TRUST-FREE BANKING MISSED THE POINT – THE EFFECT OF DISTRUST IN BANKS ON THE ADOPTION OF DECENTRALIZED FINANCE

Research Paper

Jannik Lockl, University of Bayreuth, Germany, Project Group Business & Information Systems Engineering, Fraunhofer FIT, jannik.lockl@fim-rc.de

Jens-Christian Stoetzer, University of Bayreuth, Germany, jens.stoetzer@fim-rc.de

Abstract

During the global financial crisis in 2008, trust in established financial intermediaries declined sharply. In reaction, blockchain technology was developed as an alternative system to facilitate financial transactions devoid of intermediaries. The application of blockchain in the financial sector brought a new paradigm called Decentralized Finance. Employing a modified technology acceptance model, our study aims at examining the relationship of distrust in financial intermediaries and consumer's behavioral intention to use Decentralized Finance. Even though this relationship is well-documented regarding the motivation of the development of blockchain technology, as well as in cases of unstable financial systems, empirical data from our survey research does not support this relationship in the context of consumer adoption. Our study contributes to the theory on the foundations of DeFi and the impact of blockchain technology, which must be revised by future research. Further, we propose a trust paradox in the financial sector.

Keywords: Decentralized Finance; technology acceptance research; trust; blockchain.

1 Introduction

The 2008 global financial crisis is nowadays associated with a crisis of trust in the established financial system. During the crisis, many customers lost trust in the established banking system (Lins et al., 2017). With the bankruptcy of the investment bank Lehman Brothers, customers' trust in the financial sector declined sharply (Sapienza and Zingales, 2012). This loss in the trust of customers was intertemporal to the introduction of the cryptocurrency Bitcoin. Nakamoto (2008) highlighted a financial system wherein customers had to trust central institutional intermediaries as the main motivation to develop Bitcoin as an alternative to the established financial system. Bitcoin uses blockchain technology to facilitate and execute transactions. Since then, blockchain has attracted public attention as an infrastructure technology for a wide range of applications (Blasingame, 2019; Rossi et al., 2019). Blockchain is a subset of distributed ledger technology (DLT). The technology employs consensus mechanisms and cryptographic functions to distribute and harmonize one state of information among all participants (Rossi et al., 2019; Nakamoto, 2009). Through the valid, tamper-resistant, and verifiable record of transactions, participants can rely on the information, which is why DLTs can overtake the role of institutional intermediaries and likewise produce trust in distributed systems (Seidel, 2018). As the technology allows for decentral governance mechanisms and business models (Chong et al., 2019; Kazan et al., 2014; Rossi et al., 2019), the terminus Decentralized Finance (DeFi) was established for DLT applications in the financial sector (Chen and Bellavitis, 2019; Financial Stability Board, 2019). Trust in distributed intermediation is expected to be the main driver to establish DeFi.

Hence, customers who lost trust in the established financial system might use DeFi applications as an alternative for financial transactions.

Researchers stress the rules the decentralized governance of DLT sets or consumer adoption (Beck et al., 2018), and highlight the removal of central intermediaries (Risius and Spohrer, 2017). Nonetheless, consumer adoption of DeFi applications remains largely unexplored (Beck et al., 2018; Lindman et al., 2017; Rossi et al., 2019). Li et al. (2018) found that only a minority of articles relating to DLT focused on the question of why individuals use the technology. Folkinshteyn and Lennon (2016) apply a modified technology acceptance model (Davis, 1989) in a Bitcoin case study. They build upon Gefen et al. (2003) who argue that trust is a relevant factor for technology acceptance in e-commerce. The authors apply this relationship to the adoption of the cryptocurrency Bitcoin. This positive effect of trust on the adoption of cryptocurrencies is proven in empirical studies (Mendoza-Tello et al., 2018; Shahzad et al., 2018). Lustig and Nardi (2015) found that users of Bitcoin have more trust in the algorithms than in established institutions since they perceive the latter as untrustworthy. Thus, they prefer to use Bitcoin as an alternative payment system. Further, the theoretical foundation for blockchain claims explicitly that distrust as of 2008 would lead to the shift of institutional to technological intermediation (Nakamoto, 2009). Examples of highly unstable financial systems like Argentina or Venezuela already indicate higher adoption rates to DeFi applications like crypto currencies (Cifuentes, 2019). However, to the best of our knowledge, no study examines if this effect of distrust in established intermediaries on the adoption of DLT also applies in the context of a stable economic system like Europe. Given these findings and the empirical evidence of distrust in established financial intermediaries (Sapienza and Zingales, 2012), we investigate the following research question: *Does distrust in established financial intermediaries affect the adoption of Decentralized Finance positively?*

To answer the research question, we examine the relationship between distrust of customers in the financial sector and the intention of customers to use DLT-based DeFi intermediaries as an alternative in the financial sector. We follow a deductive approach to contribute to the theory on the behavioral reasons for inventing DLT and the adoption of distributed ledgers on information systems (IS) in the financial sector. We build on existing theory to be applied in a new context by identifying key constructs from prior literature, adopting constructs from existing relationships, and proposing new relationships (Alvesson and Kärreman, 2007). We modified and extended the research model of Kim et al. (2009) as the basis for our research questions who examined the influence of trust in banks on the adoption of mobile banking by using a revised technology adoption model. Utilizing data from a survey conducted in Europe, we validated our research model and hypotheses. This approach allowed us to measure latent and dependent variables of customer's intention-to-use-perspective. By doing so, we investigated the preferences and perceptions of customers. Employing structural equation modeling (SEM) with partial least squares (PLS), we examined the relationships in our research model (Hair et al., 2017). We used SmartPLS 3 for data analysis of the relationships in our structural equation model, the descriptive analysis of our data sample, and the examination of our constructs.

Our study contributes to the theoretical foundation of DeFi, the adoption of DLT technology in the financial sector, and the field of technology adoption research of emerging technologies. Our study contributes to IS theory by explaining aspects of distrust in established financial intermediaries in the adoption of DeFi (Gregor, 2006). Our study is the first to explore such a relationship and to provide a further understanding of how distrust in established financial institutions affects the adoption of DeFi.

The remainder of this study is structured as follows: in the next section, we outline the theoretical foundations of DLT before introducing the concept and current state of research on DeFi. Further, we introduce the fundamentals of IS adoption research. In section three, we outline our research method and hypotheses. Section four presents the empirical results before we discuss their theoretical contributions and managerial implications in section five. Finally, we conclude by providing limitations of our study and discussing possibilities for further research.

2 Theoretical Foundation

2.1 Technology Acceptance Research

The acceptance of new technologies by users and customers is a major field of interest for IS researchers (Davis, 1989; Venkatesh et al., 2003). Researchers extended underlying theories with different constructs. For example, Gefen et al. (2003) examine the impact of *Trust* in technology acceptance. Vice-versa, research examined the case when users are not able to trust a technology. Thus, the construct of *Distrust* emerged in technology acceptance research. Benamati and Serva (2007) found *Trust* and *Distrust* to be two separate constructs, and that both affect the adoption of online banking services. The existence of *Distrust* in established financial intermediaries proposes that customers suspect their bank not to act in their best interest (Sapienza and Zingales, 2012).

In the field of acceptance of new technologies in the financial services industry, researchers applied modified TAM and UTAUT models (Qasim and Abu-Shanab, 2016; Folkinshteyn and Lennon, 2016). Kim et al. (2009) apply the work of Gefen et al. (2003) to the context of new technologies in the financial sector and find evidence that *Initial Trust* in the solution positively affects the intention to use mobile banking solutions. *Trust* was since then expected to be a major determinant when introducing a new technology to trust-sensitive services, such as banking.

2.2 Distributed Ledger Technology

In reaction to declining trust in financial intermediaries like banks during the global financial crisis 2008 (Sapienza and Zingales, 2012), Nakamoto (2008) introduced the concept of blockchain (Rossi et al., 2019). The initial motivation for the development of the technology, which enables trust-free transactions (Seidel, 2018), was grounded by Satoshi Nakamoto on the lack of confidence in the traditional financial sector. Nakamoto underlines this motivational aspect in a blog post in 2009 stating that several consumers do not believe anymore that banks would manage their money and protect their privacy to their advantage (Nakamoto, 2009). Even though the concept of a decentralized network was not new (Baran, 1964), the combination with cryptographic mechanisms made it unique at this moment. Within a blockchain the transparent rules preclude malicious behavior and misunderstanding (Sun Yin et al., 2019). Seidel (2018) describes DLT, the superordinate technology of blockchain, as a 'distributed trust platform'. He argues that the implementation of a distributed and trust-free transaction system can replace a trust-based central system (e.g., the financial sector). DLT could remove trust issues in a transaction process by implementing a smart contract. The resulting system can operate without trust in established intermediaries by ensuring security, as far as users trust in algorithms. Thereby, DLT allows replacing established trust-building institutions (e.g., banks) with self-executing and tamper-resistant technology like smart contracts that are deployed on a DLT (Glaser, 2017; Beck et al., 2016).

2.3 Decentralized Finance

Trust and security are important aspects for customers in the financial sector (Beck et al., 2016; Mallat et al., 2004). After the rapid increase in the value of cryptocurrencies like Bitcoin during the early months of 2018 the term DeFi began to emerge in the DLT community. DeFi describes the concept of organizing, facilitating, and executing financial services without central institutions, such as banks or insurances. Traditionally, the financial sector follows an approach relying on central institutions. Trusted third parties (e.g., banks) thereby execute transactions between two parties (Chen and Bellavitis, 2019). Third parties offer financial services and provide the necessary infrastructure to facilitate transactions. In a decentralized approach, financial transactions can be executed and accessed securely and transparently in a public network by individuals, issuers of securities, and regulators without a central institution (Chen and Bellavitis, 2019; Financial Stability Board, 2019). Hence, DeFi allows decentralization and so-called disintermediation in the financial sector by eliminating the necessity of a central authority to overview transactions. This elimination can reduce costs, improve security, and raise transaction efficiency (Chen and Bellavitis, 2019). DeFi uses DLT (e.g., Ethereum) to establish a

distributed network to carry out transactions. Therefore, all advantages of these technologies, like the possibility of self-executing and trust-producing systems (Glaser, 2017), apply to DeFi. Chen and Bellavitis (2019) found four major business models to emerge under the term DeFi. First, decentralized currencies like Bitcoin or Ether. Second, decentralized payment services such as Libra[1]. Third, decentralized fundraising like initial coin offerings. Fourth and finally, decentralized contracting providing the opportunity to automate business processes with the implementation of smart contracts (Chen and Bellavitis, 2019). The authors suggest that the implementation of DeFi leads to a potential reshaping of modern finance and a new field for entrepreneurship and innovation. Consequently, central intermediaries could become obsolete in the future.

3 Research Method

Our research model refers to Kim et al. (2009). Due to the specific context of financial services, and the specific characteristics of blockchain and DLT adoption (Beck et al., 2018; Risius and Spohrer, 2017) we propose an adaptation of this model to examine the relationship between a customer's *Distrust in Banks* and the *Behavioral Intention to Use DeFi* in the future. Referring to the intentions of the Bitcoin blockchain (Nakamoto, 2009) and the technical design and capabilities of it (Seidel, 2018), we modify the variable *Initial Trust in Mobile Banking* (Kim et al., 2009) to *Distrust in Banks*. The variable *Distrust in Banks* is a second-order construct and is mediated by *Propensity to Distrust*, *Structural Assurances*, and *Disrepute of Banks* (McKnight et al., 2002).

Additionally, we incorporate the variable *Relative Benefits* as proposed by Kim et al. (2009). This variable corresponds to the construct *Perceived Usefulness* of the initial Technology Acceptance Model (Davis, 1989). Davis posits that, when adopting new technology, a user compares the perceived benefits of the technology with the status quo. The user is likely to adopt new technology if it is perceived as more useful or beneficial.

We extend our research model with the construct of *Social Influence* from the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). Venkatesh et al. highlight the importance of *Social Influence* in IS adoption research for the adoption of a technology and note that the role of *Social Influence* is even more important in an early stage of the adoption of a new technology.

Furthermore, we incorporate the construct *Perceived Risk* into our model. Within their e-services adoption model, Featherman and Pavlou (2003) highlight the importance of *Perceived Risk* on the behavioral intention to use new technology. Martins et al. (2014) validate this relationship in the context of online banking adoption and outline that different perceived risk facets negatively affect an end user's intention to use a bank's services. Further, Lu et al. (2011) highlight this negative effect on the adoption of mobile payment services. We propose that DeFi, based on DLT, provides a secure infrastructure to carry out financial transactions. This infrastructure does not rely on a potentially malicious or defective intermediary like a bank for ensuring that untrusted parties can carry out transactions (Chen and Bellavitis, 2019).

3.1 Hypotheses

Social Influence and Behavioral Intention to Use Decentralized Finance

Social Influence is the perceived effect of a consumer's social environment on the behavioral intentions to use a technology and was first implemented by Venkatesh et al. (2003). Multiple studies confirm the positive relationship between *Social Influence* and behavioral intentions to use new technology in general (Venkatesh et al., 2003; Venkatesh et al., 2012), or DLT-based systems in particular (Cai et al., 2019). Due to the relatively early period in the appearance of DeFi, *Social Influence* can be an important

[1] Libra is a digital currency which uses a permissioned public blockchain that was initiated by the social network Facebook.

factor to explain the behavioral intention of customers to use DeFi in the future. We posit that *Social Influence* is a relevant variable to explain the *Behavioral Intention to use DeFi*. Hence, we claim that:

> H1: Social Influence has a positive effect on a consumer's Behavioral Intention to Use Decentralized Finance.

Relative Benefits and Behavioral Intention to Use Decentralized Finance

Based on the work of Davis (1989), we argue that a relationship exists between the characteristics of new technology and consumer adoption. Hence, we define the *Relative Benefits of DeFi* as a consumer's perception of the relative benefits of DeFi over traditional financial institutions. As noted by Kim et al. (2009), relative benefits involve the economic gains, greater convenience, and superior reputation a consumer derives from using an innovation. Due to the underlying technology of DeFi, and compared to traditional banking, we argue that DeFi can improve processes and save time as well as money to both businesses and customers (Nofer et al., 2017). Further, DeFi could deliver improved privacy and efficiency, and lower costs compared to central institutions in the financial sector (Chen and Bellavitis, 2019). If customers perceive DeFi as more useful or beneficial than traditional banking, they are more likely to intend to use DeFi in the future. Therefore, we propose that:

> H2: Relative Benefits of Decentralized Finance positively affect the Behavioral Intention to use Decentralized Finance.

Propensity to Distrust and Distrust in Banks

A consumer's individual propensity to trust is based on a person's characteristics, experience, and cultural background (Lee and Turban, 2001). Benamati et al. (2010) conceptualize trust and distrust as two distinct constructs, which are correlated negatively. Hence, we *define Propensity to Distrust* as a consumer's general belief in distrust, and *Distrust in Banks* as the general perception of a consumer about the trustworthiness of banks. Thus, we modify the relationship between *Propensity to Trust* and *Initial Trust* as proposed by McKnight et al. (2002). We posit a positive relationship between a consumer's *Propensity to Distrust* and the *Distrust in Banks*. Hence, we hypothesize that:

> H3: Propensity to Distrust contributes positively to Distrust in Banks.

Structural Assurances of Banking and Distrust in Banks

We define *Structural Assurances of Banking* as a consumer's perception of structural assurances in the banking sector, which are beneficial for consumers. *Structural Assurances* can be contracts, regulations, policies, laws, escrow services, and guarantees (Kim and Prabhakar, 2004). Based on the studies of Kim and Prabhakar (2004) and McKnight et al. (1998), structural assurances enhance trust in a seller. Based on our proposed relationship between trust and distrust (Benamati et al., 2010), *Perceived Structural Assurances* have a negative effect on *Distrust in Banks*. Therefore, we posit that:

> H4: Structural Assurances of Banking have a negative influence on Distrust in Banks.

Disrepute of Banks and Distrust in Banks

McKnight et al. (1998) acknowledge that a company's reputation influences a consumer's initial trust in the company. The authors postulate that reputation reflects a company's reliability in business relationships with customers. Subsequently, a customer, perceiving a high reputation of a company, is going to develop trust in the business more quickly. Vice-versa, an individual that perceives a bad reputation of banks will develop distrust more quickly. We define *Disrepute of Banks* as the consumer's conception regarding the reputation and service quality of banks. Hence, we propose the following hypothesis:

> H5: Disrepute of Banks positively relates to a consumer's Distrust in Banks.

Perceived Risk of Banking and Behavioral Intention to Use Decentralized Finance

We define the *Perceived Risk of Banking* as a consumer's perception of the characteristics of the decision to use a product or service from an organization. Perceived risk in the context of financial services includes different aspects. It includes financial risk, performance risk, privacy risk, social risk, psychological risk, and time risk (Featherman and Pavlou, 2003; Lu et al., 2011; Martins et al., 2014). Consumers perceive these risks when evaluating whether they should adopt a new product. Additionally,

the adoption of new information systems creates anxiety and discomfort for customers. The usage of the internet is supposed to strengthen this effect due to the general perception of insecurity in the internet (Featherman and Pavlou, 2003). The general negative relationship between *Perceived Risk* and the *Behavioral Intention to Use* an information system also applies to the context of internet banking (Martins et al., 2014). Therefore, the *Perceived Risk of Banking* would positively affect the *Behavioral Intention to Use* an alternative system, which provides mechanisms to eliminate negative aspects of the status quo. Thus, we hypothesize that:

> H6: Perceived Risk of Banking positively affects a consumer's Behavioral Intention to Use Decentralized Finance.

Distrust in Banks and Behavioral Intention to Use Decentralized Finance

The relationship between a user's level of trust in innovative technology and an individual's usage intention is well investigated (Gefen et al., 2003; Pavlou and Gefen, 2004; Kim et al., 2009). Kim and Prabhakar (2004) focus on the context of the adoption of new technologies (e.g., online banking) in the financial sector. Kim et al. (2009) extended this argumentation in the context of the relationship between initial trust in banks and the behavioral intention to use mobile banking, while Lu et al. (2011) apply this effect in the context of mobile payments. Benamati and Serva (2007), again, found a negative relationship between an individual's level of distrust in banks and service providers and the user's adoption of online banking. Based on the trust-building mechanisms of the underlying technology of DeFi (Seidel, 2018), and intermediating roles in the financial sector, we put forward the idea that customers do not need to trust a bank or other central institution anymore. Customers do not need to trust a central institution to carry out financial transactions because they can rely on technology (Seidel, 2018; Glaser, 2017). Thus, DLT as a distributed trust platform can replace a system based on institutional trust like the financial sector. Since *Trust* and *Distrust* are two distinct and negative related constructs (Benamati et al., 2010), we propose that customers who actively distrust central institutions (e.g., banks or insurances) in the financial sector are more likely to adopt new solutions, which can provide trust through the underlying technology. Thus, we posit that:

> H7: Distrust in Banks positively affects a consumer's Behavioral Intention to Use Decentralized Finance.

3.2 Survey Development

Based on our deductive research approach, we gathered data with a survey to examine our research model and our hypotheses. In the survey, we used different constructs to measure the individual perceptions and intentions of consumers about the banking sector and DeFi. The survey items of the constructs rely on validated items from literature. We adapted them to the specific setting and context of our research in the banking sector and the adoption of DeFi. Based on the procedure in similar studies (Qasim and Abu-Shanab, 2016), the items were measured using a seven-point Likert scale. To ensure a basic knowledge about the differences between the traditional concept in the financial market and DeFi, we displayed descriptions to the participants at the beginning of the survey. The text included an introduction to the concept and illustrated the features of DeFi. Additionally, we used control questions to ensure that the study participants use services in the financial sector (Oppenheimer et al., 2009). Respondents who do not use financial services might perceive trust and risk at a different level since they do not know reasons for distrust in central institutions. Simply, such respondents cannot be affected by central institutions for financial services. Furthermore, we gathered demographic data of respondents for the descriptive analysis of our sample.

3.3 Survey Validation

Before gathering data for our study, we followed the recommendations of Urbach and Ahlemann (2010) to receive empirical feedback on our questionnaire. We carried out an online pre-test with 30 participants

in LinkedIn[2] groups of IT and banking professionals to validate our survey items. We examined the items for validity and reliability using SmartPLS 3. We applied Cronbach's Alpha to assess the internal consistency reliability of our constructs (Urbach and Ahlemann, 2010). It measures the degree to which the indicator variables increase simultaneously when the latent variables increase (Hair et al., 2017). All our constructs show values well above the recommended threshold of .700 (Nunnally and Bernstein, 1994). To ensure the validity of our proposed constructs, we assessed convergent and discriminant validity (Urbach and Ahlemann, 2010). First, we examined the average variance extracted (AVE) of our proposed constructs. AVE measures the amount of variance in the latent variable explained by its indicators, compared to the amount explained by the measurement error. All our constructs, except for *Propensity to Distrust*, *Social Influence*, and *Perceived Risk*, pass the recommended threshold of .500 (Fornell and Larcker, 1981). While *Perceived Risk* and *Social Influence* have values of .465 and .490, *Propensity to Distrust* has an AVE value of .184. We propose that *Social Influence* and *Perceived Risk* still have acceptable values for AVE, while the AVE of *Propensity to Distrust* entails the elimination of the construct from the research model. Using the cross-loadings for an assessment of discriminant validity further supports this decision. Cross-loadings indicate the correlation of the component scores of the latent variable with all other items. The loadings allow for an interpretation if the constructs differ sufficiently from each other (Urbach and Ahlemann, 2010). The single items of *Propensity to Distrust* show very low and partly negative values. A possible explanation for the low AVE and cross-loadings are the different contextual backgrounds of the items for *Propensity to Distrust*. Moreover, Benamati et al. (2010) note that an individual's *Propensity to Distrust* is more relevant in initial trust formations than in established economic relationships that would be, for example, a bank-client relation. Subsequently, we drop our hypothesis three that *Propensity to Distrust* contributes positively to *Distrust in Banks*.

4 Results

We shared our survey with users over various social networks in Germany to reach a broad range of participants. Additionally, we used a survey exchange platform to generate further cases and a profound database. Based on our final data set, we removed participants who did not correctly answer our control questions, or either did not use financial services nor owned a bank account. This procedure followed the recommendations of Benamati et al. (2010), examining the influence of trust and distrust on behavioral intention in the financial sector. We also followed the recommendations of Hair et al. (2017) concerning the necessary sample size to carry out PLS.

In total, 326 respondents answered our questionnaire. After dropping cases with invalid control questions, as well as minors, we had a remaining sample of 264 cases that satisfies the recommended sample size for a PLS approach in an SEM (i.e., ten times the maximum number of inner or outer model links indicating any latent variable) (Hair et al., 2017).

4.1 Validity and Reliability Testing

In SmartPLS 3, we assessed the validity and reliability of our constructs to examine the quality of our final research model. Our sample provides a reliable database for our analysis. Following the procedure from our pre-test, Table 1 shows the cross-loadings for the items. All items have sufficient indicator loadings, except for five items. Following the procedure of Venkatesh et al. (2012), we removed the items *Disrepute of Banks 2*, *Distrust in Banks 6*, *Perceived Risk 4*, *Perceived Structural Assurances 1*, and *Social Influence 4* from our data analysis due to low factor loadings.

[2] https://www.linkedin.com/ is a social networking website for professionals.

Item No.	BI	DB	DT	PR	PSA	RB	SI
1	0,927	0,780	0,798	0,831	0,657	0,834	0,924
2	0,897	0,572	0,797	0,734	0,871	0,825	0,916
3	0,907	0,820	0,719	0,893	0,809	0,790	0,924
4	0,901	0,831	0,819	0,582	0,722	0,827	0,603
5			0,781				
6			0,699				

BI: Behavioral Intention to Use Decentralized Finance; DB: Disrepute of Banks; DT: Distrust in Banks; PR: Perceived Risk; PSA: Perceived Structural Assurances; RB: Relative Benefits; SI: Social Influence.

Table 1. Item Loadings

We examined the internal consistency reliability of our constructs with Cronbach's Alpha. All our constructs exceed the acceptable threshold of .700 (Nunnally and Bernstein, 1994). Disrepute of Banks (0.752), Perceived Structural Assurances (0.778), and Perceived Risk (0.791) show the lowest value for this criterion. We observed very high values for the constructs BI and SI. Since this might indicate multicollinearity, we decided to evaluate the inner Variance Inflation Factor value for the relationship between the two constructs. SmartPLS 3 indicates a value of 1.237, which is still acceptable. Therefore, we conclude that our constructs are sufficiently reliable, and collinearity does not pose a relevant issue. Furthermore, we tested our constructs for Composite Reliability and AVE. Both parameters had sufficient loadings for each construct. Table 2 depicts the Reliability, AVE, and Alpha values for all constructs of the final questionnaire. The constructs thus showed suitable for SEM.

Construct	Composite Reliability	Average Variance Extracted (AVE)	Cronbach's Alpha
BI	0.949	0.825	0,929
DB	0.863	0.678	0,763
DT	0.894	0.628	0,852
PR	0.865	0.683	0,794
PSA	0.867	0.687	0,792
RB	0.891	0.671	0,838
SI	0.953	0.870	0,926

Table 2. Reliability and validity of constructs

4.2 Descriptive Statistics

In our final sample, the average age of the respondents is 26.56 years, with a standard deviation of 6.78. Men dominate the sample with 52.72 percent. Since we carried out our questionnaire in the domains of banking and IT both dominated by men (King et al., 2018), a slightly higher number of young men with interest in technology as respondents in our sample is not surprising. Further, younger people are more affine toward novel internet technology than older generations (Venkatesh et al., 2003).

4.3 Structural Equation Modelling

Based on the recommendations of Hair et al. (2017), we used SmartPLS 3 to examine our final research model with PLS. In the first step, we calculated the standardized path coefficients for the proposed relationships using the PLS function in SmartPLS3. The relationships of *Social Influence* and *Relative Benefits of DeFi* both have a relevant coefficient (b = 0.187 and b = 0.537) on our latent variable *Behavioral Intention to Use DeFi*. As hypothesized, *Structural Assurances of Banking* have a negative influence on *Distrust in Banks* (b = -0.119), while the *Disrepute of Banks* has a positive effect on *Distrust in Banks* (b = 0.659). All these coefficients are above a threshold of 0.100, indicating that a construct has relevant explanatory value (Nunnally and Bernstein 1994). The path coefficients of

Distrust in Banks and *Perceived Risk of Banking* to *Behavioral Intention to Use DeFi* show values below this threshold (b = 0.066 and b = 0.026). Hence, the influence of these variables on the *Behavioral Intention to Use DeFi* is weak compared to the influence of other variables. In the second step, we used bootstrapping to determine the statistical significance and precision of our path coefficients, since we did not rely on our data to show a normal distribution (Henseler et al., 2009). We applied 500 iterations to calculate the values. The t-values show statistical significance at p = 0.05 level for all path coefficients except for the paths *Distrust in Banks* to *Behavioral Intention to Use DeFi* and *Perceived Risk of Banking* to *Behavioral Intention to Use DeFi*. The paths of *Social Influence* to *Behavioral Intention to Use DeFi* and *Relative Benefits of DeFi* to *Behavioral Intention to Use DeFi*, as well as *Disrepute of Banks* to *Distrust in Banks*, in contrast, show highly significant values at the p = 0.01 level. Fig. 1 depicts the path coefficients, the t-values, and the statistical significance of our path coefficients.

The R^2-value provided by Smart PLS 3 shows the proportion of variance of the criterion explained by the model (Barclay et al., 1995). It indicates the explanatory value of the research model. The value for *Behavioral Intention to Use DeFi* is $R^2 = 0.454$ and for *Distrust in Banks* $R^2 = 0.471$. Hence, we consider the explanatory value of our model above-average (Chin, 1998).

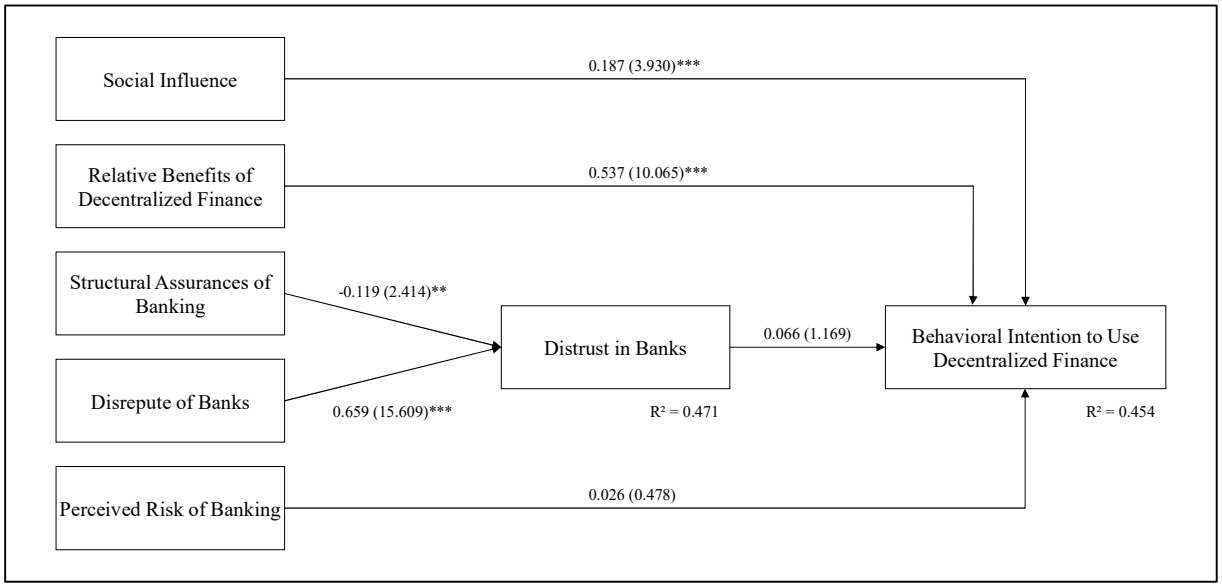

Figure 1. Path coefficients[3]

5 Discussion

5.1 Hypotheses

Based on the results of our PLS analysis, we discuss our hypotheses in the following. As can be seen in Fig. 2, we accept the hypotheses H1 and H2 and reconfirm the relationship between *Relative Benefits* of new technologies and the *Behavioral Intention to Use* for the application of DLT in the financial sector. The comparably strong path-coefficient for *Relative Benefits* indicates that customers need to perceive noticeable value compared to traditional intermediaries before adopting DeFi applications. Moreover, our data provide evidence that the *Social Influence* of customers has a significant positive impact on the adoption of DeFi. Both findings are in line with previous technology acceptance research and highlight the positive effects of both constructs on the adoption of a new technology (Venkatesh et al., 2003).

[3] **p < .05, ***p < .01

Nonetheless, in comparison to a user's perception of the relative benefits of DeFi, the effect of the social environment is considerably lower.

Our data also confirms the hypotheses H4 and H5. The results indicate a negative relationship between *Structural Assurances* and *Distrust in Banks*. Vice-versa, this finding indicates reconfirming a positive relationship between *Structural Assurances* and *Trust in Banks* as proposed by Kim et al. (2009). Furthermore, we confirm the positive relationship between *Disrepute of Banks* and *Distrust in Banks*. We find the construct *Distrust in Banks* influenced by *Structural Assurance* and *Disrepute of Banks*. This finding is in line with previous research in the field of trust in the financial sector (Kim et al., 2009; Benamati et al., 2010).

In our sample, we cannot find evidence for hypothesis H6. Thus, *Perceived Risk of Banking* does not contribute statistically significant to the *Behavioral Intention to Use DeFi*. Based on the findings of Featherman and Pavlou (2003), we expected *Perceived Risk in Banks* to enhance a customer's desire to use an alternative solution, which could reduce transactional risks (Chen and Bellavitis, 2019; Sun Yin et al., 2019). Regarding the findings of other studies, the rejection of hypothesis H6 could have two reasons. First, even though customers perceive risk in traditional banking, they are not willing to adopt DeFi because they perceive it as even riskier due to a lack of knowledge about the underlying technology (Featherman and Pavlou, 2003). Second, *Perceived Risk in Banking* might not be a relevant argument to accept an alternative system, since the traditional banking system is heavily regulated and offers institutional financial safeguards that lower the risk of the individual (Kim et al., 2009).

Additionally, we refuse our hypothesis H7. We do not find statistical evidence that *Distrust in Banks* is a relevant factor to explain the *Behavioral Intention to Use DeFi*. Hence, we did not figure out if *Distrust in Banks* influences a shift of the intermediation from banks toward DeFi. Since we cannot accept these hypotheses, our research does not support preliminary assumptions of blockchain. We expected *Distrust in Banks* to foster the need for trust-free alternatives (Nakamoto, 2008), and, thus, to influence the adoption of trust-free alternatives. Remarkably, we cannot find evidence that distrust in established intermediaries positively affects the adoption of trust-free transaction systems like DLT (Rossi et al., 2019; Risius and Spohrer, 2017).

5.2 Theoretical Contribution

The results allow us to verify relationships for the case of DeFi, which we derived from previous research in the field of technology acceptance (Benamati et al., 2010; Kim et al., 2009; Venkatesh et al., 2003). As outlined previously, *Relative Benefits* and *Social Influence* have the highest influence on the *Behavioral Intention to Use DeFi*, which is in line with existing research (Cai et al., 2019; Nofer et al., 2017). Further, we can confirm that *Distrust in Banks* is a second-order construct, which is positively affected by *Disrepute of Banks* and negatively influenced by *Structural Assurances of Banking*. Consequently, in economically stable systems like Europe, prior findings from general technology acceptance research apply to the case of DeFi. However, we do not find evidence for the hypothesis that customers in such a setting who have distrust in banks would demand DLT as an alternative to traditional banking (Cifuentes, 2019; Nakamoto, 2009). The missing evidence for this foundational assumption of DLT and DeFi research contradicts existing theories that build upon it.

The results of our study allow us to discuss further theoretical assumptions, whereof we present the three most pressing. First and before a potential adoption, consumers might struggle to trust DLT. Considering the early stage of dissemination and technological development, consumers might be skeptical about the concept and underlying algorithms (Rossi et al., 2019). Since the value in DeFi is locked in smart contracts, which reflect the business logic of the application, all users depend on the flawless execution of the algorithm. Thus, users unable to interpret smart contract code on their own would need a trusted source that verifies the accuracy of algorithms. Missing trust in underlying algorithms or a trusted verification agency could hence hinder the *Behavioral Intention to Use DeFi* and the adoption of DeFi.

Second and in line with our first theoretical remarks, Lustig and Nardi (2015) propose that the adoption of DeFi applications like Bitcoin is not only determined by trust in algorithms, but also by the integration of DLTs into a trusted institutional setting. Hawlitschek et al. (2018) confirm this pattern for the

application of DLT in the sharing economy. Our findings support challenging the preliminary assumption that solely trust in algorithms influences the adoption of DeFi. Consequently, a consumer's *Behavioral Intention to Use DeFi* could be also determined by an institutional setting. However, as already trust in a verifying institution would foil the motivation of DLT to replace trust in institutions through trust in technology, a fully institutionalized setting would contradict the initial motivation for the development of DeFi.

Third, even though customers distrust banks (Sapienza and Zingales, 2012), a parallel coexistence of trust and distrust as found by Benamati et al. (2010) might have explanatory value for customer acceptance of DLT. Given this theory, we observe a trust paradox in the adoption of DLT. Even though customers distrust financial institutions (Sapienza and Zingales, 2012), they do not prefer a shift to an alternative technology that would enable trust-free transactions (Beck et al., 2016; Chong et al., 2019; Seidel, 2018). We can compare this paradox with the privacy paradox. The privacy paradox explains that even though people care about their data privacy, the majority still uses services that are proven to lack sufficient privacy features since these services provide higher convenience than alternatives. This pattern leads to a dichotomy in the attitude about privacy and the actual behavior concerning privacy-related services (Kokolakis, 2017; Spiekermann et al., 2001). We hypothesize that this paradox is applicable to trust in financial intermediaries, such as DeFi or established institutions. DeFi could provide advantageous services, which could overcome existing concerns in the financial sector (Chen and Bellavitis, 2019). Customers, however, seem to care about the trustworthiness of banks, but customers do not care about resolving this issue if traditional banking is more convenient and state of the art. Another aspect that supports the paradox is stressed by research about network effects (Farrell and Klemperer, 2007). The effect suggests that one major argument for the usage of a new service is the number of users who adopted this system. The payoff of the adoption for an individual increases if more others adopt. This effect can be also applied to financial intermediaries (Milne, 2006). Thus, a user would not adopt DeFi if the professional and private contacts did or do not adopt DeFi as well. With the tradeoff between eliminating distrust in established intermediaries and risking reduced convenience, the user would expect added value. Nonetheless, without positive network effects, users would resist the adoption of DeFi.

5.3 Managerial Implications

In addition to our theoretical contributions, our findings have important implications for practice. First, by drawing from our theoretical contribution, practitioners could enhance the adoption of DeFi through the integration into an institutionalized setting. The setting into an organization (e.g., bank, consortium) could compromise potential trust issues in the underlying algorithms by providing a trusted authority (Hawlitschek et al., 2018; Lustig and Nardi, 2015). In the most common applications, retail banks could integrate DeFi into their existing product portfolio and provide a technologically advanced solution to their customers.

Second, providers of applications could foster the adoption of DeFi. By highlighting the benefits of DeFi over traditional banks, potential customers could be attracted. This aspect is especially important considering the early stage of dissemination of DeFi. Compared to other technological advances in the financial sector (e.g., mobile banking), DeFi is a new, quite unknown, and complex innovation in this sector. The paradigm of decentralization and its technological foundation require further explanation to users with scarce knowledge about the advantages of DeFi (Hawlitschek et al., 2018). To spread knowledge, providers need to make a concentrated communication effort.

Third, while DeFi is expected to replace the trust component of intermediation, distrust in established intermediaries does not seem to drive the adoption of DeFi. Hence, providers of DeFi solutions should not just rely on repeating this value proposition frequently but instead provide noticeable value to customers (Chen and Bellavitis, 2019). Management should foster content marketing of performance indicators that demonstrate the technological superiority of their DeFi solution. Marketing efforts should thus shift from referring to the dark side of traditional banking to the beneficial side of technological intermediation.

Fourth and finally, building upon our theoretical contributions, DeFi applications should furthermore focus on interoperability and high convenience for customers. Interoperability ensures compatibility between different providers of financial services regardless of their underlying technology. Higher convenience for customers increases their loyalty to a service provider (Dratva, 2020). Differing efforts between the use of traditional banking and DeFi would balance out over time if the inconvenience of DeFi decreases. Users would assess the advantages and disadvantages of a neutral base and show different adoption behavior in the future.

6 Limitations and Future Research

Our work faces limitations of empirical and conceptual nature. As seen in the descriptive analysis of our final data sample, the explanatory value of this study is limited. People with an average age of 26.56 years dominate the sample. On the one hand, the financial crisis as a key event for the existence of DLT was about a decade earlier than our study. An essential part of the respondents was still in a familial environment and did not have an adolescent view on the impact of financial crises (e.g., fear of losing their job). On the other hand, the sample is expected to be very likely to adopt DeFi. Researchers found younger persons to have lower risk perceptions of transactions in the internet (Featherman and Pavlou 2003). Those younger people, however, would be among the first adopters of such new technology as they have been in online banking and comparable technological inventions (Venkatesh et al., 2003). However, Shahzad et al. (2018) did not find significant effects of age and gender in the intention to use the cryptocurrency Bitcoin. Since the authors only investigated the case of Bitcoin in mainland China, a more diverse data sample in other countries might show other effects. Future research might thus address different samples and investigate the effect of moderating variables in our research model. Further, we only gathered data in Germany. Since every country has its own specific and unique cultural characteristics (Hofstede, 1980), cross-cultural studies can improve the generalizability of our results. Kim et al. (2009) found socio-economic factors of respondents to be present in the adoption of innovation. Based on our initial motivation and higher adoption rates of cryptocurrencies in regions with unstable economic environments (Cifuentes, 2019), data from countries with rather unstable financial systems might show different results. Our findings should be discussed carefully in this regard. Further, the motivation to use DeFi applications differs heavily between individuals and might have changed over time. The upturn in price and volatility of Bitcoin and other cryptocurrencies might be rather triggered by an opportunistic investment behavior, than by idealistic adoption.

We only applied *Behavioral Intention to Use* as the dependent variable. With future adoption of DLT in the financial sector, researchers might apply actual *Usage Behavior* as a dependent variable. Such an approach could improve measurement reliability (Arnold and Feldman, 1981). Also, the risk of response bias exists. Respondents may have answered parts of our questionnaire (e.g., *Relative Benefits* or *Structural Assurances*) in a way to justify their adoption behavior (Kim et al., 2009).

Our proposition of a trust paradox in the adoption of DeFi, and possibly other fields of application for DLT, demands further investigation. Kokolakis (2017) emphasizes that the privacy paradox is a highly context-related phenomenon. Thus, any further investigation should be carried out in a realistic setting. Research could investigate the analogy to the privacy paradox for DeFi in the financial sector and other applications of DLT in different industries. This might include examining the influence of different types of trust concerns in technology and established intermediaries, as well as comparative studies on different applications of DLT (Kokolakis, 2017).

As highlighted in the theoretical foundations, trust in a technology has an important impact on user adoption (Gefen et al., 2003). Besides the paradigm of a trust-free technology, we emphasize the importance of trust in DeFi to explain user adoption. This contradicts existing research, which proposes the notion of a trust-free system just relying on technological features (Seidel, 2018). Trust could be either based on technological knowledge about the underlying algorithms (Lustig and Nardi, 2015), or on an institutional setting that verifies the accuracy of the algorithms. Hawlitschek et al. (2018) emphasize that in more complex transactions with human interaction like in the sharing economy, the notion of a trust-free transaction system might not be applicable. Also for DeFi, we highlight the need

to further examine trust in DLT and the notion of a trust-free transaction system through future research on our key hypotheses in different settings (Rossi et al., 2019). This can also be addressed by narrowing the model with fewer hypotheses to gather a further understanding of the interrelation between trust and distrust. Also, the influence of return-on-reputation of participants in DeFi systems might be included in future research endeavors.

Considering the complex technological foundations of DLT, only a few customers might understand the concept of DeFi. Lustig and Nardi (2015) suggest that a customer's individual trust in a DLT system is determined by the knowledge about the technology and a potential institutional setting. Hence, future research needs to address the diverging perceptions of DeFi from customers who might not be able to grasp the concept of DeFi correctly.

7 Conclusion

With our research, we contribute to behavioral research by adapting existing research models with further constructs to the context of DLT in the financial sector. Throughout our research project, we apply and confirm existing propositions of prior studies in the context of DeFi. Furthermore, we proposed the relationship between *Distrust in Banks*, and thus in established intermediaries in the financial sector, and the *Behavioral Intention to Use* DLT in this sector. Regarding the initial motivation to develop DLT, we cannot confirm a theoretical foundation that distrust in established financial institutions affects the adoption of the rivalry solution DeFi. Even though distrust was a driver to develop DLT, remarkably, we did not find evidence that distrust explains the adoption of DeFi as DLT's first and most prominent field of application. We propose the existence of a trust paradox in the application of DLT in the financial sector, which might provide explanatory value to the academic discourse about the role of trust in DLT-based systems.

8 Appendix

BI1	I intend to use decentralized finance in the future.
BI2	I expect that I will use decentralized finance in my daily life.
BI3	I plan to use decentralized finance frequently.
BI4	I predict I would use decentralized finance in the future.
BI5	I intend to use decentralized finance in the future.

Table 1. Exemplary Items for Behavioral Intention to Use DeFi

References

Alvesson, M. and D. Kärreman (2007). "Constructing Mystery: Empirical Matters in Theory Development" *Academy of Management Review* 32 (4), 1265–1281.

Arnold, H. J. and D. C. Feldman (1981). "Social Desirability Response Bias in Self-Report Choice Situations" *Academy of Management Journal* 24 (2), 377–385.

Baran, P. (1964). "On Distributed Communications Networks" *IEEE Transactions on Communications* 12 (1), 1–9.

Barclay, D., R. Thompson and C. Higgins (1995). "The Partial Least Squares (PLS) Approach to Causal Modeling: Personal Computer Use as an Illustration" *Technology Studies* 2 (2), 285–309.

Beck, R., J. S. Czepluch, N. Lollike and S. Malone (2016). "Blockchain - The Gateway to Trust-Free Cryptographic Transactions". In: *Proceedings of the Twenty-Fourth European Conference on Information Systems (ECIS)*. Istanbul, Turkey.

Beck, R., C. Müller-Bloch and J. L. King (2018). "Governance in the blockchain economy: A framework and research agenda" *Journal of the Association for Information Systems* 19 (10), 1020–1034.

Benamati, J. S. and M. A. Serva (2007). "Trust and distrust in online banking: Their role in developing countries" *Information Technology for Development* 13 (2), 161–175.

Benamati, J. S., M. A. Serva and M. A. Fuller (2010). "The productive tension of trust and distrust: The coexistence and relative role of trust and distrust in online banking" *Journal of Organizational Computing and Electronic Commerce* 20 (4), 328–346.

Blasingame, J. (2019). *Blockchain Isn't The End Of Trust, It's The Future Of Trust*. URL: https://www.forbes.com/sites/jimblasingame/2019/07/18/blockchain-isnt-the-end-of-trust-its-the-future-of-trust/#2197e6961596 (visited on 11/13/2020).

Cai, X., X. Zhao and B. Zhang (2019). "Identify Multiple Types of Social Influences on Smart Contract Adoption in Blockchain User Network: An Empirical Examination of CryptoKitties in Ethereum". In: *Proceedings of the Fortieth International Conference on Information Systems*.

Chen, Y. and C. Bellavitis (2019). "Blockchain Disruption and Decentralized Finance: The Rise of Decentralized Business Models" *Journal of Business Venturing Insights* 13.

Chin, W. W. (1998). "The partial least squares approach to structural equation modeling". In G. Marcoulides (ed.) *Modern Methods for Business Research*, pp. 1295–1336. Mahwah, NJ: Lawrence Erlbaum Associates.

Chong, A. Y. L., E. T. K. Lim, X. Hua, S. Zheng and C.-W. Tan (2019). "Business on Chain: A Comparative Case Study of Five Blockchain-Inspired Business Models" *Journal of the Association for Information Systems*, 1308–1337.

Cifuentes, A. F. (2019). "Bitcoin in Troubled Economies: The Potential of Cryptocurrencies in Argentina and Venezuela" *Latin American Law Review* (3), 99–116.

Davis, F. D. (1989). "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" *Management Science* 13 (3), 319–340.

Dratva, R. (2020). "Is open banking driving the financial industry towards a true electronic market?" *Electronic Markets* 30 (1), 65–67.

Farrell, J. and P. Klemperer (2007). "Coordination and Lock-In: Competition with Switching Costs and Network Effects". In *Handbook of Industrial Organization*. 3rd Edition, pp. 1967–2072. URL: https://pubsonline.informs.org/doi/pdf/10.1287/isre.2018.0794.

Featherman, M. S. and P. A. Pavlou (2003). "Predicting e-services adoption: A perceived risk facets perspective" *International Journal of Human Computer Studies* 59 (4), 451–474.

Financial Stability Board (2019). *Decentralised financial technologies*. URL: https://www.fsb.org/wp-content/uploads/P060619.pdf (visited on 11/08/2020).

Folkinshteyn, D. and M. Lennon (2016). "Braving Bitcoin: A technology acceptance model (TAM) analysis" *Journal of Information Technology Case and Application Research* 18 (4), 220–249.

Fornell, C. and D. F. Larcker (1981). "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error" *Journal of Marketing Research* 18 (1), 39–50.

Gefen, D., E. Karahanna and D. W. Straub (2003). "Trust and TAM in Online Shopping: An integrated model" *MIS Quarterly* 27 (1), 51–90.

Glaser, F. (2017). "Pervasive Decentralisation of Digital Infrastructures: A Framework for Blockchain enabled System and Use Case Analysis". In: *Proceedings of the 50th Hawaii International Conference on System Sciences*, pp. 1543–1552.

Gregor, S. (2006). "The Nature of Theory in Information Systems" *MIS Quarterly* 30 (3), 611–642.

Hair, J. F., M. Sarstedt, C. M. Ringle and S. P. Gudergan (2017). *Advanced issues in partial least squares structural equation modeling:* saGe publications.

Hawlitschek, F., B. Notheisen and T. Teubner (2018). "The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy" *Electronic Commerce Research and Applications* 29, 50–63.

Henseler, J., C. M. Ringle and R. R. Sinkovics (2009). "The use of partial least squares path modeling in international marketing" *Advances in International Marketing* 20, 277–319.

Hofstede, G. (1980). "Culture and Organizations" *International Studies of Management & Organization* 10 (4), 15–41.

Kazan, E., C.-W. Tan and E. Lim (2014). "Towards a Framework of Digital Platform Disruption: A Comparative Study of Centralized & Decentralized Digital Payment Providers". In: *Proceedings of the 25th Australasian Conference on Information Systems (ACIS 2014)*.

Kim, G., B. Shin and H. G. Lee (2009). "Understanding dynamics between initial trust and usage intentions of mobile banking" *Information Systems Journal* 19 (3), 283–311.

Kim, K. K. and B. Prabhakar (2004). "Initial trust and the adoption of B2C e-commerce" *ACM SIGMIS Database* 35 (2), 50–64.

King, M., M. Ortenblad and J. J. Ladge (2018). *What Will It Take to Make Finance More Gender-Balanced?* URL: https://hbr.org/2018/12/what-will-it-take-to-make-finance-more-gender-balanced (visited on 11/15/2020).

Kokolakis, S. (2017). "Privacy attitudes and privacy behaviour: A review of current research on the privacy paradox phenomenon" *Computers & Security* 64, 122–134.

Lee, M. K. O. and E. Turban (2001). "A Trust Model for Consumer Internet Shopping" *International Journal of Electronic Commerce* 6 (1), 75–91.

Li, Y., T. Marier-Bienvenue, A. Perron-Brault, X. Wang and G. Paré (2018). "Blockchain Technology in Business Organizations: A Scoping Review". In: *Proceedings of the 51st Hawaii International Conference on System Sciences*, pp. 4474–4483.

Lindman, J., V. K. Tuunainen and M. Rossi (2017). "Opportunities and risks of Blockchain Technologies–a research agenda". In: *Proceedings of the 50th Hawaii International Conference on System Sciences*, pp. 1533–1542.

Lins, K. V., H. Servaes and A. Tamayo (2017). "Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis" *The Journal of Finance* 72 (4), 1785–1824.

Lu, Y., S. Yang, P. Y. Chau and Y. Cao (2011). "Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective" *Information & Management* 48 (8), 393–403.

Lustig, C. and B. Nardi (2015). "Algorithmic Authority: The Case of Bitcoin". In: *48th Hawaii International Conference on System Sciences*: IEEE, pp. 743–752.

Mallat, N., M. Rossi and V. K. Tuunainen (2004). "Mobile banking services" *Communications of the ACM* 47 (5), 42–46.

Martins, C., T. Oliveira and A. Popovič (2014). "Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application" *International Journal of Information Management* 34 (1), 1–13.

McKnight, D. H., V. Choudhury and C. Kacmar (2002). "Developing And Validating Trust Measure for E-Commerce: An Integrative Typology" *Information Systems Research* 13 (3), 334–359.

McKnight, D. H., L. L. Cummings and N. L. Chervany (1998). "Initial Trust Formation in New Relationships" *Academy of Management* 23 (3), 473–490.

Mendoza-Tello, J. C., H. Mora, F. A. Pujol-Lopez and M. D. Lytras (2018). "Social Commerce as a Driver to Enhance Trust and Intention to Use Cryptocurrencies for Electronic Payments" *IEEE Access* 6, 50737–50751.

Milne, A. (2006). "What is in it for us? Network effects and bank payment innovation" *Journal of Banking & Finance* 30 (6), 1613–1630.

Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic cash system*. URL: https://bitcoin.org/bitcoin.pdf (visited on 11/15/2020).

Nakamoto, S. (2009). *Bitcoin open source implementation of P2P currency*. URL: http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source? (visited on 11/03/2020).

Nofer, M., P. Gomber, O. Hinz and D. Schiereck (2017). "Blockchain" *Business & Information Systems Engineering* 59 (3), 183–187.

Nunnally, J. C. and I. H. Bernstein (1994). *Psychometric Theory.* New York, New York, USA: McGraw-Hill.

Oppenheimer, D. M., T. Meyvis and N. Davidenko (2009). "Instructional manipulation checks: Detecting satisficing to increase statistical power" *Journal of Experimental Social Psychology* 45 (4), 867–872.

Pavlou, P. A. and D. Gefen (2004). "Building effective online marketplaces with institution-based trust" *Information Systems Research* 15 (1), 37–59.
Qasim, H. and E. Abu-Shanab (2016). "Drivers of mobile payment acceptance: The impact of network externalities" *Information Systems Frontiers* 18 (5), 1021–1034.
Risius, M. and K. Spohrer (2017). "A Blockchain Research Framework" *Business & Information Systems Engineering* 59 (6), 385–409.
Rossi, M., C. Mueller-Bloch, J. B. Thatcher and R. Beck (2019). "Blockchain research in information systems: Current trends and an inclusive future research agenda" *Journal of the Association for Information Systems* 20 (9), 1388–1403.
Sapienza, P. and L. Zingales (2012). "A Trust Crisis" *International Review of Finance* 12 (2), 123–131.
Seidel, M.-D. L. (2018). "Questioning Centralized Organizations in a Time of Distributed Trust" *Journal of Management Inquiry* 27 (1), 40–44.
Shahzad, F., G. Xiu, J. Wang and M. Shahbaz (2018). "An empirical investigation on the adoption of cryptocurrencies among the people of mainland China" *Technology in Society* 55, 33–40.
Spiekermann, S., J. Grossklags and B. Berendt (2001). "E-privacy in 2nd generation E-commerce". In: *Proceedings of the 3rd ACM conference on Electronic Commerce*. New York, New York, USA: ACM Press, pp. 38–47.
Sun Yin, H. H., K. Langenheldt, M. Harlev, R. R. Mukkamala and R. Vatrapu (2019). "Regulating Cryptocurrencies: A Supervised Machine Learning Approach to De-Anonymizing the Bitcoin Blockchain" *Journal of Management Information Systems* 36 (1), 37–73.
Urbach, N. and F. Ahlemann (2010). "Structural Equation Modeling in Information Systems Research Using Partial Least Squares" *Journal of Information Technology Theory and Application* 11 (2), 5–40.
Venkatesh, V., M. G. Morris, G. B. Davis and F. D. Davis (2003). "User Acceptance of Information Technology: Toward a Unified View" *MIS Quarterly* 27 (3), 425–478.
Venkatesh, V., J. Thong and X. Xu (2012). "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology" *MIS Quarterly* 36 (1), 157–178.