graph. *Cryptology ePrint Archive*, 584.
- Dupont, Q. (2014). The politics of cryptography: Bitcoin and the ordering machines. *Journal of Peer Production*, Volume 4.

- FDIC (Federal Deposit Insurance Corporation), (2009). National survey of unbanked and underbanked households, December.
https://www.fdic.gov/householdsurvey/2012_unbankedreport.pdf (accessed January 22, 2015)
- FinCEN (Financial Crimes Enforcement Network), (2013). Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies. Retrieved from http://fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html
- Garrett, J. L., Rodermund, R., Anderson, N., Berkowitz, S., & Robb, C. A. (2014). Adoption of mobile payment technology by consumers. *Family and Consumer Sciences Research Journal*, 42(4), 358-368.
- Given, M. (2008). *The Sage Encyclopedia of Qualitative Research Methods*. Sage: Thousand Oaks.
- Graeber, D. (2011). *Debt: The First 5,000 Years*. New York: Melville House.
- Grinberg, R. (2011). Bitcoin: An innovative alternative digital currency. *Hastings Science & Technology Law Journal* 4(1), 159–208.
- Hameed, M., Counsell, S., & Swift, S. (2012). A conceptual model for the process of IT innovation adoption in organizations. *Journal of Engineering and Technology Management*, 29, 358-390.
- Hayashi, F., & Bradford, T. (2014). Mobile payments: Merchants' perspectives. *Economic Review - Federal Reserve Bank of Kansas City*, 5.
- Hayashi, F. (2012). Mobile payments: What's in it for consumers? *Economic Review, First Quarter*, 35–66.
- Hayes, K., Eljiz, K., Dadich, A., Fitzgerald, J., & Sloan, T. (2015). Trialability, observability, and risk reduction accelerating individual adoption decisions. *Journal of Health and Organizational Management*, 29, 271-294.
- Hurlburt, G., & Bojanova, I. (2014). Bitcoin: Benefit or curse? *IT Professional*, 16, 10-15.
- International Communications Union (2014). ICT Facts and Figures 2014. Retrieved from <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2014-e.pdf>
- Keynes, J. M. (1919). *The Economic Consequences of the Peace*. New York: Harcourt.
- Kim, C., Mirusmonov, M. & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, 26, 310-322.

- Kinley, D. (2003). *Money: A study of the theory of the medium of exchange*. San Diego: Simon Publications.
- Kostakis, V., & Giotitsas, C. (2014). The (a)political economy of bitcoin. *Triple C.*, 12, 431-440.
- Lee, Y.-H., Hsieh, Y.-C., & Hsu, C. -N. (2011). Adding Innovation Diffusion Theory to the Technology Acceptance Model: Supporting Employees' Intentions to use E-Learning Systems. *Educational Technology & Society*, 14 (4), 124–137.
- Lessig, L. (2006). *Code. Version 2.0*. New York: Basic Books.
- Lewins, A., Taylor, C. & Gibbs, G. (2005). What is qualitative data analysis? School of Human & Health Sciences, University of Huddersfield. United Kingdom
- Lievrouw, L. (2006). New media design and development: Diffusion of innovations v social shaping of technology. In L. Lievrouw & S. Livinstone (Eds.). *New Media: Social shaping and social consequences of ICTs*. (pp. 246-265. London: Sage.
- Lyytinen, K., & Damsgaard, J. (2001). What's wrong with the diffusion of innovation theory? *Diffusing software product and process innovations*, 59, 193-190.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments—A qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413-432.
- Mani, S. & Dhingra, T. (2012). Diffusion of innovation model of consumer behavior: Ideas to accelerate adoption of renewable energy sources by consumer communities in India. *Renewable Energy*, 39, 162-164.
- Mills, A., Durepos, G., & Wiebe, E. (2010). *Encyclopaedia of case study research: Thematic analysis*. Thousand Oaks: Sage.
- Morse, J. (2008) Confusing categories and themes. *Qualitative Health Research*, 18, 727-728
- Murray, C. (2009). Diffusion of Innovation Theory: A bridge for the research-practice gap in counseling. *Journal of Counseling & Development*, 87, 108-116.
- Nakamoto, S. (2009). Bitcoin: A peer-to-peer electronic cash system. Consulted, 1(2012), 28.
- Nakamoto, S. (2009). Bitcoin open source implementation of P2P currency. Retrieved from <http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source>
- Neo, C., & Calvert, P. (2012). Facebook and the diffusion of innovation in New Zealand public libraries. *Journal of Librarianship and Information Science*, 44, 227-237.
- Nor, K., Pearson, J. M. and Ahmad, A. 2010. Adoption of internet banking: Theory of the diffusion of innovation. *International Journal of Management Studies*, 17, 69-85.

- Oliveira, T. & Martins, M. (2011). Literature review of information technology adoption Models at firm level. *The Electronic Journal Information Systems Evaluation*, 14, 110- 121.
- Peck, M. (2014). Prehistory: The dream of anonymous digital currencies. Retrieved from <http://p2pfoundation.net/bitcoin>
- Perez, C. (2002). *Technological revolutions and financial capital: The dynamics of bubbles and golden ages*. Cheltenham, England: Edward Elgar Pub.
- Perez, C. (2009). The double bubble at the turn of the century: Technological roots and structural implications. *Cambridge Journal of Economics*, 33(4), 779–805.
- Pflaum, I., & Hateley, E. (2014). A bit of a problem: National and extraterritorial regulation of virtual currency in the age of financial disintermediation. *Georgetown Journal of International Law*, 45(4), 1169-1215.
- Reitman, R. (2014). How does bitcoin work? Retrieved from <http://p2pfoundation.net/bitcoin>
- Rogers, E. M. (1962). *Diffusion of innovations*. The Free Press of Glencoe, New York.
- Rogers, E. M. (2003). *Diffusion of innovations (5th ed.)*. New York: Free Press.
- Rubin, H., & Rubin, I. (2012). *Qualitative interviewing: The art of hearing data*. London: Sage.
- Saldana, J. (2009). An introduction to codes and coding. In J. Sadana (ed.), *The Coding Manual for Qualitative Researchers*. (pp. 1-31). Thousand Oaks: Sage.
- Sapuric, S., & Kokkinaki, A. (2014). Bitcoin is volatile! Isn't that right? *Business Information Systems Workshops*, 183, 255-265.
- Shenton, A. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22, 63-75.
- Sherry, L. (1997). The boulder valley internet project: Lessons learned. *THE (Technological Horizons in Education) Journal*, 25(2), 68-73.
- Shire, D. (2014). Companies to be aware of should Bitcoin acceptance keep increasing. Retrieved March 8, 2014, from <http://seekingalpha.com/article/2008791-companies-to-be-aware-of-should-bitcoin-acceptance-keep-increasing>
- Sidel, R. (2014). Hard Times for a Bitcoin Evangelist. *The Wall Street Journal*, 5 Feb. [online]. Available at <http://online.wsj.com/news/articles/SB10001424052702304450904579365201803918312?mg=reno64->

- wsj&url=http://online.wsj.com/article/SB10001424052702304450904579365201803918312.html [Accessed on 03 Feb. 2015].
- Simonite, T. (2013). Bitcoin Hits the Big Time, to the Regret of Some Early Boosters. *MIT Technology Review* [online]. Available at <http://www.technologyreview.com/news/515061/bitcoin-hits-the-big-time-to-the-regret-of-some-early-boosters> [Accessed on 14 Jan. 2015].
- Smith, A., & Weismann, M. (2014). Are you ready for digital currency? *The Journal of Corporate Accounting & Finance*, Nov/Dec, 17-21.
- Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, 79, 625-649.
- Tucker, P. (2009). The digital currency doppelganger: Regulatory challenge or harbinger of the new economy?. *Cardozo Journal of International and Comparative Law* 17 (3): 589–626.
- Vigna, P., & Casey, M. (February, 2015). Bitcoin for the unbanked. *Foreign Affairs*.
- Vijayarathy, L. R. (2004). Predicting consumer intentions to use online shopping: the case for an augmented technology acceptance model. *Information & Management*, 41, 747-762.
- Weber, B. (2014). Can Bitcoin compete with money? *Journal of Peer Production*, 4.
- Williams, R., & Edge, D. (1996). The social shaping of technology. *Research Policy*, 25, 865-899.
- Yang, K. C. C. (2005). Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics and Informatics*, 22(3), 257-277.
- Yuan, S., Liu, Y., & Yao, R. (2014). An investigation of users' continuance intention towards mobile banking in China. *Information Development*, 1-15.
doi:10.1177/0266666914522140.

Appendix A - Pattern of Adoption (Rogers, 1962)

Appendix B - Interview Guide (Merchants)

Background

- What is your background in business?
- Tell me about your current business.

Knowledge Stage

- How did you first learn of Bitcoin?
 - What were your first impressions? Why?
- Initially, what interested you the most about it?
- How do you believe Bitcoin differs from currency linked to governments and banks?

Persuasion Stage

- At first, how did you see Bitcoin compared to other payment options? Why?
- Did you ever have doubts about using Bitcoin?
 - If yes, how so?
- What helped you, if anything, overcome these doubts?

Decision Stage

- Tell me about how you arrived at your final decision to use Bitcoin?
- What were the key considerations for making this decision?
 - What was the most important consideration? Why?

Implementation

- How long have been using Bitcoin and what has it been like?
- What have been your positive experience with it since adoption?
- What have been your negative experiences with it since adoption?

Confirmation

- Overall, how do you currently feel about using Bitcoin in your business?
- How do you see your business's future with Bitcoin?

Appendix C - Interview Guide (Experts)

Background

- How is your work using Bitcoin?
- How did you become interested in Bitcoin?

About Bitcoin

- Can you describe exactly what makes Bitcoin a different currency?
- How would you describe Bitcoin in laymen's terms?
- How would you describe your attitude toward Bitcoin?
 - If you compare Bitcoin to current monetary systems, what makes it different?
 - Do you think it is better? If yes, for whom?

Appeal of Bitcoin

- In your view, who is an average Bitcoin user?
 - What do you see as the advantages to Bitcoin for consumers?
 - What do you see as the advantages to Bitcoin for merchants?
- Why do you think Bitcoin is unpopular among those who have rejected it?
 - What do you see as the advantages to Bitcoin for consumers?
 - What do you see as the disadvantages to Bitcoin for consumers?

Success of Bitcoin

- If Bitcoin succeeds, why do you believe it will succeed?
- If Bitcoin fails, why do you believe it might fail?
- Do you think Bitcoin will be regulated by national or international monetary authorities?
If so, Why?

Future of Bitcoin

- Where do you believe Bitcoin is headed in the future?
 - Do you think Bitcoin will become regulated?
 - Do you think Bitcoin might become illegal?
- Do you have anything else to add on the topic of Bitcoin?

Appendix D – Participant Demographic Table

Merchants	Occupation Details	Point-of-sale location
A	Hostel Owner	Offline
B	Food Delivery Website	Online
C	Events Agency	Online
D	Hostel Owner	Offline
E	Guitar Teacher	Online
F	Club Manager	Offline
G	Commodities Trader	Online
H	Animation Software	Online
I	Restaurant Owner	Offline
J	Bitcoin ATM Sales	Offline
Experts	Occupation Details	
1	Bitcoin Payments Processor Marketing Manager	
2	Bitcoin Author, Speaker, and Advisor	
3	Owner of Blockchain Telecommunications Company	
4	Lead of Malaysia Bitcoin Exchange	