Exposé Master Thesis

Adoption of Blockchains – A Cross Cultural Comparison

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Abstract

Keywords
Blockchain, Bitcoin, Technology Acceptance, Unified Theory of Acceptance and Use of Technology (UTAUT), UTAUT2, Cultural Comparison

Background
In 2008, an anonymous programmer or group of programmers, known under the pseudonym Satoshi Nakamoto developed the digital bitcoin currency, an algorithmic alternative to the currencies provided by national banks. It represents a decentralized cryptocurrency utilized the innovative blockchain technology that allows digital payments to be sent between two parties without the support of financial institutions. Due to the increasing digitalization - especially the growing use of mobile banking and mobile commerce, the blockchain technology tend to have a large influence on the financial service industry. However, there is always a risk of illegal transactions, because dark businesses may be able to adopt this new technology (Eyal & Sirer, 2014). Therefore, it is important to determine the main factors, which have an impact on the adoption of blockchains in order to gain a future insight in consumer’s usage behaviour. Furthermore, consumer response to new technologies may be not the same in every culture, since cultural values and differences could play an important role in the field of technology acceptance.

Purpose
The purpose of this study is to identify the factors having an impact on the adoption of the bitcoin currency by using the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). It is particularly interesting to understand how culture has an influence on the adoption of a new technology. The results can provide businesses that plan to apply the bitcoin currency as international payment method, an understanding about the actual usage behaviour of consumers in different cultures. Furthermore, the results can be used in further research to improve the acceptance of the blockchain or similar technologies. Therefore, it aims to propose a cultural comparison of technology acceptance for consumer adoption of bitcoin in four different countries based on the UTAUT2 framework.
Method
Firstly, an overview about the existing literature is given to establish a theoretical foundation. For analyzing the technology acceptance a quantitative research model will be used. Thereby, the data will be collected by spreading a questionnaire in four different countries: Germany, USA, South Korea and Iceland. The development of the hypotheses is based on the UTAUT2 framework. Structural equation modelling (SEM) will be used for the data evaluation.
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<th>Full Form</th>
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<tbody>
<tr>
<td>SEM</td>
<td>Structural Equation Modeling</td>
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<tr>
<td>TAM</td>
<td>Technology Acceptance Model</td>
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<td>TPB</td>
<td>Theory of Planned Behaviour</td>
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<tr>
<td>US</td>
<td>User Satisfaction</td>
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<tr>
<td>UTAUT</td>
<td>Unified Theory of acceptance and Use of Technology</td>
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<tr>
<td>UTAUT2</td>
<td>Unified Theory of acceptance and Use of Technology 2</td>
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1. Introduction

Nowadays, online communication seems to be an important integral of individual’s lifestyle. In view of the high use of mobile devices and mobile commerce, the development of new digital technologies is steadily growing. In 2009, the first digital decentralized currency named bitcoin has been developed by an anonymous person or a group, known as Satoshi Nakamoto. It is a peer-to-peer electronic cash system based on the blockchain technology, where no third party, like financial institutions is involved (Eikmanns & Sander, 2015; Nakamoto, 2008). Especially today, in view of a high uncertainty on the financial markets, consumers have become more cautious regarding their money. As a result, Bitcoin provides consumers a reliable, fast and cost-effective alternative to the currencies from national banks. In 2015, the volume of Bitcoin transactions already reached about 27 billion Dollars and is likely to continue growing. Experts estimate that the total volume of transactions will increase to 92 billion Dollars in the year 2016 (BTC-ECHO, 2016). Until now, there are various forms of electronic cash systems, but bitcoin is the most popular and is still thriving. It is already applicable in online commerce, digital wallets, exchanges, casinos and mining pools (Silinskyte, 2014). More and more business sectors apply the so called cryptocurrency as possible payment method. It is likely, that bitcoin based on its blockchain technology will have a great impact on the financial service industry in future (Fanning & Centers, 2016).

However, despite the advantages of blockchains, there is a potential risk regarding illegal transactions. Through the high degree of anonymity the system is offered to its clients, it attracts dark businesses to use Bitcoins. Although the blockchain records all numbers of transactions between the costumers and prevents double spending of money, previous research demonstrates a worst case scenario, how to implement an attack, called selfish mining (Eyal & Sirer, 2014). Despite the high certainty the blockchain is offered, selfish mining may provide one reason for consumers to shy away from using digital currencies for their payments, because the adoption of digital payment technologies mainly depends on trustworthiness and security (Slade, Williams, Dwivedi, 2013).

The adoption of new technologies on consumer’s side can vary depending on different factors. Particularly, cultural factors seem to have a large impact on consumer’s usage behaviour. Therefore, it is of great importance for the business sector to deal with its customers in different ways depending on their culture, behaviour, habits, motivation, etc.
This research focuses on the technology adoption of blockchains by analysing the role of culture influencing the behavioural intention to use bitcoins in four different countries. In order to conduct the study, the UTAUT2 model will be applied to the case of bitcoin by considering cultural differences. The selected countries that have to be researched are Germany, USA, South Korea and Iceland. In view of the cultural dimensions of individualism, power distance, uncertainty avoidance and masculinity, Hofstede (2001) as well as Cardon and Marshall (2008) identified uncertainty avoidance as the most influential dimension on technology adoption. In order to get significant results, the selected countries are quite different regarding their cultural dimensions, but similar in terms of a high technological development.

In 2003, Venkatesh et al. developed the Unified Theory of Acceptance and Use of Technology (UTAUT) on the basis of eight different technology acceptance models to predict the usage behaviour of technologies. In addition, Schuster, Falkenreck and Wagner (2016) developed a framework combining the Technology Acceptance Model (TAM) and the User Satisfaction theory (US) to study in particular the acceptance of mobile payments in the German retail market, which is of great importance for this study. Since most of the previous research deals with the use of technologies in the context of employees in organizations, Venkatesh et al. (2012) extended the UTAUT model by integrating three further constructs to analyze the technology acceptance in the context of consumers. As a result, UTAUT2 includes seven key dimensions: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit as well as three moderating variables: gender, age and experience (Venkatesh et al., 2012). Due to the fact, that consumers set a high value on security and reliability in terms of digital payment technologies, the UTAUT2 model will be extended to incorporate the variables of perceived risk and trust (Slade, Williams, & Dwivedi, 2013).

Previous research focused mainly on the adoption of mobile banking by using the UTAUT2 framework. While usually technology acceptance models are used to analyse the technology adoption within organisations, this study will focus on consumers. Further studies that regard in particular the acceptance of bitcoin, applied the UTAUT model without considering cultural differences. In general today bitcoin works in praxis, but the theory receives too little attention (Bonneau, Miller, Clark, Narayanan, Kroll, & Felten, 2015).

This research aims to understand the effect of culture on the acceptance of using bitcoins. Thereby, the factors that affect the adoption of bitcoin will be identified, as well as the impact of cultural values on behavioural intention of the use will be studied. The study contributes to
further research in technology acceptance and gives an insight about cultural differences and similarities in this field.

2. Theoretical background

2.1. Bitcoin

This section is aimed to provide an insight about the concept of bitcoin. It gives an understanding about how bitcoin works as well as the technology’s opportunities and risks.

With the development of the internet digital currencies were come onto the market. Thereby, the concept of bitcoin, which was first published in 2008 under the name of Satoshi Nakamoto, has been particularly successful. While nowadays there is a high loss of confidence among people concerning the financial system, bitcoins offer a new reliable way to conduct payment transactions across the world. Bitcoin is a so called peer-to-peer currency that allows a direct interaction between individuals without involving a trusted third party like national banks (Clement & Schreiber, 2016). With regard to the technology, there are three main elements which are linked to each other – the users, the blockchain and the miners (Kerscher, 2014). Bitcoin is based on a network of independent computers running the system. It is open source software that can be downloaded freely by everyone. In this way the users can receive or send bitcoins to another account after generating an own private signature - a password containing of 51 characters (Clement & Schreiber, 2016) Furthermore a public key serving as an account number is used for the network to identify the transactions and to validate the payment. Every payment transferred in the network is clustered in a block of transactions, called the blockchain (Böhme, Christin, Edelman & Moore, 2015). The main benefit of the blockchain is the prevention of double-spending i.e. an amount of digital money cannot be copied or sent several times to another account. The blockchain is a chronological order of all transactions ever conducted in the bitcoin network and presents a chain of hash values. Each new block that is created contains of new transactions and additionally of a hash value from the block before (Clement & Schreiber, 2016). Responsible for the creation of new blocks are the participants of the network, individuals or groups that are also called miners. Miners are grouping transactions together in valid blocks and adding them to the chain. Instead of the central control of a national bank, bitcoin is proved through a cryptographic algorithm. It can be seen as a competition between miners solving a mathematic cryptographic puzzle in order to create a new block. As a reward the miners receive
new bitcoins that also serves as incentive for continuing their work (Nakamoto, 2008; Böhme et al., 2015). As described above, Figure 1 shows the bitcoin system including the transaction flow and the building of the blockchain.

![Transaction flow of bitcoin](image)

**Figure 1:** Transaction flow of bitcoin
Based on Nakamoto (2008).

There are a lot of opportunities bitcoin can provide for businesses and consumers. Firstly, the decentralized system involves that there is no need for trusting the control of any financial institution. Moreover, there are no transactions costs like for services or the registration. The system ensures a fast transfer, i.e. the user receives the payment immediately. In general, the main innovative advantage of bitcoin represents the blockchain by preventing the risk of double-spending (Nair & Cachanosky, 2016; Fanning & Centers, 2016; Clement & Schreiber, 2016). The amount of bitcoins in circulations cannot exceed 21 million bitcoins, thus the risk of inflation is very low (Clement & Schreiber, 2016).

However, a critical factor by using bitcoins represents the high anonymity. A lot of people would consider a higher anonymity as a great benefit, but it has a dark side as well. A well-known example represents the Silk Road, a large anonymous digital marketplace, where bitcoins were
used as exchange currency to deal with drugs, weapons or other illegal items. Because of bitcoin’s anonymity it was possible to create an international online platform, where buyers and sellers could not be easily identified (Christin, 2012). In addition, previous research demonstrates a scenario, where miners collude in order to reach the majority of mining power. This process is called selfish mining and would have serious consequences for the bitcoin system (Eyal & Sirer, 2013). Although bitcoin could play an important role in the future of international online retailing, bitcoin has limited acceptance on both sides – consumers and merchants. Businesses could drive the development forward but therefore, it is necessary to have a look on the technology acceptance of consumers (Casey & Vigna, 2015).

2.2. Culture

Bitcoin is a currency that works across international borders, just in the same way in Europe as in Asia for example. It is a technology, which can be used worldwide, but the acceptance on consumer’s side can vary depending on different cultural values (Prypto, 2016). Business strategies cannot simply be applied to other countries without considering cultural differences in consumer behaviour. For instance, there is a need of retailers to identify these differences before introducing a new international payment method.

With regard to previous research culture can be defined in various ways. From an anthropological perspective “culture consists of patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievement of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values” (Kroeber and Kluckhohn, 1952, p. 86). According to Hofstede (1991, p. 5) culture is “the collective programming of the mind which distinguishes the members of one human group from another”. It represents one of the most widely used definitions in cross-cultural research (Srite, 2006).

Valuable approaches concerning culture are provided by Hofstede, Schwartz and GLOBE (Nakata, 2009). Hofstede (2002) developed a model of five dimensions in order to understand differences in consumer behaviour across nations. Thus, it can be differentiated between individualism/collectivism, power distance, uncertainty avoidance, masculinity/femininity and long-term/short-term orientation. The five dimension model can also applied to the field of technology acceptance and can play an important role in this research. It provides a theoretical basis for studying cultural differences in technology adoption. For instance, according to
Hofstede (2001) and the GLOBE team (2004), uncertainty avoidance can be seen as the cultural dimension that has the most significant impact on technology adoption. Cultures showing high uncertainty avoidance are more likely to accept new technologies, because there is more confidence in technological solutions than in human decisions. Cardon & Marshall (2008, p. 107) support this statement as follows: “Technological solutions appeal to these cultures in order to reduce the inevitable uncertainty associated with people-based solutions”.

Another important cultural framework is developed by Schwartz (1999), which contains of seven dimensions that can be used to compare different cultures – conservatism, intellectual autonomy, affective autonomy, hierarchy, egalitarianism, mastery and harmony. This concept can also be used to test the impact on technology adoption. Furthermore the GLOBE team studied the relation of culture to organizational, societal and leader effectiveness. The results were built on the cultural dimensions of Hofstede (1984), Schwartz (1994) and others. Hereby, cultural clusters have been developed based on similarities and differences of a society. In view of the countries selected for this research, Germany is assigned to the cluster of “Germanic Europe”, the USA belongs to “Anglo” and South Korea is part of “Confucian Asia” (Hoppe & Regina, 2014). However, Iceland is not incorporated in the studies of Hofstede, the Globe team and other researchers. Therefore, Guðmundsdóttir, Guðlaugsson and Aðalsteinsson (2015) studied the differences between Iceland and 25 OECD member states on the basis of VSM94 - the scales that measure the cultural dimensions developed by Hofstede. According to this, Iceland rather belongs to the “Anglo” cluster, i.e. the USA, New Zealand, United Kingdom, South Africa White, Australia and Canada, than to the Nordic cluster, consisting of Sweden, Denmark and Finland.

2.3. Research model
Nowadays, there are various theoretical models for studying user’s adoption of new technologies. For example, TAM, introduced by Davis as well as the theory of planned behaviour (TPB) are among the most widely used models in this field and are tested to explain the acceptance and use of information technology systems (Davis, 1989; Ajzen, 1991). In 2003, Venkatesh, Morris, Davis and Davis developed a new model – the unified theory of acceptance and use of technology based on TAM constructs and integrated elements of further user acceptance models. It consists of four key determinants, i.e. performance and effort expectancy, social influence and facilitating conditions, and four moderating variables, i.e. gender, age, experience and
voluntariness. UTAUT is mostly used in the context of organizations to understand technology acceptance and use among employees. Therefore, Venkatesh, Thong and XU (2012) extended UTAUT to the unified theory of acceptance and use of technology 2 by integrating three further variables in order to adopt the model to the context of consumers. The three new constructs that influence consumer’s behavioural intention are hedonic motivation, price value and habit. Regarding the moderating factors, the authors eliminated the factor voluntariness, because of the fact that consumer behaviour is normally expected to be voluntary. Hence, UTAUT2 includes seven key determinants, which have an impact on acceptance and use, as well as three moderating factors, which show individual differences. Particularly in the field of mobile commerce, the adoption of new technologies depends mainly on factors like security and reliability. Therefore, Slade et al. (2013) studied the relation of mobile payments and user’s perceived risk and trust by incorporating them in UTAUT2 and provides a significant contribution for future research in the field of mobile banking and mobile commerce. Given the fact that bitcoin can be assigned to the field of mobile banking, it might be important to pay attention on these two factors. Thus, in this study UTAUT2 will be extended by the variables perceived risk and trust.
3. Literature review

3.1. Bitcoin

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<th>Authors</th>
<th>Title</th>
<th>Publication</th>
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<tbody>
<tr>
<td>Nakamoto S. (2008)</td>
<td>Bitcoin: A Peer-to-Peer Electronic Cash System</td>
<td>Bitcoin.org</td>
<td>This study focuses on the solution of the problem of double-spending in terms of digital payments. Nakamoto developed the innovative blockchain technology, a proof-of-work through a cryptographic algorithm. It creates hash values by adding them in a chain in chronological order. If the transaction is done, it cannot be changed. It requires the majority of participants (miners) to be honest to prevent attacks.</td>
</tr>
<tr>
<td>Eyal, I., &amp; Sirer, E. G. (2014)</td>
<td>Majority is not enough: Bitcoin mining is vulnerable</td>
<td>Financial Cryptography and Data Security</td>
<td>The aim of this study is, to show the weaknesses of the bitcoin protocol by presenting an attack where selfish miners can reach larger revenues. Rational miners join this group and can become the majority. The authors propose a change of the protocol that protects users against attacks of selfish miners.</td>
</tr>
<tr>
<td>Hileman, G. (2015)</td>
<td>The Bitcoin Market Potential Index</td>
<td>Financial Cryptography and Data Security</td>
<td>This study ranks the potential use of bitcoin across 178 nations to show which country has the biggest potential to adopt bitcoins. Factors like inflation rate, technology penetration, financial crises in the history, etc. are considered. It is demonstrated that Argentina as well as Sub-Saharan Africa have great potential for bitcoin adoption.</td>
</tr>
<tr>
<td>Fanning, K., &amp; Centers, D. P.</td>
<td>Blockchain and Its Coming</td>
<td>Journal of Corporate</td>
<td>The article gives an overview about the functionality of blockchains, the</td>
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<td>(2016)</td>
<td>Impact on Financial Services</td>
<td>Accounting &amp; Finance</td>
<td>advantages as well as the impact on the financial service industry in future.</td>
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<td>Polasik, M., Piotrowska, A., Wisniewkie, T. P., Kotkowski, R., &amp; Lightfoot, G. (2016)</td>
<td>Price Fluctuations and the Use of Bitcoin: An Empirical Inquiry</td>
<td>International Journal of Electronic Commerce</td>
<td>This research focuses on the investment and payment features of Bitcoin. The authors demonstrate that the returns depend on the popularity of bitcoin, articles about cryptocurrencies in newspapers and the amount of transactions. Payment methods, type of company, consumer knowledge, etc. can be significant factors. The findings might be interesting for traders and vendors for planning the adoption of the digital currency.</td>
</tr>
<tr>
<td>Christin, N. (2012)</td>
<td>Traveling the Silk Road: A measurement analysis of a large anonymous online marketplace</td>
<td>Proceedings of the 22nd international conference on World Wide Web</td>
<td>The article provides an analysis about the Silk Road. Particularly about the type of goods that are traded and the revenues made by the sellers. Hereby, the authors also regard the evolution of the bitcoin value during the period of eight month.</td>
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### 3.2. Culture

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<th>Authors</th>
<th>Title</th>
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<tbody>
<tr>
<td>Hofstede, G. (1984)</td>
<td>Culture’s consequences - International differences in work-related values</td>
<td>Book</td>
<td>The study provides a framework of four cultural dimensions that explain the differences in behaviour among different cultures – uncertainty avoidance, power distance, individualism/collectivism and masculinity/femininity.</td>
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<tr>
<td>Study</td>
<td>Research Question</td>
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<tr>
<td>Center for Creative Leadership (2014)</td>
<td>Cultures can be compared – conservatism/intellectual and affective autonomy, hierarchy/egalitarianism and mastery/harmony.</td>
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<tr>
<td>Mooij, M., &amp; Hofstede, G. (2002)</td>
<td>This study focuses on the consequences of cultural differences on marketing and advertising strategies, whereas the Hofstede model is mostly used in this context. It is tested to be useful to identify cultural differences in consumer behaviour.</td>
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<tr>
<td>Dwyer, S., Mesak, H., &amp; Hsu, M. (2005)</td>
<td>This research focuses on differences in consumer behaviour across cultures applying Hofstede’s cultural dimensions. Furthermore some implications for international retailers are given.</td>
<td></td>
<td></td>
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<tr>
<td>Kroeber, A., &amp; Kluckhohn, C. (1952)</td>
<td>The authors provide an overview about the history, concepts and most important definitions of culture.</td>
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### 3.3. Research model

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<th>Authors</th>
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<tr>
<td>Im, I., Hong, S., &amp; Kang, M. S. (2011)</td>
<td>An International Comparison of Technology Acceptance – Testing the UTAUT Model</td>
<td>Information &amp; Management</td>
<td>It is a study about the effect of culture on the adoption of the MP3 player and Internet banking in different cultures – the United States and Korea.</td>
</tr>
<tr>
<td>Venkatesh, V., Thong, J., &amp; Xu, X. (2016)</td>
<td>Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead</td>
<td>Journal of the Association for Information Systems</td>
<td>The study provides a review about the UTAUT literature, since September 2003 until December 2014 in order to give a theoretical understanding about the latest research on the acceptance and use of technologies.</td>
</tr>
<tr>
<td>Venkatesh, V., Thong, J., &amp; Xu, X. (2012)</td>
<td>Consumer Acceptance and the Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology</td>
<td>MIS Quarterly</td>
<td>Extension of UTAUT to UTAUT2 to the context of consumers by adding three further core factors – hedonic motivation, price value and habit, which have an impact on behavioural intention and technology use.</td>
</tr>
<tr>
<td>Venkatesh, V., &amp; Davis, F. (2000)</td>
<td>A Theoretical Extension of the</td>
<td>Management Science</td>
<td>Extension of TAM to TAM2 by studying perceived usefulness and</td>
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4. **Hypotheses development**

4.1. **Performance expectancy and culture**

Performance expectancy can be defined as the degree to which people believe using a certain technology may be beneficial in particular activities (Davis, 1989; Venkatesh et al., 2003). People from high individualistic cultures attach great importance on personal values and interdependence, whereas people from low individualistic cultures tend to consider more likely the opinion of others (Basabe & Ros, 2005). According to Sun and Zhang (2005) the influence of performance expectancy would be stronger in high individualistic cultures with a lower power distance. Thus, people from these cultures are assumed to take their own independent decisions in terms of technology adoption. In this case, the USA shows the highest score of individualism worldwide, followed by Germany (Hofstede & Mooij, 2002). In comparison, South Korea shows great cultural differences with a low score of individualism and a high power distance. Therefore, it can be hypothesize that performance expectancy and behavioural intention will be stronger for consumers from the USA and Germany compared to Iceland and South Korea.

\[H1a: \text{The relationship between performance expectancy and behavioural intention to use bitcoin will be stronger for consumers from the USA compared to those from South Korea.}\]

\[H1b: \text{The relationship between performance expectancy and behavioural intention to use bitcoin will be stronger for consumers from the USA compared to those from Iceland.}\]

\[H1c: \text{The relationship between performance expectancy and behavioural intention to use bitcoin will be stronger for consumers from Germany compared to those from South Korea.}\]
H1d: The relationship between performance expectancy and behavioural intention to use bitcoin will be stronger for consumers from Germany compared to those from Iceland.

4.2. Effort expectancy and culture

Effort expectancy can be defined as the degree of ease an individual relates with the use of a certain technology (Venkatesh et al., 2003). In view of the cultural dimensions of Hofstede, personal convenience plays a greater role for people from high individualistic cultures like the USA (Smith, Deitz, Royne, Hansen, Grünhagen, Witte, 2013). Furthermore, according to Schwartz (1999), the USA can be considered as a strong culture in relation with its mastery orientation, thus, in those countries the use of a technology is perceived as easier than in countries that are characterized lower in this dimension (Smith et al., 2013). In addition, Im, Hong and Kang (2011) show, that the influence of effort expectancy on behavioural intention is greater in the USA than in South Korea. However, given the fact that the USA is the most individualistic country compared to Germany, Iceland and South Korea, it can be hypothesize that the strength of relationship between effort expectancy and behavioural intention will be stronger for consumers from the USA. Moreover, Srite (2006) argued that feminine cultures are more influenced by the perceived ease of use of a technology, since quality of life and free time plays a greater role than instrumental goals, i.e. a technology which can be used without effort is less associated with instrumental goals. In this case, Iceland shows the lowest score on masculinity and thus, it can be assumed that it has a high impact on the relationship between effort expectancy and behavioural intention.

H2a: The strength of the relationship between effort expectancy and behavioural intention to use bitcoin will be stronger for consumers from the USA in comparison to those from South Korea.

H2b: The strength of the relationship between effort expectancy and behavioural intention to use bitcoin will be stronger for consumers from the USA in comparison to those from Germany.

H2c: The strength of the relationship between effort expectancy and behavioural intention to use bitcoin will be stronger for consumers from Iceland in comparison to those from South Korea.

H2d: The strength of the relationship between effort expectancy and behavioural intention to use bitcoin will be stronger for consumers from Iceland in comparison to those from Germany.
4.3. Social influence and culture

Social influence can be defined as the degree to which a person gets influenced by the opinion of important others to use a new technology (Venkatesh et al., 2003). For instance, Schwartz (1999) dimension conservatism versus affective and intellectual autonomy involves the role of an individual which is influenced by others thinking. Conservatism, also known as embeddedness describes the individual as embedded in a collectivistic society sharing the same traditional values, interests and goals. In contrast, an autonomous individual place particular emphasis on their own uniqueness by expressing their preferences, feelings and attributes. Particularly, intellectual autonomy explains the desire of individuals in a culture to pursue their own goals and ideas independently. Hence, it can be assumed that the effect of social influence is stronger in cultures with a high level of conservatism and a low level of intellectual autonomy. In this study, Germany appears as a culture with the highest score on intellectual autonomy and the lowest on conservatism. On the other hand, South Korea scores the lowest on intellectual autonomy, but the highest on conservatism. Therefore, the behaviour of individuals from South Korea is assumed to be more influenced by the opinion and thoughts of others than the behaviour of individuals from Germany.

\textit{H3a: The strength of the relationship between social influence and behavioural intention to use bitcoin will be the strongest for consumers from South Korea.}

\textit{H3b: The strength of the relationship between social influence and behavioural intention to use bitcoin will be the weakest for consumers from Germany.}

4.4. Facilitating conditions and culture

Facilitating conditions can be defined as the degree to which an individual believe that the use of a technology is supported by a technical and organizational infrastructure (Venkatesh et al., 2003). According to Dwyer, Mesak and Hsu (2005), there is a high need of clear structures and rules in cultures with a high level of uncertainty avoidance. People from those cultures are insecure concerning the advantages of new innovations. It can be assumed that the higher the support for a technology, the less affected is the use of a technology by uncertainty. Facilitating conditions could help to reduce insecurities on consumer´s side and would support the adoption of new technologies, because it could simplify the use. Thus, cultures that show a high score of uncertainty avoidance are expected to be more influenced on behavioural intention and use by
facilitating conditions. In this study, South Korea scores the highest on uncertainty avoidance, followed by Germany, while the USA scores very low in this dimensions. It can be hypothesize, that the influence of facilitating conditions and behavioural intention will be the strongest for consumers from South Korea and the weakest for consumers from the USA.

H4a: The relationship between facilitating conditions and behavioural intention to use bitcoin will be the strongest for consumers from South Korea.

H4b: The relationship between facilitating conditions and behavioural intention to use bitcoin will be the weakest for consumers from the USA.

H4c: The relationship between facilitating conditions and actual use of bitcoin will be the strongest for consumer from South Korea.

H4d: The relationship between facilitating conditions and actual use of bitcoin will be the weakest for consumer from the USA.

4.5. Hedonic motivation and culture

Hedonic motivation can be referred to the influence of fun and pleasure on a person’s willingness to use a technology. It is tested to have a significant impact on behavioural intention and use (Venkatesh et al., 2012). Schwartz (1999) dimension affective autonomy addressed pleasure as well as life enjoyment as desirable values of individuals.

H5: The strength of the relationship between hedonic motivation and behavioural intention to use bitcoin will be the weakest for consumers from South Korea.

4.6. Price value and culture

In the context of consumers, the price of a technology may have a large influence on the use of a technology. The value of the price can be defined as positive when the perceived advantage of using a technology is greater than its monetary costs. According to Furnham and Okamura (1999), attitudes towards money like saving and spending money differ between cultures and may be independent of income. Consumer’s consideration of the perceived benefit and the monetary costs depends on individual characteristics and views. Therefore, it is hypothesized that:
**H6:** The strength of the relationship between price value and behavioural intention to use bitcoin will be the same for consumers from the USA, Germany, Iceland and South Korea.

### 4.7. Habit and culture

Habit can be defined as the degree to which people behave automatically, because of learning processes (Venkatesh et al., 2012). Individual habits and behavioural patterns are created on the basis of social behaviour, communication and joint action. Literature concerning the cultural differences of habits could not be found. Therefore, it can be hypothesize as follows:

**H7a:** The strength of the relationship between habit and behavioural intention to use bitcoin will be the same for consumers from the USA, Germany, Iceland and South Korea.

**H7b:** The strength of the relationship between habit and actual use of bitcoin will be the same for consumers from the USA, Germany, Iceland and South Korea.

### 4.8. Perceived risk and culture

At this point, perceived risk is incorporated as construct in the UTAUT2 model, since previous research demonstrates that risk can be a significant factor in technology adoption of mobile commerce and mobile payments (Slade et al., 2013). The perception of risk is related to uncertain feelings and anxiety and resulting consequences of the behaviour. The use of bitcoin is characterized by uncertainty, because of its complex and less regulated environment. It can be assumed, that the use of bitcoin will be influenced by perceived risk.

Hofstede (2001) addressed the perception of risk in his cultural framework. In order to develop a hypothesis, it is necessary to regard the degree of uncertainty avoidance in the selected countries. As mentioned above, previous research suggests that uncertainty avoidance applies as the most influential cultural dimension on technology adoption (Cardon & Marshall, 2008; Hofstede, 2001; GLOBE, 2004). Cultures scoring a low level on uncertainty avoidance are more risk-taking, while high uncertainty avoidance cultures are less willing to take an unknown risk by adopting a new technology (Lee, Trimi & Kim, 2013). Thus, it is supposed that individuals from cultures with a high level of uncertainty avoidance are more influenced by the outcome than individuals from cultures that show a lower score on this dimension. In addition, the dimension power distance may play an important role in the case of bitcoin, since a large power distance is strongly related to centralized control (Hofstede, 1997). The bitcoin technology is developed based on its decentralized, still unregulated system, where no centralized control is required.
High uncertainty avoidance cultures are less likely to accept such a technology than weak uncertainty avoidance cultures (Mooij & Hofstede, 2002).

Regarding the selected countries in this study, South Korea appears as the country with the highest score of uncertainty avoidance, whereas the USA shows the lowest score. Furthermore South Korea shows a high score of power distance, i.e. centralization plays an important role in this society. Therefore, it can be hypothesized that:

\[ H8a: \text{The strength of the relationship between perceived risk and behavioural intention to use bitcoin will be the strongest for consumers from South Korea.} \]

\[ H8b: \text{The strength of the relationship between perceived risk and behavioural intention to use bitcoin will be the weakest for consumers from the USA.} \]

4.9. Trust and culture

In addition to the construct of perceived risk, trust will be added as an integral part of the UTAUT2 model in this study. Especially in the field of electronic payment system like bitcoin trust was considered particularly important, because of its high anonymity and presumed high vulnerability. According to previous research, trust has been demonstrated as a significant factor of user’s behaviour (Zhou, 2012; Yan & Yang, 2015). In addition, trust could have a negative impact on perceived risk, because it reduces existing uncertainty and anxiety.

According to Jarvenpaa, Tractinsky and Saarinen (1999) cultures high on individualism are considered as self-reliant and trust others to get better outcomes. On the other hand, collectivistic cultures trust in relationships and first-hand experiences, i.e. people from those cultures are less likely to trust a person who is not part of them. Given the fact that South Korea scores the lowest on individualism in this study, whereas the USA scores the highest score and trust can be closely related to perceived risk, it can be hypothesized that:

\[ H9a: \text{The strength of the relationship between trust and behavioural intention to use bitcoin will be the strongest for consumers from South Korea.} \]

\[ H9b: \text{The strength of the relationship between trust and behavioural intention to use bitcoin will be the weakest for consumers from the USA.} \]
According to the well-known theoretical framework of Markus and Kitayama (1991) culture can also be differentiated on the basis of independent and interdependent self-construal, which can have an impact on individual’s experience containing cognition, emotion and motivation. Thus, people from high individualistic cultures are more likely to develop an independent self-construal, whereas people from collectivistic cultures rather define their selves as interdependent. For example in individualistic cultures, primarily in western cultures like western Europe and North America, it is imperative to be independent from others, having unique attributes and pursuing own goals. According to Geertz (1975, p. 48) a person with an independent self is viewed as "a bounded, unique, more or less integrated motivational and cognitive universe, a dynamic center of awareness, emotion, judgment, and action organized into a distinctive whole and set contrastively both against other such wholes and against a social and natural background". In contrast, in non-western cultures like in Asian countries people do not want to be separated from their social environment and are more connected to each other. Hence, people with an interdependent self-construal “are motivated to find a way to fit in with relevant others, to fulfil and create obligation, and in general to become part of various interpersonal relationships” (Markus & Kitayama, 1991, p. 227). Particularly important in the view of the interdependent self is the role of others. In contrast to the independent self-construal, where the role of others is important for social comparison and self-evaluation, in the view of the interdependent self, people define their selves on the basis of relationships and getting influenced by others. In this way, culture influences the self-construal of individuals that influence individual’s behavioural intention. This implies that a person with an interdependent self-construal is more likely to trust people from its social context, for example. Furthermore Ma, Yang and Mourali (2014) analysed the impact of independent and interdependent selves on consumer adoption of new products. The researchers found out, that independent cultures are more likely to adopt really new products than interdependent cultures, which have a preference for incrementally new products. It can be assumed that independent cultures seek for differentiation and are more willing to take a risk by adopting a new product. However, previous research provides evidence that cultures with an interdependent self-construal are less risk averse regarding their financial decisions, because it can be assumed that people with a vast social network are getting higher financial support from their family and friends if needed (Hsee & Weber, 1999). Therefore, trust in using bitcoin can be more highly affected by interdependent self among collectivists that are more concerned about personal relationships, harmony and social interactions.
H9c: The interdependent self will have a higher influence on the relationship between trust and behavioural intention to use bitcoin than the independent self.

5. Methodology

In order to answer the research question of this study the data will be collected through a quantitative questionnaire, which will be distributed online to the selected countries, the USA, Germany, South Korea and Iceland. It is considered, that the majority of participants will be students. According to Hofstede´s cultural dimensions, particularly the United States and South Korea are showing significant differences in most cases, that makes these countries appropriate for a cross cultural comparison.

The survey will be developed on the basis of past studies. As it used in previous research, e.g. for the UTAUT model (Venkatesh et al., 2003) the seven point Likert scale will be used for the development of the questionnaire. The UTAUT model contains of nine constructs, thus the questionnaire is divided in ten sections. In the first section, the respondent will be asked about general characteristics (e.g. age, gender and experience), while each construct of the research model will be measured in the other sections. The questionnaire will be designed on Sphinx online software for survey creation.

For analysing the collected data and getting precise statistical results SmartPLS software will be used. Research models including unobservable variables can be analysed by using structural equation modelling (SEM). For example, in this case, social influence, hedonic motivation and perceived risk are latent variables, which cannot be measured directly. According to Hox and Bechger (1998) SEM can be seen as a combination of factor analysis and path or regression analysis.

6. Overview of chapters

Abstract
Table of content
List of figures
List of abbreviations
1. Introduction
   a. Background
   b. Purpose
c. Structure

2. Theoretical background
   a. The concept of bitcoin
      i. Blockchain technology
      ii. Opportunities and risks
   b. Cultural frameworks
      i. Importance of culture for technology adoption
      ii. Hofstede’s cultural dimensions
      iii. Schwartz’s cultural dimensions
   c. Research model
      i. Technology acceptance model (TAM)
      ii. Unified theory of acceptance and use of technology (UTAUT)
      iii. Unified theory of acceptance and use of technology 2 (UTAUT2)

3. Research design
   a. Research question
   b. Hypothesis development
   c. Methodology
      i. Data collection
      ii. Questionnaire

4. Analysis and results

5. Conclusion
   a. Findings and implications
   b. Limitations

Bibliography

Appendix
7. Work plan

<table>
<thead>
<tr>
<th>Period</th>
<th>To do</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>01.08.2016 – 30.09.2016</td>
<td>General research Exposé</td>
<td>Selection of the topic, readings, literature review, First-draft exposé</td>
</tr>
<tr>
<td>01.10.2016 – 31.10.2016</td>
<td>Research design</td>
<td>Designing the questionnaire and research model, preparing the survey, Pre-test</td>
</tr>
<tr>
<td>01.11.2016 – 15.12.2016</td>
<td>Theoretical background, Methodology</td>
<td>While running the survey, development of theoretical background and methodology</td>
</tr>
<tr>
<td>16.01.2017 - deadline</td>
<td>Finalize</td>
<td>Writing of results and implications, conclusion, review and correction</td>
</tr>
</tbody>
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8. References


Sun, H., & Zhang, P. (2006). The role of moderating factors in user technology acceptance, *International Journal of Human-Computer Studies, 64*(2), 53-78.


