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ADVANTAGES AND CHALLENGES OF INCORPORATING VIRTUAL CURRENCY INTO
SMALL BUSINESSES

By

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Undergraduate Thesis
presented in partial fulfillment of the requirements
for the University Scholar distinction

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Missoula, MT

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Approved by:

Dr. David Firth, Faculty Mentor
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ABSTRACT

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Advantages and Challenges of Incorporating Virtual Currency into Small Businesses

Faculty Mentor: Dr. David Firth

This research paper discusses my findings in assisting Lake Missoula Tea Company become one of the first businesses in Missoula, Montana to accept Bitcoin, a virtual currency, as payment. First, I will offer a background of how Bitcoin technology works, and draw on notable historical issues to better understand its evolution, leading up to how it is currently used. I will explore possible economic benefits realized through utilizing Bitcoin in a business environment, such as transaction fee savings through substitution of traditional credit card processors, alleviating security and privacy issues, as well as publicity and marketing benefits. Serious roadblocks of the applicable usefulness of Bitcoin for a business are also discussed, based on my experience with Lake Missoula Tea Company and other examples. I hope to educate the small business sector on the risks and rewards of virtual currency, as well as enabling them to properly accept and process it as payment for goods or services.

Advantages and Challenges of Incorporating Virtual Currency into Small Businesses

I. Background

This research paper discusses my findings in assisting one of the first businesses in Missoula, Montana to accept Bitcoin, a virtual currency, as payment. I also explore economic reasons to use Bitcoin, such as transaction fee savings when not using traditional credit card processors, alleviating security and privacy issues, as well as publicity and marketing benefits. However, after executing much of my research in implementing Bitcoin usage for this local Montana business, I paused to consider the social and political implications of Bitcoin adoption. Bitcoin is like money, but the similarities are extremely limited. Since Bitcoin is truly the first decentralized currency, whose value is not manipulated whatsoever by a central authority, and can be moved digitally around the world from one person to another with staggering anonymity. In fact, many “Bitcoiners”, or Bitcoin users, have pointed to the Federal Reserve, as well as large national banks, saying this virtual currency could possibly disrupt the entire fiat currency system. Banks are likely not fond of this idea (and skeptical of being disrupted), as Bitcoin users store money not in a traditional bank account, but a completely encrypted, private, and anonymous Bitcoin “wallet”, out of reach by large corporate institutions. In a Bitcoiner’s perfect world, there is no such thing as banking fees, debit or credit card security breaches, currency exchange issues, and government manipulation of currency. By using Bitcoin, one is essentially engaging in transactions without using a government-backed unit of value. The effects of currency inflation and deflation will never be relevant for Bitcoin, due to the fact that the number of Bitcoin that can ever be introduced is limited to 21 million (Bitcoin.org). The value of Bitcoin is not directly affected by a government’s printing of money. The currency will rather only be affected by what *acquirers of Bitcoin believe it is worth*. Additionally, if one lives in a nation whose currency

fails, the value of Bitcoin would not plummet along with it, but rather theoretically serve as a possible substitution. Gold could still be used in the event of a currency crisis such as hyperinflation, but Bitcoin's digital convenience would be more relevant for online commerce. These implications of Bitcoin, if it were to become a widely-used technology, are massive, and as such, peaked my interest. Therefore, I decided to initiate this project in which I introduced Bitcoin into Missoula, Montana, a community which has seen ultimately zero Bitcoin usage by vendors and consumers. This research paper will begin by addressing a few core issues surrounding Bitcoin, and then finally discuss my experience in being the first to my knowledge to integrate Bitcoin into a small business in Missoula, Montana.

II. Bitcoin Overview and Key Issues

Bitcoin is a totally new technology, and before its creation (around 2009) by an anonymous programmer with the pseudonym Satoshi Nakamoto, nothing like it yet existed. Marc Andreessen, one of the co-inventors of the world's first widely used internet browser in the nineties, and founder of one of the most well-known Silicon Valley venture capital firms Andreessen Horowitz, said in an interview with the Washington Post, "When we're sitting here in 20 years, we'll be talking about Bitcoin the way we talk about the Internet today. We just need time for it to play out" (Fung). Just as there was serious skepticism towards the Internet in its infancy, Andreessen feels Bitcoin may follow a similar path, from an innovation seen as preposterous to an integral part of daily human life. A roadblock these two separate, complex innovations have faced has been getting the public to understand how they work and what the actual benefits are to utilizing them. In one senior-level MIS class, "Information Infrastructures", I was assigned a group project, which was to introduce a disruptive technology to the class, which is a process, service, or product that solves an existing problem in a new way. We had

approximately 15 minutes to explain Bitcoin, its history, as well as its implications for the future, and were only able to scratch the very top of the surface of this subject. Even trying to simplify the Bitcoin world to a group of young, tech-savvy students resulted in many glazed-over expressions. In short, the Bitcoin phenomenon has many dimensions, which all interact in ways that offer both substantial opportunities and risks. I will begin to discuss Bitcoin's many uses and some of its relevant history, so readers of this paper will better understand my observations at Missoula Lake Tea Company, which will be discussed later.

II (A). Bitcoin as an Investment

For many, the virtual currency has served as an investment, since a select few "Bitcoin millionaires" purchased hundreds or thousands of Bitcoin when the exchange rate was only \$0.10 for 1 BTC, and were able to sell them each at around \$1,145 only a few years later. Looking at Blockchain.info's Bitcoin Market Price graph in **Appendix A**, the price of one Bitcoin skyrocketed from nearly zero to a record of about \$1,145 (dated November 29, 2013) in a matter of a few years, which is the most at which the virtual currency has ever been valued, or any virtual currency for that matter, as of the date of this writing. Many believe the sudden increase in its value is attributed to increased awareness, usage, and venture capital interest. The sad news for those who held onto their hordes of Bitcoin after that January realized a huge loss on their investment, when it sporadically tumbled to \$569 on December 17, 2013. Ever since its last large increase to \$666 on June 2, 2014, Bitcoin has been slowly decreasing in value, down to about \$245 as of this writing in March of 2015. It is extremely uncertain what the value of Bitcoin will be in the future. It is clear that scandals such as the Bitcoin stolen by the former Mount Gox CEO and illegal drug smuggling activity with the usage of Bitcoin has caused many

to view Bitcoin as a negative technology which promotes criminal activity. It should be noted however, that some believed the same of the Internet in its own early beginnings.

II (B). Bitcoin as a Currency

To other stakeholders, Bitcoin can serve as a currency, as is the more long-term approach to its use. This however has proven difficult, due to the incredibly volatile value of Bitcoin. If one purchases \$500 worth of the virtual currency today, it could be worth \$300 in a few months, or even days. Additionally, because few individuals actually own Bitcoin, fewer businesses accept them as payment. In August of 2014, Coinbase stated in a hearing to the United States House of Representatives Committee on Small Business that "...roughly 50,000 businesses that are accepting [Bitcoin]," or less than 1 percent of all small businesses in the United States (16). Using Bitcoin in everyday life instead of currency is currently extremely difficult. In Kashmir Hill's book, *Secret Money: Living on Bitcoin in the Real World*, the author attempts to "live on Bitcoin" for one week, which ends up proving to be a challenging task, even in the forward-thinking, tech-minded city of San Francisco. Kashmir was able to successfully order food using companies such as Foodler, where one can order food for delivery using the virtual currency. However, Kashmir was forced to purchase additional Bitcoin as well as solicit donations from her supporters of her experiment, due to its tremendous drop in value at the time. Bitcoin is certainly not at the stage of acceptance where it can be used as a regular, every-day currency, but rather as an alternative currency, which can be valued for its anonymity, security, and virtually nonexistent transaction and transfer fees. If a primary currency fails, Bitcoin will always be available for personal and business use, regardless of government stability.

II (C). Bitcoin as a Transaction Network Protocol for Fiat Currency

Coinbase, one of the most widely used United States-based Bitcoin exchanges, offers a service for merchants to instantly exchange Bitcoin for USD upon completion of every Bitcoin transaction, and the amount to be deposited directly into a separate, traditional bank account. This is treating Bitcoin as a transaction network for fiat currency: Person A sends Person B \$2 to purchase a cup of coffee. To Person A, they view the coffee as being purchased in dollars. To Person B, the case is similar: they receive \$2 and thus view the coffee as being sold in this fiat currency denomination. However behind the scenes, a Bitcoin processing network (instead of a bank or credit card network), such as Coinbase, instantly converts the dollars into virtual currency, which travels swiftly from ownership of the buyer to the seller, and is then converted back into dollars, which are subsequently deposited into a traditional bank account. In this scenario, the Bitcoin is only used while it is actively being transferred between parties, and not kept in long-term storage, nor is it even seen by either party in the transaction. In the case of Lake Missoula Tea Company, the owner does not have an incentive to store Bitcoin in a Bitcoin wallet over time, since the exchange rate of Bitcoin to USD can fluctuate rapidly within a matter of hours. The advantageous feature of using Bitcoin as a method of transporting money is its speed, security, anonymity, comparative cheapness, and disregard for international borders. Transferring money internationally using the Money Gram network comes along with fees. Domestically, accepting credit cards and utilizing their networks as a merchant also come with sizable fees, which are discussed later. The Bitcoin network however, is free for anyone to use. Coinbase charges about 1% every time an individual user wishes to convert Bitcoin into USD or vice-versa, which is small in comparison to traditional transaction fees. For businesses, Coinbase charges 0% on the first \$1 million of sales (Coinbase.com).

II (D). Economic Savings Analysis of Transaction Fees on Business, Local, State, and National Scale

One of the key reasons small businesses would be interested in using Bitcoin is due to their thin gross margins. Eliminating an unnecessary, old way of transacting is namely the savings Bitcoin provides in comparison to accepting credit cards. For a huge company such as McDonald's, making a one dollar transaction on the VISA network is not nearly as big of an issue as it is for a company such as Big Dipper Ice Cream, a local business in Missoula, Montana, which historically required a minimum dollar amount of a sale to be willing to process a credit or debit card transaction. The reason is due to the tremendously huge fees that credit card processors charge small businesses. In a testimony at a hearing to the U.S. House of Representatives Committee on Small Business, Mark Williams, a member of the Finance committee at Boston University, noted credit card processors' toll on small businesses: "The cost of processing plastic is higher and small businesses attempt to manage higher fees especially on smaller purchased items by imposing credit card minimums or by establishing a cash or credit card price. The average cost of credit card transactions to merchants ranges from 2 to 3 percent," (it should be noted that elsewhere in the hearing, it is noted that credit card fees can also range from 3 to 5 percent) (16, 6). Square, a popular payment processing service, has been widely adopted by many small businesses due to its low 2.75% fee per transaction when a card is physically present. Simply entering in a credit card number costs the merchant 3.5% plus 15 cents per transaction (Square.com). Because these transaction fees are relatively cheap, and the hardware to use the service requires nothing more than a free credit card reader which can plug into any smartphone or tablet, it may seem like too much work to utilize Bitcoin for the additional 1-4% savings. However, accepting Bitcoin is extremely easy with an app such as

Coinbase, where a user simply scans a QR code with their smartphone to pay the merchant. The company has stated that for the first \$1,000,000 dollars worth of Bitcoin transactions, it will not charge any transaction fees to merchants, and after which the fee will only be 1% (Coinbase.com). Therefore, it is both easy and virtually free to accept Bitcoin as a payment. On the other hand, Square is rolling out a new feature in which merchants' customers can purchase goods or services using their Bitcoin, and the merchant will never have to interact with the virtual currency. The customer will pay in Bitcoin, Square will automatically and instantly exchange the Bitcoin for dollars, and send the money to the Square merchant. In fact, it was noted in an article at Coindesk.com that Square merchants will not even know if a transaction occurred in Bitcoin, as they will only see the end result in USD as any other transaction. It is within a small business owner's best interest to identify the potential savings Bitcoin has to offer when utilizing one processor for virtual currency, such as Coinbase, over others like Square.

The method in which I have implemented at Lake Missoula Tea Company to accept Bitcoin results in a 0% transaction fee. If Bitcoin gains popularity, this fee will become more relevant as the volume of Bitcoin transactions increases for a merchant, and their desire to avoid the processing fees charged by comparatively more expensive payment processors such as Square. In a world without traditional payment processors who charge fees (VISA, Mastercard, Square, Paypal, etc) and wedge themselves between merchants and customers' transactions, I have estimated that approximately 103 billion dollars (using 2007 United States Census small business retail revenue amounts and weighted-average processing fee rates) could be saved by small businesses each year. Looking at the charts provided in the proceeding pages, the potential savings on a local, state, and national level are depicted in bold under "Estimated Fees Paid". The charts take into account that currently 66% of B2C transactions nationally occur via credit

card networks (Forbes). To calculate the average fees paid per credit card transaction, I calculated the weighted average of the range of credit card fee percentages paid to processors:

$$((3+4+5)/3) = 4.$$

Estimated Retail Merchant Fees Paid Annually to Credit and Debit Card Processing Firms

Citywide Transaction Fees Estimation		Amount
Missoula Retail Revenue, 2007		1,718,610,000.00
Percent of purchases via credit card		0.66
Missoula Retail Revenue via credit card		1,134,282,600.00
Average credit card transaction processing fee		0.04
Estimated Fees Paid		\$45,371,304.00

Statewide Transaction Fees Estimation		Amount
<i>Montana Retail Revenue, 2007</i>		14,686,854,000.00
Percent of purchases made via credit card		0.66
Montana Retail Revenue via credit card		9,693,323,640.00
Average credit card transaction processing fee		0.04
Estimated Fees Paid		\$387,732,945.60

National Transaction Fees Estimation		Amount
<i>USA Retail Revenue, 2007</i>		3,917,663,456,000.00
Percent of purchases via credit card		0.66
Missoula Retail Revenue via credit card		2,585,657,880,960.00
Average credit card transaction processing fee		0.04
Estimated Fees Paid		\$103,426,315,238.40

III. Observations from Integrating Bitcoin into Lake Missoula Tea Company

After taking time to think about what kind of business might be willing to accept Bitcoin, I came upon the following criteria for the quintessential adopter: a company with an online presence, small, approachable, and open to new ideas. Lake Missoula Tea Company (<http://lakemissoulateacompany.com/>) sells their loose-leaf tea online already, where the Bitcoin market can reach it globally. Before approaching the owners with my idea, I had already been to Lake Missoula Tea Company already on several occasions and had enjoyed their incredibly fresh

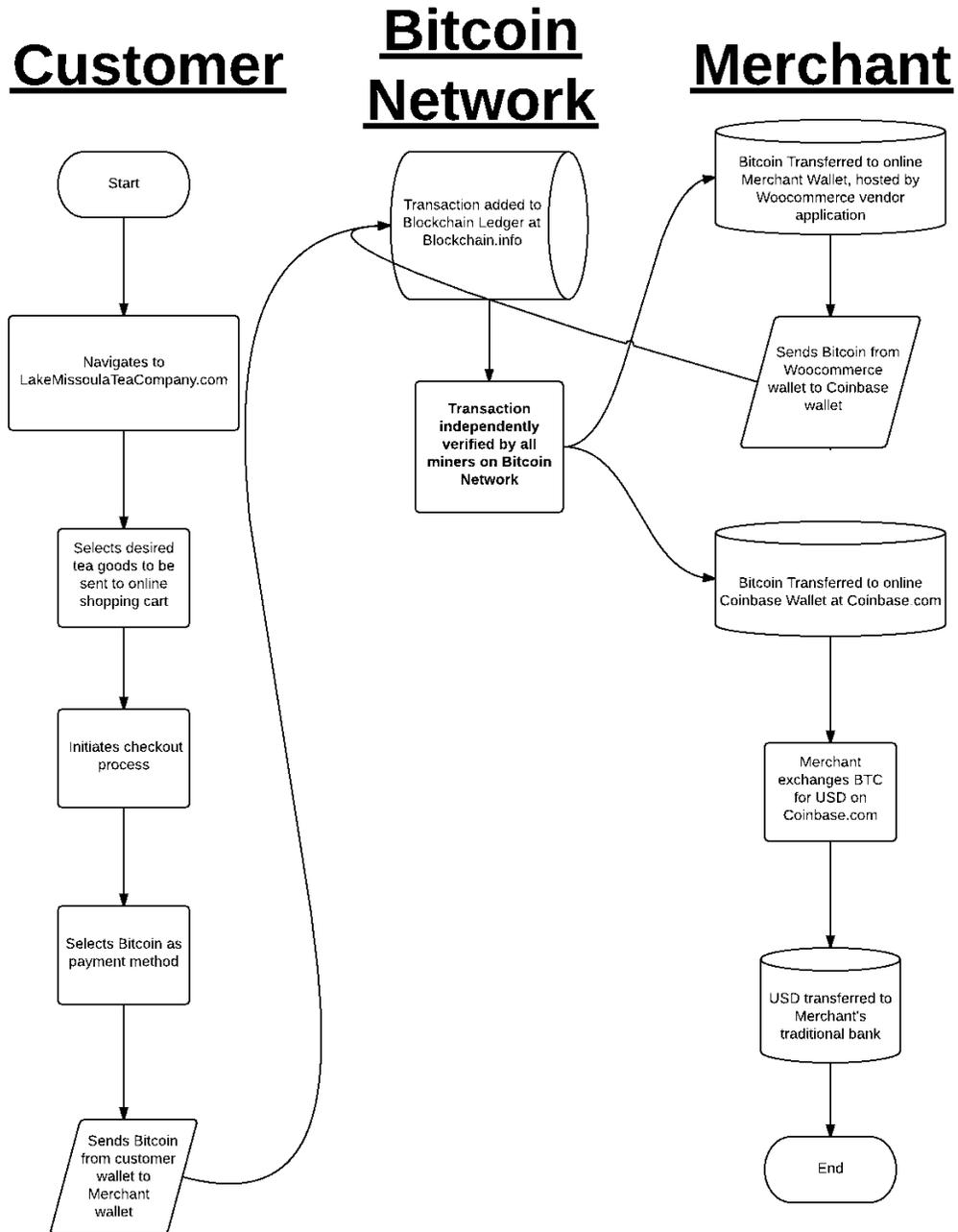
and exotic collection of teas from all across the globe. For some of their teas, the owners have actually travelled to the farms/gardens in which the product is grown, for the purpose of verifying humane working environments, and reliable quality. All of this can be enjoyed at a welcoming tea bar on their Broadway Street location in Downtown Missoula, inside the Masonic Temple building.

For Lake Missoula Tea Company, I was able to find a “plug-in” which altered their existing sales checkout software on their WordPress website for them to accept Bitcoin. A “plug-in” in this context is pre-written software on a Wordpress site that adds-in additional features to an existing website. As shown on the proceeding flowchart, the process of a customer paying with Bitcoin is somewhat complex, but relatively swift. When the customer is ready to pay, they can choose Bitcoin as a payment method. The customer is then brought to a Bitcoin checkout page (which is generated by the plugin), where both a QR code and a Bitcoin wallet address (a string of numbers and letters) are shown to the customer, instructing him or her to send a specified amount of the currency to the vendor. The customer may either copy and paste the text format of the wallet address into their own wallet and send the amount to the merchant, or use a smartphone app such as Coinbase, scan the QR code with the phone’s camera, and perform the same action. The next step occurs every time Bitcoin is transferred from one wallet to another: the Bitcoin network posts the amount of currency transferred, as well as the addresses at either end of the transaction onto the Blockchain Ledger. The Blockchain is a public ledger crucial to how Bitcoin works. Once a transaction has been posted, thousands of computers individually verify that the exchange of Bitcoin is genuine using a relatively complicated mathematical formula, which has cryptographic applications. This process ensures that no single Bitcoin can be spent twice by the same individual. It is widely accepted that Bitcoin’s cryptographic nature

of transaction verification is impossible for even any supercomputer to hack. However, this is not to be confused with hacking individual wallets to steal another users' Bitcoin—this has been done numerous times on Bitcoin exchanges such as Mount Gox and BitStamp. Rather, the *process of validating Bitcoin transactions themselves* is nearly impenetrable. If a Bitcoin user has an extremely large quantity of Bitcoin for an extended period of time, it is safest to store the Bitcoin on an offline, “cold” wallet for safekeeping. Coinbase takes care of this detail by storing 97% of users' funds spread “...geographically in safe deposit boxes and vaults around the world,” (Coinbase.com).

After the Blockchain network posts and verifies a Bitcoin transaction, the Wordpress plugin creates a temporary wallet for each transaction, asks the purchasing customer to send a specified amount of Bitcoin to that wallet, and the transaction is marked as complete, showing up in the vendor's list of pending shipments just as any other order. The Bitcoin in the temporary plug-in wallet are then sent to a Coinbase wallet, where an instant BTC to USD conversion and deposit into a traditional US bank account occurs. We attempted to find the most easy, direct, and inexpensive process of accepting Bitcoin while still using an existing checkout system. To view more detail regarding the Bitcoin acceptance process at Lake Missoula Tea Company, please refer to the flowchart below.

Bitcoin Transaction Process at Lake Missoula Tea Company



III (A). Benefits of Becoming a Community's First Adopter

Upon successful implementation of the Bitcoin POS feature, I registered with sites such as SpendBitcoins.com and Coinmap.org. The purpose of these sites is to act as a sort of “Yellow

Pages” for vendors who accept Bitcoin as payment. To further target “Bitcoiners”, or virtual currency aficionados who actively use Bitcoin, I began a small advertising campaign on Reddit.com, targeted at the site’s “technology buffs” block of users, or Reddit “readers”. This includes Subreddits, or different subpages within the website, with specific themes such as Bitcoin in general, “Bitcoin Markets” (topics on the price of bitcoin and exchanging bitcoin for other currencies), “Technology”, “Programming”, “InternetIsBeautiful”, or even “TalesFromTechSupport”. Although a Subreddit such as Bitcoin seems extremely specific and low profile, the page is reported at the time of this writing to have 142,117 subscribers. For only \$15, I was able to make 15,000 impressions upon this highly targeted area of users, many of whom likely *own* Bitcoin. However, the short ad campaign was met with little success. It seems as though word of mouth spread locally is the most effective means of getting customers interested to transact in Bitcoin, especially since it is such a new concept to Missoula. One customer of Lake Missoula actually spent upwards of \$60 on tea in Bitcoin, just out of sheer curiosity as to how the process would work. My hope is that Lake Missoula Tea company will release a news article to the Missoulian concerning its acceptance of Bitcoin, which will not only help market the business, but also the idea that Bitcoin can help local economies thrive.

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