

What Differentiates Early Organization Adopters of Bitcoin From Non-Adopters?

Emergent Research Forum Paper

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Abstract

This paper describes a study to understand what differentiates organization adopters of Bitcoin from non-adopters by comparing their IT-readiness, innovativeness and social media presence. The craze over cryptocurrency such as Bitcoin has been likened to a modern-day gold rush, yet academic research has not caught up. Governments are struggling with the very idea of cryptocurrency systems. After the price of Bitcoin fell from \$1,200 to \$300 in 2014, consumer interest flagged, leaving the future of Bitcoin adoption uncertain despite a slow and steady increase of organization adopters. Organization adoption is more important than consumer, because consumers can't use cryptocurrency if organizations don't accept them as payment. This research serves as a basis for future research on Bitcoins and Bitcoin adoption by highlighting some important hurdles to its adoption as a new innovation, in the hope that such endeavors move us ever closer to the vision of a true "people's currency."

Keywords

Bitcoin, cryptocurrency, diffusion of innovations theory, organizational adoption

Introduction

Mining cryptocurrency such as Bitcoin has been likened to a modern-day gold rush (Schneider 2015). Consumer demand for Bitcoin grew to an all time high in late 2013 when the price rose to \$1,200 USD, causing the general public to take notice of the 4-year old innovation (MarketWatch 2013). General sentiment suggested Bitcoin might finally become a mainstream currency. However, since then, the price of Bitcoin fell to under \$300, taking consumer interest with it. But what caused the sudden lack of interest? Why didn't consumer demand continue? When will more organizations adopt Bitcoins? Will Bitcoin mature as an innovation or is it too disruptive to leap the chasm?

To better understand factors affecting Bitcoin adoption, this paper considers the research question, "What differentiates organization adopters of Bitcoin from non-adopters?" We describe early results from a study conducted in April 2015 to investigate the differences between organizations that have and have not adopted Bitcoins as a method of payment. This understanding is important, because without places to use Bitcoins to purchase goods and services, consumer reluctance will continue. Thus, network effects will play a role in future Bitcoin adoption by consumers, but these network effects will be limited by organizations' adoption of Bitcoin as a payment method.

This research serves as a basis for future research on Bitcoins and Bitcoin adoption and highlights the primary hurdles to Bitcoin adoption, which will aid organizations considering adoption. By comparing one's own organization to organizations that have and have not adopted Bitcoin, it may be possible for managers to better gauge whether they should offer customers the option to pay with Bitcoin. Because the value of Bitcoin has fluctuated considerably since its inception in 2009, speculators have invested in Bitcoins, similar to stocks and bonds. Therefore, this research might also interest Bitcoin investors, as it may shed light on when (or if) Bitcoin will mature as an innovation. Ideally, wider adoption of Bitcoin should increase and eventually stabilize its value in the market.

Background: How Bitcoin Works

Although other types of cryptocurrency exist, Bitcoin is the most well-known and widely used example available today. Cryptocurrencies are digital money systems based on end-to-end, peer-to-peer networks. Data is encrypted using a public-private key system. For example, to transfer Bitcoins between users, User A sends User B his public key, in the form of his account number. User B creates a transaction with a certain amount of Bitcoins, using A’s public key as the receiving address. Then, User A signs the transaction with his private key to confirm the Bitcoin transfer. Finally, the transaction is processed and verified by the so-called “mining” process by adding it to the block chain. The block chain maintains an official ledger of all confirmed transactions (Kerscher 2013). An unknown group designated “Satoshi Nakamoto” designed Bitcoins in 2008 as “the people’s currency.” They foresaw a world where citizens would not have to rely on governments for fiat money (Freyne 2013). For countries without strong banking systems or easy access to banks and hard currency, Bitcoin can offer an attractive alternative. To date, Nakamoto’s vision has not come to fruition because Bitcoins have not gained mainstream adoption.

Literature Review

We examined current research on Bitcoin to understand the state of the field as a research area and to identify factors preventing Bitcoin from mainstream adoption. Unfortunately, studies on Bitcoin are scarce. We searched for Bitcoin research published through February 2015 in the ACM, Science Direct, JSTOR and Web of Science databases by using the keyword “Bitcoin.” ACM provided 108 results, Science Direct 128, JSTOR 3 results and Web of Science 20 results. Of these, 23 articles related to adoption or diffusion of Bitcoins, and none of these related to organization adoption. As discussed in this section, existing research does not account for differences between organizations that have adopted Bitcoins and those that have not. Table 1 highlights the most interesting and relevant articles, and we discuss some of the issues raised by this research in more detail below.

Research Questions Discussed	Authors (Year)
What is Bitcoin?	Hobson (2013)
What problems prevent Bitcoin adoption?	Eyal & Siner (2013), Karame & Androulaki (2012), Moore (2013)
Is Bitcoin really a currency?	Aron (2011), Aron (2012), Cusumano (2013), Henningsson (2014), Hodson (2013), Hurlburt & Bojanova (2014), Scott (2014), Van Alstyne (2014)
How else can Bitcoin technology be used?	Omohundro (2014)

Table 1. Relevant Studies on Bitcoin Adoption

Like any new currency, Bitcoin’s biggest hurdle is the market’s trust. Since inception, the price has fluctuated wildly (Scott 2014), and the market does not trust unstable currencies. The price of Bitcoin varied from \$1 USD to \$1,242 USD, a 124,100% change between 2009 and 2013 (History Of Bitcoin 2013). In comparison, the value of a US Dollar against a Euro has only changed 8.82% in that time period (OANDA 2013). As exemplified in developing countries, when more people use currency, the value can stabilize, which often increases adoption.

Unlike fiat-currency like the US Dollar which is theoretically backed by physical gold, the average consumer does not understand what Bitcoin is or how it works, reducing trust. Bitcoins are not issued by a central authority who backs the Bitcoins. Rather, they are generated by a digital process termed “mining” (Hobson 2013). During the mining process, miners provide the necessary computational power to process a complex block hashing algorithm simultaneously with other Bitcoin miners to validate transactions. Once the community validates a block of transactions through calculations on the hashing algorithm, the miner is rewarded with Bitcoins (Investopedia n.d.) Consumers do not understand how computers can “generate money.”

The market also worries about Bitcoin’s privacy. Despite being infamous for its supposed anonymity, every transaction is publicly visible. Unlike private bank accounts, anyone can see the Bitcoin balance of another user without knowing his or her identity (Investopedia 2015). This increased visibility turns high-dollar accounts into targets for potential thieves. The most famous example was the theft of over 700,000 Bitcoins which bankrupted the former Bitcoin exchange, Mt. Gox, in Japan (The New York Times 2014).

In 2013, Sheep Marketplace, a market for illicit goods, was ransacked for Bitcoins valued at \$100 million (Business Insider 2013). In order to encourage anonymity and increase privacy, Bitcoin wallet and exchange services now automatically generate new addresses for every transaction.

Another oft-cited issue with Bitcoin and other cryptocurrencies like Doge and Litecoin is the “double-payment problem.” Most fast payment businesses are subject to this problem, but Bitcoin is especially vulnerable due to relatively slower payment verification. Bitcoin developers claim they addressed this concern, but it is still possible to double-spend Bitcoins. Researchers Karame and Androulaki claimed success multiple times in performing double-spend attacks with fast payments (2012). However, the average thief would not exploit this weakness, because of the effort and comprehensive background knowledge involved. Also, transactions in fast payment businesses usually involve relatively small amounts, meaning the effort far outweighs the benefit.

Simply put, consumers don’t believe Bitcoins are really money. Bitcoin is completely decentralized and digital. The US Internal Revenue Service (IRS) for example stated that for tax purposes, citizens should treat Bitcoins as property, not currency. Aron (2012) suggested that if popularity increased, governments would have to regulate Bitcoins. Whether or not they have that power is also an interesting question. Payment processing and exchange services are expected to become important bridges towards solving some of Bitcoin’s adoption issues, because they will simplify Bitcoin transactions and separate consumers from the complex underlying technology.

Mature adoption may not solve Bitcoin’s problems with trust, privacy issues, or double-payments. Rather, reducing these problems should lead to mature adoption. Bitcoin has not gained mainstream adoption, being a fairly new innovation. McDougall (2014) suggested that as an innovation, Bitcoins are still in the early adopters phase. Therefore, diffusion of innovations theory (DOI) is an appropriate theory to consider in analyzing differences between adopters and non-adopters of Bitcoins.

Theoretical Basis: Diffusion of Innovations Theory (DOI)

Rogers’ Diffusion of Innovations Theory (DOI) is the prevailing theory to explain how innovations are adopted (Rogers 1995). An innovation is “an idea, invention or service that creates value or for which customers will pay” (Business Dictionary n.d.) For example, electronic data interchange was an innovation introduced in 1996 (Premkumar et al. 2011). DOI theory identifies a bell shaped curve to explain the an innovation’s adoption over time. The curve is divided into 5 groups based on when they adopt the innovation: innovators, early adopters, early majority, late majority and laggards. These groups’ characteristics are distinct, in that innovators are venturesome and willing to try out new things, early adopters express their own opinions and take leadership and the early majority adopt innovations before the average person does. The late majority is rather skeptical of innovations and laggards are even more skeptical. We use DOI in our study to identify some characteristics which will allow us to compare adopters with non-adopters of the Bitcoin innovation.

Considering Bitcoin’s potential for improving the world economy, particularly in low income countries, it would be a shame for cryptocurrencies to die out (Mcdougall 2014). Using the Bitcoin system to transfer international funds, for example, saves workers in foreign countries the high fees associated with money transfers to their home country (The Telegraph 2014). Therefore, we believe it’s important to understand organization adoption, in order to discover ways to encourage more mainstream adoption. In the study described below, we describe a study to distinguish adopters of Bitcoins from non-adopters to address the research question.

Study Methodology

Because Bitcoin adoption by organizations is a fairly new area of research and because it is not possible to survey the organizations directly, we believe that a qualitative, categorical analysis is appropriate at this time in order to understand the current state of Bitcoin adoption. This section describes a study to compare adopters of Bitcoins with non-adopters. Based on the characteristics of the 5 user groups from DOI theory, we logically identified characteristics of organizations that would predispose them to adopting Bitcoins, with the idea that it should be conceptually possible to classify companies into the five categories of innovators, early adopters, early majority, late majority and laggards. However, since Bitcoin

is a relatively new technology and thus very early in the adoption curve, it is difficult if not impossible to correctly differentiate early adopters from early majority or late majority from laggards, etc. Therefore, as an initial proof of concept, we classified organizations into adopters and non-adopters.

As of February 2015, Bitcoin’s Wikipedia page listed 1,500 organizations that accept Bitcoin (2015). Every year, hundreds more organizations accept Bitcoin (Fortune 2015). In the hopes of encouraging increased Bitcoin adoption, multiple Web sites track companies accepting Bitcoins. Companies register with these sites to lure consumers who want to use Bitcoins to their Web sites to purchase goods and services. The most popular of these sites is usebitcoins.info (Usebitcoins 2014). As of April 26, 2015, usebitcoins listed 4,199 organizations that accept Bitcoin as payment. Due to the rapidly changing nature of this field, we believe it is important to collect data from an industry-reliable Web site that has been updated within the past 2 months.

In April 2015, we randomly selected 30 representative companies from the list of organizations provided on usebitcoins.info. After collecting descriptive information about each company such as type of business, name, size, location, age and country of origin, we then categorized the companies by sub-industry (e.g., IT, e-commerce, mobile app developers, etc.) We compared each adopter to a “similar other” non-adopter company. A comparable company might be operating in the same branch or located in the same geographic location. For example, Dell accepts Bitcoins in the form of a direct payment via the Bitcoin exchange service Coinbase, but HP does not accept Bitcoins. By making these pair-wise comparisons, we can compare characteristics of Company A who has adopted Bitcoins to Company B who has not.

We initially selected 3 primary characteristics of organizations: IT readiness, innovativeness, and social media presence. We qualitatively assessed each characteristic on a scale of 1 (low) to 5 (high). We expect that adopters will be higher on all 3 characteristics than non-adopters. We identified IT readiness and innovativeness because Bitcoin is technology-intensive and highly innovative. IT readiness refers to a company’s state of being ready to implement new information technology or to “have a positive attitude about adopting new technology” (American Medical Association n.d.) We assessed IT readiness by measuring whether or not the companies offer a mobile application, if they serve different platforms such as Android, iOS or Windows Phone, if they own a mobile version of their Web site, if they are currently looking for IT professionals and/or if they use cloud technologies.

Innovativeness is a company’s attitude towards applying new ideas “in order to further satisfy the needs and expectations of the customers” (Business Dictionary n.d.) Innovative companies, like innovative adopters, are venturesome and like to try new things. Therefore, we assessed innovativeness by measuring the rate of offering new products or services, whether or not companies use renewable energy, if they already offer payment methods such as PayPal and Google Wallet, how many payment methods they offer and/or the amount of their R&D expenses.

We assessed social media presence qualitatively by how many social media platforms they use and how active they are/their level of activity/their activity level. A social media presence on sites such as Facebook and Twitter is very important for companies’ public images and their ability to keep up with new innovations. Table 2 presents a representative sample of the data collected.

Company Name	Employees	Country	IT Readiness (1-5)	Innovativeness (1-5)	Social Media Presence (1-5)
Foodler	200	USA	3	3	3
airBaltic	1,000	Latvia	3	3	4
Rakuten	11,000	Japan	5	5	4
Gyft	50	USA	5	3	3
Takeaway	300	Netherlands	3	3	3

Table 2. Characteristics of Select Organization Adopters of Bitcoin

While we submit that other factors may influence Bitcoin adoption, this study is not exhaustive. In order to bound the study, we chose to focus on the most logical organization characteristics. We leave other factors to future research. If we qualitatively find that adopters tend to have higher IT readiness, innovativeness, and social media presence than non-adopters, then we plan to test a research model to determine which antecedent most affects the outcome. We would test a logit model where the dependent variable is 0 (non-adopter) or 1 (adopter). This type of model would allow us to identify and test additional antecedents to adoption.

Conclusion and Contributions

Whether or not Bitcoin will disrupt existing payment systems like Visa remains to be seen. In this paper, we presented a concise literature review of Bitcoin research to date. We then presented a study comparing adopters' IT readiness, innovativeness, and social media presence to non-adopters, based on characteristics from Rogers' diffusion of innovation theory. This research contributes to research on adoption by measuring an innovation's actual diffusion "live" and in-progress. It may be useful for future Bitcoin adopters, exchange services, investors and researchers. Organizations can use these results to compare themselves to Bitcoin adopters and non-adopters in order to identify their own level of readiness to adopt Bitcoins. Future research should extrapolate future Bitcoin diffusion and adoption and survey companies directly as to why they adopted Bitcoins, which will increase our understanding of how an innovation proceeds through the adoption lifecycle. Ideally, we hope that this and future research on Bitcoin will help make Nakamoto's vision of "the people's currency" a reality.

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