Benefits from Using Bitcoin:: Empirical Evidence from a European Country

6 authors, including:

Rainer Schmidt
Munich University of Applied Sciences
275 PUBLICATIONS   **2,391** CITATIONS

SEE PROFILE

Michael Möhring
Hochschule Reutlingen
105 PUBLICATIONS   **1,293** CITATIONS

SEE PROFILE

Ralf-Christian Härting
Hochschule Aalen
75 PUBLICATIONS   **891** CITATIONS

SEE PROFILE

Barbara Keller
Duale Hochschule Baden-Württemberg Stuttgart
40 PUBLICATIONS   **173** CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Project   SEO Metrics View project

Project   Digital architecture framework View project

Benefits from Using Bitcoin:
Empirical Evidence from a European Country

Rainer Schmidt, Munich University of Applied Sciences, Munich, Germany

Michael Möhring, Munich University of Applied Sciences, Munich, Germany

Daniel Glück, Aalen University of Applied Sciences, Aalen, Germany

Ralf Haerting, Aalen University of Applied Sciences, Aalen, Germany

Barbara Keller, Aalen University of Applied Sciences, Aalen, Germany

Christopher Reichstein, Aalen University of Applied Sciences, Aalen, Germany

ABSTRACT

Bitcoin is the most successful approach for establishing a currency outside of state supervision and government institutions. Besides, Bitcoin is very controversial discussed. Therefore, a further investigation of different aspects of the benefit of using Bitcoin should be realized in order to identify some core aspects of the digital currency Bitcoin. In this context, the study described in the following achievements is done. It shows that there exist key aspects, like dissemination as well as safety, which are important impact factors on users' benefit of using a digital currency like Bitcoin. In addition, it also gives implications for a further development of the topic and aspects for future research.

KEYWORDS

1. INTRODUCTION

For centuries, the privilege of issuing banknotes and coins had been exclusively assigned to states and government institutions. Only they were able to suppress forgery by criminal prosecution. At the same time, the monopoly on the creation of money was also an expression of power. Therefore, it does not surprise that the rise of Bitcoin (Nakamoto, 2008) is also regarded as a "democratic disruption of finance" (El-Erian, 2014). Both, positive as well as negative aspects of Bitcoin can be found in the public discussion. Some regard it as a means to drive financial sector innovation (Hileman, 2014) or even as a weapon to break U.S. dominance in financial markets (Sheng, 2014). Critical voices consider Bitcoin as evil (Krugman, 2013), a kind of ultra-liberal putsch in order to destroy governmental structures (Krugman, 2013).

A central trait of bitcoin is anonymity (Reid & Harrigan, 2013), although first concepts are developed in order to de-anonymize bitcoin users (Dupont & Squicciarini, 2015). Nevertheless, there is research striving to identify the most important user groups of bitcoin (Bohr & Bashir, 2014). This research found that the average bitcoin user is rather young, 33 years old. Most bitcoin users are living in the U.S. and selected libertarian as preferred political ideology. In consequence freedom from government regulations is an important motivation to use bitcoins. Over recent years, the interest in Bitcoin increases while more and more companies starting to accept Bitcoin as a digital

currency. Companies can simply establish Bitcoin in their web pages due to payment service providers (Barber, Boyen, Shi, & Uzun, 2012). They provide supply Bitcoin as a payment information system in thousands of companies. For instance, the biggest payment systems are 'Bitpay' with over 50.000 and 'Coinbase' with more than 39.000 businesses and organizations. They include major companies like Dell, Microsoft, Expedia, Overstock.com and Wordpress ("BitPay," 2015, "Coinbase," 2015). The widespread practical use and the influence on Information Systems make Bitcoin of high relevance for information systems research (Giaglis & Kypriotaki, 2014; Glaser, Zimmermann, Haferkorn, Weber, & Siering, 2014). As a virtual currency Bitcoin can be used as a payment for services (Karame, Androulaki, & Capkun, 2012; Meiklejohn et al., 2013). However, Bitcoin can be also considered as a service (Sasson et al., 2014) or part of service-systems (Jim Spohrer, 2007).

The obvious fierceness of the discussions about Bitcoin makes it necessary to carve out the facts in a more clearly and precisely manner. Therefore, it is important to clarify what influences the benefits of using Bitcoin by using empirical research. This paper addresses the following research question: *What influences the benefit of using Bitcoin?* Thereby, the benefit of using Bitcoin can be defined as the advantages of the utilization of a digital currency (Bitcoin) from a user`s point of view.

Thus, this paper addresses two communities, the academic community and practical users of bitcoin such as enterprises. Academics will profit from the empirical insights as foundation for theoretical analysis. Potential users of bitcoin receive a framework allowing them to evaluate the benefits of bitcoin.

The contribution of the paper is to provide empirical insights into the benefits of using bitcoin. Existing research either tried to develop an economic model of bitcoin or analyzed the technological aspects such as anonymity. This research will address the research gap of the missing investigation of the benefits of using Bitcoin from a European view.

The paper is structured as follows: First, we give a short introduction to the topic about Bitcoin and develop a literature review (Cooper, 1998). In the next section, we define and explain the empirical research design and the method of structural equation modeling (Wong, 2013). Afterward, we discuss the findings of the research. Finally, the paper will be finished with a conclusion.

2. DIGITAL CURRENCY AND BITCOIN

Digital currency is growing rapidly based on the increasing use of internet services. According to ITU ("Country classifications," 2015), the volume of worldwide internet users surpassed 2.9 billion in 2014 – this is consistent with growth by a factor of 8 over 14 years, and it is expected that the rise will be continued in the future. In the context of these technological developments a widespread use of new internet services, especially virtual communities like Facebook or Twitter has to be stated.

In connection with some of these services, new types of digital currencies and methods of payment appeared. In economic literature, we find different approaches to categorize digital money. We find a helpful approach given by the European Central Bank (*Virtual Currency Schemes*, 2012, p. 12). The ECB distinguishes between regulated and unregulated digital currencies and the money format (see Table 1).

Table 1. Legal status of digital money, according to (Virtual Currency Schemes, 2012, p. 12)

	Legal Status	
	Regulated	**Unregulated**
Digital	E-Money	**Bitcoin**
	Commercial bank money (deposits)	
Physical	Banknotes and coins	Certain types of local currencies

The physical appearance of money differs between digital and physical. Regulated and physical money (e.g. traditional currencies) has a fixed supply of money, which is issued by a legally established money institution. Unregulated digital money is without has no statutory regulations. It is not fixed and often issued by a private institution. Within the frame of Table 1 and according to the definition of the virtual (digital) currency from the ECB, the following understanding for Bitcoin could be given: Bitcoin "is a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community" (*Virtual Currency Schemes*, 2012, p. 13).

Bitcoin is based on digital signatures saved in a protocol file. The protocol enables, a decentralized virtual network to transfer digital money, like TCP/IP (Fall & Stevens, 2011). This open source protocol is available to all peers of the internet without limitation. In that community, all transactions are packed into blocks, which are connected by a reference. The result is an ordered transaction in time, which is called block-chain (Nakamoto, 2008).

There are two mechanisms to receive Bitcoin (Nakamoto, 2008). First, Bitcoin can be generated by transferring goods against the digital currency. The second mechanism is a mining process. Creating a new valid block will be rewarded by the system. In other words, miners are credited by Bitcoin. The on-going mining process becomes more and more complex. This calls for more computing power with the result that the creating of Bitcoin decreases geometrically. Every four years the reward is halved (Nakamoto, 2008). The supply of Bitcoin will be finally limited by approaching 21 million bitcoins (*Virtual Currency Schemes*, 2012, p. 24). Due to this limit, it is expected for the future that fees play a more important role if miners create new blocks.

According to different determinants of a digital currency like Bitcoin, we developed a literature review in the next section.

3. DETERMINANTS OF THE DIGITAL CURRENCY BITCOIN

In order to gain a deeper knowledge in the field of the digital currency Bitcoin, a literature review according to Cooper (Cooper, 1998) was carried out. We systematically looked up for papers in established journals and conferences to ensure a high-quality standard. Therefore, we used databases such as Springer Link, AISel, IEEEXplore and ACM Digital Library. In association with the keyword "Bitcoin", we found several articles in English. The range of the field was wide and spread. It began with the first publication about Bitcoin by Satoshi Nakamoto in the year 2008 (Nakamoto, 2008) and also involved the field of Computer Science, Theoretical and Applied Economics, Public Policy as well as Finance. All relevant publications about Bitcoin (with respect to keyword "Bitcoin") were taken into consideration. All keywords with respect to other digital currencies (e.g. "digital currency") with different schemes were excluded. In summary, there was no broad view about the benefit of using Bitcoin. But we collected interesting determinants of the digital currency Bitcoin. Therefore, we design a research model as well as empirical study according to the results of the literature review.

Based on the literature review and the categorization of the results, we found the six determinants (summarized results) in relation to the determinants of using Bitcoin (Table 2).

Based on the literature, we found specific determinants that summarize main characteristics of Bitcoin.

The determinant "Transaction velocity" (Bamert et al., 2013; Barber et al., 2012; Singh et al., 2013) explains the fact that transactions are near real-time. Compared to traditional currencies, it is possible to transfer money in a digital world at a faster pace and with marginal transaction costs.

The term "Dissemination" (Brito & Castillo, 2013; Rogojanu & Badea, 2014; Van Alstyne, 2014) describes the rising spreading of the digital currency Bitcoin with more than 22,000 merchants accepting Bitcoin. Therefore, more and more gain from the opportunity to pay with Bitcoin in thousands of shops worldwide. One of the main reasons of these phenomena might be, that products bought with Bitcoin can be offered for a much lower price. This stands in contrast to the traditional

Table 2. Determinants

Determinant	Short Description	References
Transaction velocity	transactions are near real-time	(Bamert, Decker, Elsen, Wattenhofer, & Welten, 2013; Barber et al., 2012; Singh, Chandavarkar, Arora, & Agrawal, 2013)
Acceptance	rising dissemination	(Decker & Wattenhofer, 2013; Glaser et al., 2014; Rogojanu & Badea, 2014)
	more than 22.000 merchants accept Bitcoin	(Van Alstyne, 2014)
	no (physical) trader presence needed	(Brito & Castillo, 2013; Rogojanu & Badea, 2014)
	products are cheaper if are paid with bitcoins	(Brito & Castillo, 2013; Hurlburt & Bojanova, 2014; Rogojanu & Badea, 2014)
Decentrality	independent of central institutions and banks	(Bohr & Bashir, 2014; Glaser et al., 2014; Van Alstyne, 2014)
	no control by the government	(Bohr & Bashir, 2014; Rogojanu & Badea, 2014; Van Alstyne, 2014)
Usability	handling transactions (e.g. easy transfers, division of bitcoins)	(Bamert et al., 2013; Barber et al., 2012; Dev, 2014; Evans-Pughe, Novikov, & Vitaliev, 2014)
	Immediately available for implementations (e.g. smartphones)	(Barber et al., 2012; Hurlburt & Bojanova, 2014)
	no third parties (e.g. intermediate agents)	(Alt & Puschmann, 2012; Reid & Harrigan, 2013)
Community	Bitcoin users are part of a community	(Glaser et al., 2014)
	only a designated group (e.g. internet users) is able to use Bitcoins	(Glaser et al., 2014; Rogojanu & Badea, 2014)
Safety	users have virtual pseudonyms (Bitcoin addresses)	(Androulaki, Karame, Roeschlin, Scherer, & Capkun, 2013; Jayasinghe, Markantonakis, & Mayes, 2014; Miers, Garman, Green, & Rubin, 2013; Reid & Harrigan, 2013; Sasson et al., 2014)

currencies and could be explained for example through savings in time, because the physical presence of a trader is not needed (Decker & Wattenhofer, 2013; Hurlburt & Bojanova, 2014).

Considering the determinant "Decentrality" (Glaser et al., 2014; Rogojanu & Badea, 2014; Van Alstyne, 2014), the digital currency Bitcoin is neither dependent on central or even financial institutions nor is it controlled by the government. Hence, the digital currency Bitcoin is not at a risk of manipulations by institutions, governments and politicians (Gervais, Karame, Capkun, & Capkun, 2013; Sasson et al., 2014).

The determinant "Usability" (Barber et al., 2012; Reid & Harrigan, 2013) stands at least for three elementary factors. First, there is the handling of transactions. Therefore, Bitcoin is relatively uncomplicated because of the possibility to divide. Bitcoins can be divided into minimum units smaller than 1 Eurocent (Dev, 2014; Evans-Pughe et al., 2014). Second, digital money transfers are quite flexible. There are independent of the terminal device and can be done by e.g. smartphones, tablets, etc. everywhere and at any time. ("BitPay," 2015; Barber et al., 2012). Third, there are no intermediate agents like financiers when using Bitcoin as a digital currency (Alt & Puschmann, 2012; Reid & Harrigan, 2013).

For the explanation of the determinant "Community" (Glaser et al., 2014; Rogojanu & Badea, 2014), the psychology of group dynamics has to be understood (Alt & Puschmann, 2012). On the

one hand, it is crucial for group members to be an equivalent part of a certain group. On the contrary, groups aim to be more powerful in a special area compared with others. In this context, it is, therefore, important for Bitcoin users to be part of a designated group of internet user, which is exclusively able to deal with digital currencies (Bohr & Bashir, 2014; Evans-Pughe et al., 2014; Glaser et al., 2014).

Finally, the determinant called "Safety" (Androulaki et al., 2013; Miers et al., 2013; Sasson et al., 2014) describes the circumstance that users of digital currencies like Bitcoin have virtual pseudonyms meaning "Bitcoin addresses". Consequently, the use of the digital currency Bitcoin is not anonymous, but pseudonymous. Third parties do not know about the user's identity, but information about the usage is recorded and thus possible to backtrack (Jayasinghe et al., 2014; Reid & Harrigan, 2013).

We referred to the results and recommendations of prior research in our conducted empirical research. We investigated the impact of all the mentioned aspects on the benefits of using bitcoin. In contrast to studies in the past, we include all of them in our research model in order to create a framework as effectively as possible. This approach seems beneficial for theory as well as practice because it shows the evidence of each single aspects and develops the unique influence. Therefore, the model shows not only implications for starting point in future research and but also recommendations for practical implementation and use.

4. RESEARCH DESIGN AND METHODS

The following section defines our research design and methods to explore the benefit of using Bitcoin. It depicts the design of the study, research methods, and data collection.

4.1. Design of the Study

In order to explore the benefit of using Bitcoin, a quantitative research study was realized. The design of the study is shown in Figure 1 and it is developed in the following section. It is based on the literature review mentioned before (section 3).

The authors identified six determinants that might influence the benefit of using Bitcoin (according to section 3). First, we assume that users benefit from a fast transaction regarding the time needed to

Figure 1. Research model
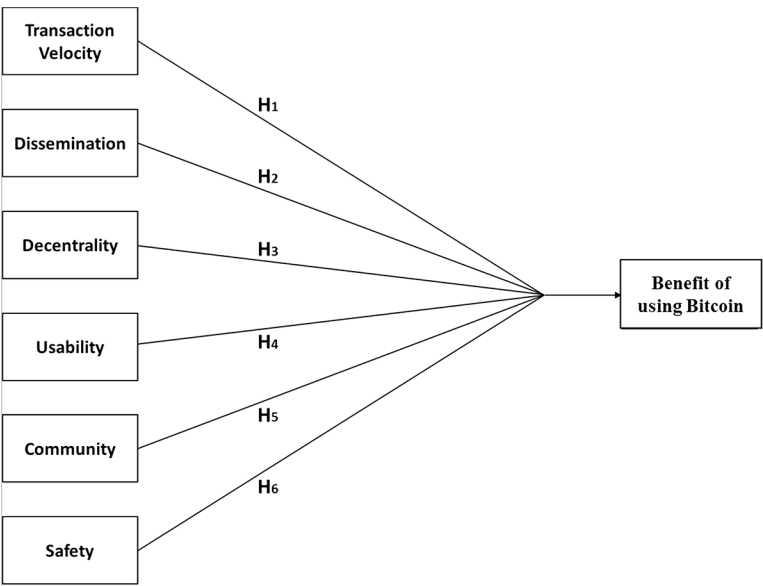
transfer money. With an electronic (financial) mechanism, the infrastructure of Bitcoin allows nearly real-time transactions, what might positively influence the benefit using Bitcoin, because of high time savings and low transaction costs (Bamert et al., 2013). Therefore, we postulated Hypothesis 1:

H1: A fast transaction positively influences the benefit of using Bitcoin.

There are crucial factors describing the high acceptance of Bitcoin. With an increasing number of merchants accepting Bitcoin and a widely distributed network of Bitcoin user, the dissemination of this digital money is rising (Brito & Castillo, 2013; Rogojanu & Badea, 2014). Furthermore, there is no need for a (physical) trader presence. Additionally, products can be bought at a lower price if they are paid with Bitcoin. This results in a higher user dissemination (Van Alstyne, 2014). Hence, we assume the following Hypothesis 2:

H2: A higher dissemination positively influences the benefit of using Bitcoin.

Third, studies showed admittedly that people value the possibility of central institutions and banks to intervene in recession or depression periods in order to harmonize fluctuations and to react against manipulations like counterfeit money (Benston & Kaufman, 1996; Richardson & Troost, 2006). In contradistinction to traditional currencies, the unregulated currency Bitcoin is neither dependent on central institutions and banks nor is it under government control which "... greatly appeals to individuals who wish for a freely-traded currency not in control by any governments, banks, or authorities…" (Giaglis & Kypriotaki, 2014, p. 4; Virtual Currency Schemes, 2012). These circumstances lead to Hypothesis 3:

H3: A decentralized digital currency positively influences the benefit of using Bitcoin.

It can be assumed that users exploit the usability of Bitcoin regarding the opportunity to transfer money easily by smartphones, etc. without involving third parties like intermediate agents (Barber et al., 2012; Reid & Harrigan, 2013). This assumption results in Hypothesis 4:

H4: The usability positively influences the benefit of using Bitcoin.

Studies have shown that the bigger a community is the higher is their influence on others (Glaser et al., 2014; Rogojanu & Badea, 2014). Thus, being part of a community, more specifically being part of a designated group, strongly influence the benefit of using Bitcoin. Therefore, Hypothesis 5 is formulated:

H5: A community-based currency positively influences the benefit of using Bitcoin.

In terms of security aspects, we expect that the possibility to use pseudonyms while trading with Bitcoins positively influences the benefit of using Bitcoin because of more privacy compared to real world trading transactions (Androulaki et al., 2013). This aspect resulting in Hypothesis 6:

H6: Safety positively influences the benefit of using Bitcoin.

For the investigation of the impact of the specified determinants above, the online-based responses of the participants ranged on a scale of one to five (1: very unimportant; 2: unimportant; 3: either... nor; 4: important; 5: very important) regarding specific items according to Table 4.

All questions were designed according to general empirical study guidelines (Hewson, 2003) and described in Table 4 as well as Table 5 in the appendix.

4.2. Research Methods and Data Collection

We conducted our quantitative research study via a web based online survey in Germany. We followed general empirical research guidelines (Creswell, 2012; Greenlaw & Brown-Welty, 2009).

First of all, we tested our web questionnaire via a pre-test to ensure a good quality of the study. After improving the questionnaire based on the pre-test data and decisions, the study started in July 2014 and was finished in September 2014. Our questionnaire was implemented into the open source web platform LimeSurvey ("LimeSurvey," 2011) and the pre-tested questions were implemented to ensure the quality of the survey. During three months a sample of about n=660 participants was collected. After cleaning the data, we collected a sample of about n=534.

The respondents include a wide range of personal attributes. The age of the asked persons differs from 16 to 82 (mean age: 31). 34% female and 66% male persons answered our questionnaire. More than 90% person using online financial systems (e.g. online banking) regularly and have been in contact with the Bitcoin topic (see Figure 2).

Moreover, we asked our participants about how they would use Bitcoin with 4 given possibilities to answer seen in Figure 3.

As a result, 283 persons out of 534 (53%) stated that they would use the digital currency Bitcoin mainly private rather than predominantly on business (4%) while almost one-third (33%) would never use Bitcoin. At least 55 people (9.7%) stated that they would use Bitcoin both, private and on business.

In the next step, structural equation modeling (SEM) (Chin, 1998; Hooper, Coughlan, & Mullen, 2008; Wong, 2013) were used to analyze our causal model (hypothesis). SEM (Hooper et al., 2008) can be defined as a method to analyze and evaluate the fit of a multivariate theoretical causal model with empirical data (Chin, 1998; Wong, 2013).

Figure 2. Usage of online financial systems
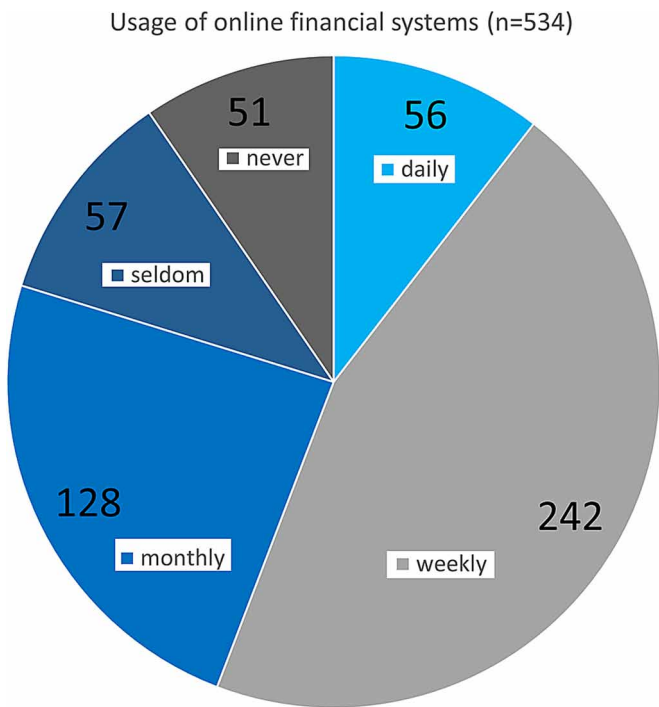

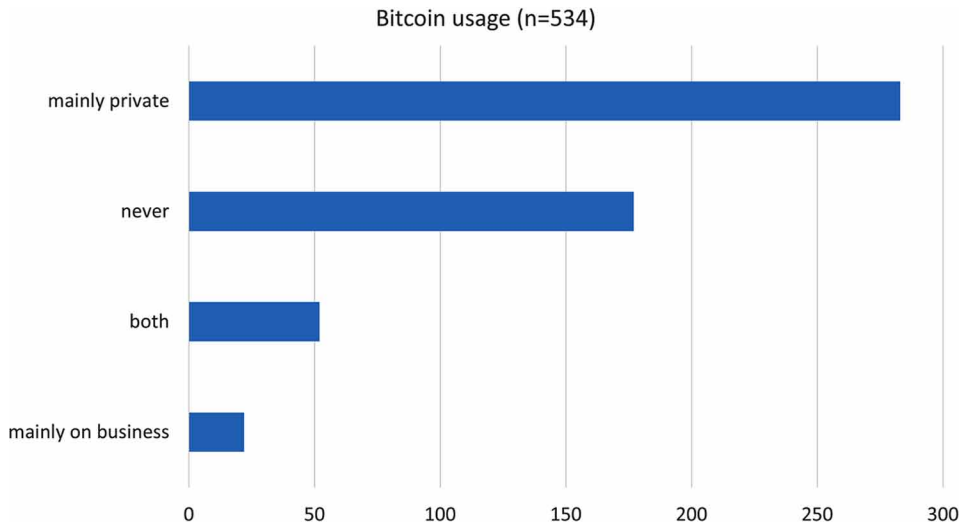Usage of online financial systems (n=534)

Figure 3. Bitcoin usage

We used a Partial Least Squares (PLS) (Wong, 2013) SEM approach because it is not so restrictive like other SEM approaches (e.g. AMOS) and focuses on analyzing the Partial-Least-Squares. Therefore, we test our PLS-SEM by using the software SmartPLS 3.1 (Ringle, Wende, & Will, 2005). In the case of single item sets, these are allowed and often used in information systems research (Ringle, Sarstedt, & Straub, 2012). There is no need to calculate metrics like Cronbach's Alpha for single item sets. For other item-sets with more than one item, we calculate Cronbach's Alpha for validating the scales (Ringle et al., 2012). By scale-validating with Cronbach's Alpha two item sets are also verifiable (Bland, Altman, & others, 1997). Furthermore, significances are calculated via Bootstrapping (Ringle et al., 2005).

5. RESULTS

After analyzing our data with structural equation modeling (SEM) to test the hypotheses by using SmartPLS 3.1 (Ringle et al., 2005), we got the following results (visualized in Figure 4).

According to Hypothesis 1 (*A fast transaction positively influences the benefit of using Bitcoin.*) the transaction velocity has a positive impact (+ 0.124) on the benefit of using Bitcoin. Therefore, the hypothesis can be confirmed. Based on this Hypothesis, Bitcoin must process a transaction very quickly to be successful as well as beneficial for users.

Hypothesis 2 analyzes the influence of the dissemination of Bitcoin. After analyzing the data with structural equation modeling, Hypothesis 2 (*A higher dissemination positively influences the benefit of using Bitcoin.*) can be confirmed. According to our structural equation model (Figure 1, 4), the dissemination even has the highest influence (+ 0.246) on the benefit of using Bitcoin. For users of this digital currency, the results show that paying at different places (e.g. Bars, web shops) with Bitcoin is very important.

Regarding the fact that the digital currency Bitcoin is decentralized, our hypothesis 3 (*A decentralized digital currency positively influence the benefit of using Bitcoin.*) tests this relation. Based on the sample data combined with our structural equation model, Hypothesis 3 can be confirmed because of a positive effect (+ 0.147). As a consequence, Bitcoin users greatly honor a freely-traded currency, which is not in control by any government, bank or authority.

Figure 4. Structural equation model with coefficients
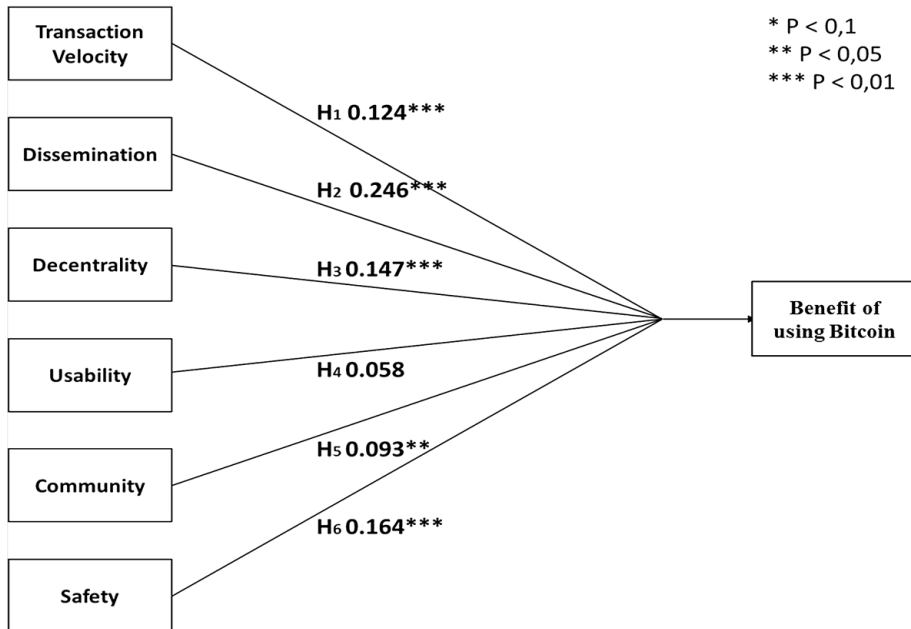
The usability of Bitcoin can be seen as another very important aspect referred to the reviewed literature. Unfortunately, our analysis of the influence of the usability on the benefit of using Bitcoin is not significant (see Table 3). Furthermore, the value of Cronbach's Alpha is not as high as mentioned in the literature ($0.4 < 0.7$) (Santos, 1999). Therefore, Hypothesis 4 (*The usability positively influences the benefit of using Bitcoin.*) cannot be confirmed. Reasons for not confirming Hypothesis 4 might be difficulties in understanding the Bitcoin mining process (Dwyer, Hiltz, & Widmeyer, 2008). In addition to a less convenient handling, the Bitcoin mining process is said to be vulnerable, too (Karanasios, Cooper, Deng, Molla, & Pittayachawan, 2010).

If someone wants to be a user of Bitcoin, he or she must be a member of the community. Our Hypothesis 5 tried to explain the effect of the community aspects on the benefit of using Bitcoin. Covering our data, communities are relevant aspects of Bitcoin ($+ 0.093$). Based on this, Hypothesis 5 (*A community-based currency positively influences the benefit of using Bitcoin.*) can be confirmed. Hence, users benefit from Bitcoin by being part of a designated group of internet user that are solely able to deal with digital currencies (Glaser et al., 2014; Rogojanu & Badea, 2014). As a result, the

Table 3. SEM coefficient

Path	Path Coefficient	Significance (P Values)
Transaction velocity → Benefit of using Bitcoin	0.124	0.007
Dissemination→ Benefit of using Bitcoin	0.246	0.000
Decentrality → Benefit of using Bitcoin	0.147	0.002
Usability → Benefit of using Bitcoin	0.058	0.193
Community → Benefit of using Bitcoin	0.093	0.042
Safety → Benefit of using Bitcoin	0.164	0.000

bigger (i.e. stronger) the Bitcoin community is, the higher its influence on others and the higher the benefit of using Bitcoin.

Hypothesis 6 (*Safety positively influences the benefit of using Bitcoin.*) can be confirmed based on our structural equation model, too. Pseudonymity in terms of security aspects is consequently very important for users trading with Bitcoin in the digital world (+ 0.164) because of more trading privacy compared to real world transactions (Androulaki et al., 2013).

The important values of the SEM (Figure 4) are all summarized in Table 3 and Table 4. The coefficient of determination (R^2) is also in a satisfying range (0.242 > 0.19) according to the literature (Chin, 1998) as well the composite reliability (>0.70).

For single item sets (in this paper: transaction velocity and safety) there is no need to calculate metrics like Cronbach's Alpha (Ringle et al., 2012). Additional material (e.g. questions) of the study can be found in the appendix of the paper.

6. CONCLUSION

Our paper explores different aspects of the benefit of using Bitcoin. Dissemination as well as safety are important impact factors for users of the benefit of using Bitcoin. Increasing daily transactions are important for a growing (shop) acceptance. Also important is a network for Bitcoin and its increasingly the standing (Van Alstyne, 2014). Furthermore, decentralization and the velocity of a transaction are important for the user of a digital currency (Bitcoin).

Our study can help academics to understand some core aspects of the use and benefits of Bitcoin. Further, it can be helpful with regard to a development and combination with other economics as well as information system concepts. We contribute to the literature how the benefit of using Bitcoin is influenced. Researchers can profit from the identified influence factors in different ways. For instance, they can validate it. Also an investigation for other digital currencies like AuroraCoin, Litecoin, etc. could be interesting. The aspects, which have a significant influence on Bitcoin could be transferred to this different but similar currencies. Maybe there are differences between, which are not immediately recognizable. Therefore, future research should provide some further insights and put the results of the conducted study in a more common context. Furthermore, the influence factors can be used to examine user behavior in the context of digital currencies.

Table 4. Cronbach's-Alpha and items; *rounded

	Cronbach's Alpha*
Transaction velocity (How important is velocity regarding transactions with a digital currency?)	- (1 item)
Dissemination (How important are the following criteria regarding Bitcoin: number of users, number of merchants, no needed (physical) trader presence, buying power?)	0.7 (4 items)
Decentrality (How important are the following criteria regarding Bitcoin: independency of central institutions, state control?)	0.8 (2 items)
Usability (How important are the following criteria regarding Bitcoin: ease of handling, mobility, service?)	0.4 (3 items)
Community (How important are the following criteria regarding Bitcoin: being part of a community, group behavior?)	0.8 (2 items)
Safety (How important is it to be pseudonym when trading with a digital currency?)	- (1 item)
Use of Bitcoin (For how important do you value the use of Bitcoin and the use of digital currencies in general?)	0.8 (2 items)

Practical users can benefit from this study for developing or improving current or new digital currencies. The mentioned aspects, which are all significant can help to fulfill the requirements users impose to digital currency. This could be a beneficial approach not only to enhance the benefit of using digital currencies (e.g. Bitcoin), but also to improve the benefit and consequently hold a competitive market position. Furthermore, the users (e.g. online stores, retailers, or personal users) can evaluate Bitcoin for their individual use and compare the important influence factors with their own preferences.

According to aspects of distributed organization, not all argumentations of the literature can be confirmed in an empirical case. However, there are some limitations to discuss. First, our study was based only on a German-Speaking sample. The aspects may differ in other countries (e.g. US and BRIC states). Furthermore, Bitcoin is not used by all of the people we asked. Therefore, the answers might be differenced after the responder has used some of the digital currency. Hence, most factors are not as strong as expected in the literature. A deeper insight into the personal preferences of Bitcoin users can not be reached via a quantitative study (cf. qualitative research methods).

Therefore, future research should investigate cultural differences as well as differences to other digital currencies in order to enlarge our study. Furthermore, qualitative insights of using of Bitcoin would also be a good opportunity for future research.

Therefore, future research should investigate deeper insights in personal preferences of the use of Bitcoin by using a qualitative research approach (e.g. interviews). Future research can further enlarge the sample of different countries and can explore cross-cultural aspects as well as differences in this study (e.g. in the next decade). Furthermore, analysis of current Bitcoin transactions with methods of Big Data can be applied (Zikopoulus & Eaton, 2011; Schmidt et al., 2014). Other qualitative research methods to investigate user Behavior of Bitcoins can also be a good opportunity for future research.

REFERENCES

Alt, R., & Puschmann, T. (2012). The rise of customer-oriented banking-electronic markets are paving the way for change in the financial industry. *Electronic Markets*, *22*(4), 203–215. doi:10.1007/s12525-012-0106-2

Androulaki, E., Karame, G. O., Roeschlin, M., Scherer, T., & Capkun, S. (2013). Evaluating user privacy in bitcoin. In *Financial Cryptography and Data Security* (pp. 34–51). Springer. doi:10.1007/978-3-642-39884-1_4

Bamert, T., Decker, C., Elsen, L., Wattenhofer, R., & Welten, S. (2013). Have a snack, pay with bitcoins. *Proceedings of the 2013 IEEE Thirteenth International Conference on Peer-to-Peer Computing (P2P)* (pp. 1–5). IEEE. doi:10.1109/P2P.2013.6688717

Barber, S., Boyen, X., Shi, E., & Uzun, E. (2012). Bitter to better—how to make bitcoin a better currency. In *Financial Cryptography and Data Security* (pp. 399–414). Springer. doi:10.1007/978-3-642-32946-3_29

Benston, G. J., & Kaufman, G. G. (1996). The appropriate role of bank regulation. *The Economic Journal*, *106*(436), 688–697. doi:10.2307/2235577

BitPay. (2015). Accept Bitcoin. Retrieved from https://bitpay.com/

Bland, J. M., & Altman, D. G. et al. (1997). Statistics notes: Cronbach's alpha. *BMJ (Clinical Research Ed.)*, *314*(7080), 572. doi:10.1136/bmj.314.7080.572 PMID:9055718

Bohr, J., & Bashir, M. (2014). Who Uses Bitcoin? An exploration of the Bitcoin community. *Proceedings of the 2014 Twelfth Annual International Conference on Privacy, Security and Trust (PST)* (pp. 94–101). IEEE. doi:10.1109/PST.2014.6890928

Brito, J., & Castillo, A. (2013). *Bitcoin: A primer for policymakers*. Mercatus Center at George Mason University.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, *295*(2), 295–336.

Coinbase. (2015). Accept Bitcoin Payments. Retrieved from https://www.coinbase.com/merchants?locale=en

Computing Research & Education. (2015). Conference Rankings. Retrieved from http://www.core.edu.au/index.php/conference-rankings

Cooper, H. M. (1998). *Synthesizing research: A guide for literature reviews* (Vol. 2). Sage.

Creswell, J. W. (2012). Qualitative inquiry and research design: Choosing among five approaches. *Sage (Atlanta, Ga.)*.

Decker, C., & Wattenhofer, R. (2013). Information propagation in the Bitcoin network. *Proceedings of the 2013 IEEE Thirteenth International Conference on Peer-to-Peer Computing (P2P)* (pp. 1–10). IEEE. doi:10.1109/P2P.2013.6688704

Dev, J. A. (2014). Bitcoin mining acceleration and performance quantification. *Proceedings of the 2014 IEEE 27th Canadian Conference on Electrical and Computer Engineering (CCECE)* (pp. 1–6). IEEE. doi:10.1109/CCECE.2014.6900989

Dupont, J., & Squicciarini, A. C. (2015). Toward De-Anonymizing Bitcoin by Mapping Users Location. Proceedings of the 5th ACM Conference on Data and Application Security and Privacy (pp. 139–141). ACM; Retrieved from http://dl.acm.org/citation.cfm?id=2699128 doi:10.1145/2699026.2699128

Dwyer, C., Hiltz, S. R., & Widmeyer, G. (2008). Understanding Development and Usage of Social Networking Sites: The Social Software Performance Model. *Proceedings of the 41st AnnualHawaii International Conference on System Sciences* (p. 292). http://doi.org/ doi:10.1109/HICSS.2008.476

El-Erian, M. A. (2014, April 22). The Democratic Disruption of Finance. Retrieved from http://www.project-syndicate.org/commentary/mohamed-a--el-erian-compares-nascent-innovations-in-the-financial-sector-to-those-that-have-transformed-media

European Central Bank. (2012). *Virtual Currency Schemes*. Retrieved from http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf

Evans-Pughe, C., Novikov, A., & Vitaliev, V. (2014). To bit or not to bit?[Bitcoin cryptocurrency]. *Engineering & Technology*, *9*(4), 82–85. doi:10.1049/et.2014.0411

Fall, K. R., & Stevens, W. R. (2011). TCP/IP illustrated, volume 1: The protocols. Addison-Wesley.

Gervais, A., Karame, G., Capkun, S., & Capkun, V. (2013). Is Bitcoin a decentralized currency? *IACR Cryptology ePrint Archive*.

Giaglis, G. M., & Kypriotaki, K. N. (2014). Towards an Agenda for Information Systems Research on Digital Currencies and Bitcoin. Proceedings of the Business Information Systems Workshops (pp. 3–13). Springer. doi:10.1007/978-3-319-11460-6_1

Glaser, F., Zimmermann, K., Haferkorn, M., Weber, M. C., & Siering, M. (2014). *Bitcoin-Asset or Currency? Revealing Users' Hidden Intentions.* ECIS.

Greenlaw, C., & Brown-Welty, S. (2009). A comparison of web-based and paper-based survey methods testing assumptions of survey mode and response cost. *Evaluation Review*, *33*(5), 464–480. doi:10.1177/0193841X09340214 PMID:19605623

Hewson, C. (2003). Internet research methods: A practical guide for the social and behavioural sciences. *Sage (Atlanta, Ga.)*.

Hileman, G. (2014, February 12). Buying into Bitcoin. Retrieved from http://www.project-syndicate.org/commentary/garrick-hileman-highlights-bitcoin-s-potential-to-drive-financial-sector-innovation-and-reform

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: guidelines for determining model fit. *Articles*, 2.

Hurlburt, G. F., & Bojanova, I. (2014). Bitcoin: Benefit or Curse? *IT Professional*, *16*(3), 10–15. doi:10.1109/MITP.2014.28

ITU. (2015). Country classifications. Retrieved from http://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx

Jayasinghe, D., Markantonakis, K., & Mayes, K. (2014). Optimistic Fair-Exchange with Anonymity for Bitcoin Users. *Proceedings of the 2014 IEEE 11th International Conference on e-Business Engineering (ICEBE)* (pp. 44–51). IEEE. doi:10.1109/ICEBE.2014.20

Karame, G. O., Androulaki, E., & Capkun, S. (2012). Double-spending fast payments in bitcoin. Proceedings of the 2012 ACM conference on Computer and communications security (pp. 906–917). ACM. Retrieved from http://dl.acm.org/citation.cfm?id=2382292

Karanasios, S., Cooper, V., Deng, H., Molla, A., & Pittayachawan, S. (2010). Antecedents to Greening Data Centres: A conceptual framework and exploratory case study.

Krugman, P. (2013). Bitcoin is evil. *New York Times*.

LimeSurvey. (2011, April 24). Survey Tool [Software]. Retrieved from http://www.limesurvey.org/de/start

Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCoy, D., Voelker, G. M., & Savage, S. (2013). A fistful of bitcoins: characterizing payments among men with no names. Proceedings of the 2013 conference on Internet measurement conference (pp. 127–140). ACM. Retrieved from http://dl.acm.org/citation.cfm?id=2504747 doi:10.1145/2504730.2504747

Miers, I., Garman, C., Green, M., & Rubin, A. D. (2013). Zerocoin: Anonymous distributed e-cash from bitcoin. *Proceedings of the 2013 IEEE Symposium on Security and Privacy (SP)* (pp. 397–411). IEEE.

Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Consulted, 1*(2012), 28.

Reid, F., & Harrigan, M. (2013). *An analysis of anonymity in the bitcoin system*. Springer. doi:10.1007/978-1-4614-4139-7_10

Richardson, G., & Troost, W. (2006). *Monetary intervention mitigated banking panics during the Great Depression: Quasi-experimental evidence from the Federal Reserve district border in Mississippi, 1929 to 1933*. National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w12591

Ringle, C. M., Sarstedt, M., & Straub, D. (2012). A critical look at the use of PLS-SEM in MIS Quarterly. *Management Information Systems Quarterly*, *36*(1).

Ringle, C. M., Wende, S., & Will, A. (2005). SmartPLS 2.0 (beta). Hamburg, Germany.

Rogojanu, A., & Badea, L. (2014). The issue of competing currencies. Case study–Bitcoin. *Theoretical and Applied Economics*, *21*(1), 103–114.

Santos, J. R. A. (1999). Cronbach's alpha: A tool for assessing the reliability of scales. *Journal of Extension*, *37*(2), 1–5.

Sasson, E. B., Chiesa, A., Garman, C., Green, M., Miers, I., Tromer, E., & Virza, M. (2014). Zerocash: Decentralized anonymous payments from Bitcoin. *Proceedings of the 2014 IEEE Symposium on Security and Privacy (SP)* (pp. 459–474). IEEE.

Schmidt, R., Möhring, M., Maier, S., Pietsch, J., & Härting, R. C. (2014, May). Big data as strategic enabler-insights from central european enterprises. In International Conference on Business Information Systems (pp. 50-60). Springer International Publishing.

Sheng, A. (2014, August 14). The Coming CLASS War. Retrieved from http://www.project-syndicate.org/commentary/andrew-sheng-argues-that-cyberspace--land--air--sea--and-space-now-define-the-basis-of-global-conflict

Singh, P., Chandavarkar, B. R., Arora, S., & Agrawal, N. (2013). Performance Comparison of Executing Fast Transactions in Bitcoin Network Using Verifiable Code Execution. *Proceedings of the 2013 2nd International Conference on Advanced Computing, Networking and Security (ADCONS)* (pp. 193–198). IEEE.

Spohrer, J. (2007, January). Steps Toward a Science of Service Systems. Retrieved from http://csdl2.computer.org/persagen/DLAbsToc.jsp?resourcePath=/dl/mags/co/&toc=comp/mags/co/2007/01/r1toc.xml&DOI=10.1109/MC.2007.33

Van Alstyne, M. (2014). Why Bitcoin has value. *Communications of the ACM*, *57*(5), 30–32. doi:10.1145/2594288

Wong, K. K.-K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS. *Marketing Bulletin*, *24*, 1–32.

Zikopoulos, P., & Eaton, C. (2011). Understanding big data: Analytics for enterprise class hadoop and streaming data. McGraw-Hill Osborne Media.

Rainer Schmidt is a professor for business information systems at Munich University of Applied Sciences. He has a PhD and an engineering degree in Computer Science. His current research areas include service science, enterprise computing, business process management, social software, business/IS alignment and the integration of these themes. He has industrial experience as management consultant and researcher. Rainer Schmidt is co-organizer of the BPMDS working conference at CAISE, the BPMS2 workshop series at BPM'08, BPM'09, BPM'10, BPM'11, BPM'12, BPM'13 the SoEA4EE workshop series and member of the program committee of several workshops and conferences. Rainer Schmidt is serving on the editorial boards of International Journal of Information Systems in the Service Sector and International Journal on Advances in Internet Technology. Rainer Schmidt applies his research in a number of projects and cooperation with industry.

Michael Möhring, MSc, studied Business Information Systems at the Ilmenau University of Technology and works as a Researcher and Lecturer at Munich University of Applied Sciences.

Daniel Glück received his Bachelor in Business Administration and Economics from the University of Aalen in 2014. At the end of 2014 he started a Master Program in Industrial Sales and is currently working as a Student Assistant at the University of Aalen and in the Software Division of a company.

Ralf Härting holds a PhD in economics from Munich University and is a professor of business information systems at the University of Applied Sciences Aalen.

Barbara Keller, Dipl.-Kffr., studied Business economics and Marketing at the University of Augsburg and works as a Researcher and Lecturer at Aalen University.

APPENDIX

In the following section there are additional materials (e.g. quality metrics) of the made data analysis.

Table 5. Questions of the study

Transaction velocity	● How important are fast transactions regarding the use of Bitcoin?
Dissemination	● How important are the increasing number of merchants accepting Bitcoin regarding the use of Bitcoin? ● How important is a high number of users regarding the use of Bitcoin? ● How important are cheaper prices due to lower transaction fees regarding the use of Bitcoin? ● How important is the benefit compared to other currencies regarding the use of Bitcoin?
Decentrality	● How important is the independency of Bitcoin to central institutions regarding the use of Bitcoin? ● How important is the independency of Bitcoin to state controls regarding the use of Bitcoin?
Usability	● How important is to pay almost everywhere regarding the use of Bitcoin? ● How important is mobility regarding the use of Bitcoin? ● How important is internet access regarding the use of Bitcoin?
Community	● How important is to being part of a community regarding the use of Bitcoin? ● How important is that only group members can use Bitcoin regarding the use of Bitcoin?
Safety	● How important is it to be pseudonym when trading Bitcoins regarding the use of Bitcoin?
Use of Bitcoin	● For how important do you value the use of Bitcoin? ● For how important do you value the use of digital currencies?
General information	● How old are you? ● What is your gender? ● How often do you use online financial systems? ● How would you use Bitcoin?