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Transferring Trust, Risk and Security on Users' Intention to Trade Cryptocurrency, Using PayPal as an Example

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Abstract

As one of the largest digital payment providers, PayPal has integrated the possibility to use cryptocurrency as a payment method and to buy cryptocurrency via the platform. Building on the considerations of trust-transfer theory and extending this model adding the trust-related attributes perceived risk and security, this paper therefore examines to what extent these attributes can be transferred from the payment service provider PayPal to cryptocurrency. In a second step, based on this transfer of attributes, the intention to use cryptocurrencies via PayPal will be examined, as well as the general intention to use cryptocurrencies. By conducting an online survey (N=398), a significant effect of the transfer of the examined attributes from PayPal to cryptocurrency if handled by PayPal was found. Furthermore, in the second step of the data analysis, significant effects for the attributes of cryptocurrency if handled by PayPal on the intention to use were found.

Keywords: Cryptocurrencies, Trust Transfer, Payment Provider, PayPal.

1 Introduction

Online commerce is booming - and with it digital payments and transactions made online. With 361 million users, PayPal is considered to be one of the largest online payment service providers worldwide (PayPal 2020c). When PayPal announced that cryptocurrencies could be bought and paid via the platform within the USA, Bitcoin price rose to an annual high immediately. Since 2021, PayPal has also offered its customers in the USA the option of using cryptocurrency as a means of payment for payment transactions, while the seller receives dollars (Sparkes 2021). PayPal is also planning to enter the cryptocurrency market in other countries in the coming years (dpa 2020), having started in Europe in August 2021 by offering customers in the U.K. to buy and sell cryptocurrencies (Browne 2021). Via simple explanations in video form as well as seamless integration into the in-house app, which is already used daily by millions of customers around the world, PayPal is trying to make cryptocurrencies accessible to more and more customers (PayPal 2020a). One month after the launch in the USA, already one-fifth of PayPal's U.S. users had used the PayPal app to buy or sell Bitcoins (Reynolds and Voell 2020), which is one of the four via PayPal tradable cryptocurrencies along with Ethereum, Bitcoin Cash and Litecoin (PayPal 2020a). Users who have already purchased cryptocurrencies through PayPal have logged into PayPal twice as often as before the purchase, generating 12% more revenue (PayPal 2021a). For PayPal, introducing the ability to use cryptocurrencies through their platform seems to have paid off.

The trend towards the use of cryptocurrency and especially the possibility to use cryptocurrency is not only shown by the example of PayPal. Digital currencies are increasingly being positioned in the public domain, having payment card providers Visa and Mastercard supporting selected cryptocurrencies on their own networks in the near future (Dhamodharan 2021; Visa Inc. 2021), individual companies, such as Tesla or

Microsoft, already accepting payments with cryptocurrency in some cases (Sparkes 2021), and the European Central Bank already working on a digital e-euro (Jackisch 2021). However, the acceptance of cryptocurrencies is dwindling and German consumers, for example, increasingly know more about cryptocurrencies, but use them less (BearingPoint 2020).

When analyzing cryptocurrency acceptance, trust seems to play a crucial role (Arli et al. 2020). We therefore refer to the concept of trust transfer as it is described by Stewart's (2003) Trust-Transfer Model as the basic theoretical framework of this study. Previous studies have shown that the rejection of the use of cryptocurrency results, among others, from a low level of trust in cryptocurrency itself (Arli et al. 2020) as well as from a low level of trust in the blockchain technology (Völter et al. 2021). In this context, trust can be described as institution-based trust. Institution-based trust plays a central role in building trust in a business environment with which there is no prior interaction (Zucker 1986). Hereby, institution-based trust is linked to the existence of third-party structures and trust in an institution like PayPal also increases users' trust in sellers distributing via this marketplace (Pavlou and Gefen 2004). According to previous research, trust in cryptocurrencies is influenced by various aspects, such as being traded in a decentralized location (Arli et al. 2020), or transactions' transparency (Sas and Khairuddin 2017). Moreover, trust in online services increases, when users believe that the online service has security measures built into the website (Gefen, Karahanna, and Straub 2003). Further, literature shows that attributes such as trust, which are attributed to an online service provider, can also be transferred to cooperating providers, companies, or services (e.g., Cao et al. 2018, Wang et al. 2013, Stewart 2003). For instance, studies have confirmed that users transfer trust from a website they know to an unknown website (e.g., Stewart 2003). Furthermore, unknown websites can gain users' trust if they cooperate with well-known brands (Ballester and Espallardo 2008). In addition to trust, perceived risk has also been shown to be a critical factor in cryptocurrency acceptance and use (Mendoza-Tello et al. 2019). Most consumers seek to avoid risk (Mendoza-Tello et al. 2019), which plays a particularly crucial role in the adoption of new technologies (So et al. 2005). In the context of cryptocurrency, risks that can be identified are volatility (Mendoza-Tello et al. 2019) or the risk of unsafe transactions due to the risk of dishonest traders (Sas and Khairuddin 2017). As a further determinant, security concerns also play a major role in the context of cryptocurrencies (Rehman et al. 2020). In this context, financial intermediaries guarantee both security for the customer's account and financial transactions (Marella et al. 2020). Concerns about the security of cryptocurrency for example may result from concerns about cyber-attacks (Marella et al. 2020), whereby these attacks can be carried out as wallet attacks on customers, as DDoS attacks on networks, or as mining attacks (Conti et al. 2018). In contrast, security concerns can be reduced, for example, by providing information about the provider's technology infrastructure (Rehman et al. 2020). Therefore, in addition to trust, risk and security are also crucial determinants for the use of cryptocurrency.

Furthermore, literature has shown that trust in an online marketplace provider such as Amazon can also increase users' trust in sellers distributing via this marketplace (Pavlou and Gefen 2004). Since, as described above, the determinants of risk and security are also linked to the institution, they follow the same process of establishment of institution-based trust. Moreover, previous research has shown the transfer of other determinants than trust following the Trust-Transfer Model (Teubner et al. 2019). Accordingly, a transfer of the attributes risk and security is also very likely according to the Trust-Transfer Model. Based on this, with our study we analyze whether a transfer of attributes that are associated with a payment service provider to cryptocurrency is possible and whether attribute transfer influences user intention to use cryptocurrencies. To gain insight into this topic, we use PayPal as a case study, because, for example, Kalinic et al. (2019) have shown in a review study that perceived trust, risk or security are among the main drivers of customer intention to use mobile payment systems, like PayPal. PayPal is considered the most secure payment method on the internet by 70% of users, according to a study by Seidenschwarz et al. (2020). A representative study by Cofinpro AG found that 54% of respondents would trust PayPal as a platform provider for bundling all accounts in one place (Cofinpro AG 2018). Thus, PayPal is of significant importance as a brand and we regard it as a suitable example for a payment system. We address the following research questions:

1) Is it possible to transfer perceived trust, risk and security in / of PayPal to cryptocurrencies when handled by PayPal?

2) Do these transferred attributes have an influence on the intention to a) use cryptocurrencies if handled by PayPal and b) use cryptocurrencies in general?

Thus, this paper investigates whether a payment method that is predominantly perceived as risky by many users is potentially more likely to be used by consumers if the payment service provider offering this payment method is already trusted by consumers. To the best of our knowledge, an extension of a payment service provider's offering such as trading cryptocurrencies via PayPal has not been studied before.

The results of this study are expected to add value to further research in IC in several ways: By answering the research questions, implications for theory can be derived from this study. We apply the Trust-Transfer Model in a context, which is becoming increasingly important for IC research, i.e. online payment services. In contrast to previous research, we focus on trust transfer from a service provider (company) to a payment option (service). Besides applying the model in an expanded context, we further investigate, whether an extension of the Trust-Transfer Model is possible, expanding the Trust-Transfer Model with further determinants (risk and security). These two extensions of the model provide new theoretical insights and broaden the understanding of IC-service usage in an era where technologies, business, and services are increasingly connected to each other, and new interfaces and intersections are created.

Moreover, this study also creates added value for practical applications. Different cryptocurrency providers, also including social media platform companies (e.g., Meta) or state-owned central banks (e.g., China's) can better understand the transfer of perceived attributes when working with payment service providers, which e.g., also include traditional banks, as well as enhance their knowledge of how users' intention to use cryptocurrencies can be influenced. In addition, user intention to use cryptocurrencies and thus the cryptocurrency market itself can be strengthened. By offering more cryptocurrencies via service providers or players that are optimally already established and highly trusted as well as perceived to have low risks, more users might dare to trade cryptocurrencies, giving them access to additional payment and investment opportunities.

In the following, we introduce our conceptual framework and present our hypotheses on the transfer of trust-related attributes between a service provider and the services it trades and the influence on user intentions. By using PayPal as an example, we conducted an online questionnaire that queries the determinants of "trust", "security", and "risk" in relation to the use of PayPal in general, as well as in relation to trading cryptocurrencies via PayPal. In addition, the general usage intention of users to trade cryptocurrencies as well as to trade cryptocurrencies using PayPal is examined using a regression analysis. Our results show how users behave when a financial service provider they have known and which they trust (here: PayPal) enters into cryptocurrency trading and that trust and related attributes they associate to this financial service provider are then also transferred to a cryptocurrency. Finally, we discuss our results and provide a conclusion.

2 Conceptual Framework

In the 1990s, a new method for peer-to-peer (P2P) payment transactions was introduced, using cryptography and information technology and not requiring a bank authorization process (Clemons et al. 1996). Cryptocurrencies were finally materialized with Bitcoin, a cryptocurrency still attracting the most attention within this context being introduced by Nakamoto (2008). Bitcoin is an electronic financial mechanism which is based on a decentralized organizational structure. The creation of "money" in the Bitcoin system is realized through an open algorithm, which facilitates the reliability of expectations regarding future money supply. This technology enables the real-time monitoring of transactions via a public peer-to-peer network. The entire transaction history is stored in a "chain" of transactions, often referred to as a blockchain. The blockchain represents all verified and valid transactions between users of the network. Bitcoin is therefore independent of a bank authorization process (Nakamoto 2008).

Researchers argue that cryptocurrencies rearrange the existing structure of payment and currency systems, as they are constantly gaining users' attention (Glaser et al. 2014).

Prior research on cryptocurrencies initially focused on the decentralized infrastructure and its risks. Various techniques based on network theory were used to analyze transaction anomalies and possibilities for de-anonymizing individual entities in the blockchain (Reid and Harrigan 2011). Furthermore, Karame et al. (2012), as well as Clark and Essex (2012), focused on anonymity and transaction speed. Through a quasi-simulative approach, the authors were able to identify various deficiencies, which were then taken into account in further cryptocurrency generations. Brezo and Bringas (2012) emphasize that Bitcoin is particularly susceptible to speculation and misinformation. In addition, they criticized the lack of regulatory supervision of the market. They argue that, in general, currency exchanges are an integral part of the cryptocurrency ecosystem as they link traditional currencies to cryptocurrencies. However, as they are not regulated, they have substantial default risk.

Usually, the value of a currency is based on macroeconomic conditions, inflation and interest rates (Meese and Ragoff 1983). However, cryptocurrencies do not offer the same features as traditional currencies, where interest rates are provided by central banks. Therefore, valuation models based on a particular interest rate are difficult to adapt. Users tend to determine the value of a cryptocurrency themselves by analyzing news or web resources. Glaser et al. (2014) conclude that most users have so far traded cryptocurrencies like assets on a stock market, rather than using them as a payment instrument. However, cryptocurrencies can now also be increasingly used as a means of payment, such as at Microsoft or Tesla (Sparkes 2021). Furthermore, Kristoufek (2015) has shown that there is a strong correlation between users' information gathering and the price of a particular cryptocurrency. Furthermore, trust plays a crucial role for payment systems and financial transactions, with all parties involved expecting a secure transaction. For novel technologies as payment options, such as cryptocurrencies, trust is therefore particularly important (Nelms et al. 2018). In general, trust has been identified as a key driver, when trying to establish new technologies (Ofori et al. 2017, Kumar et al. 2020). Researchers investigating users' trust in cryptocurrencies have been e.g. Arli et al. (2020). In their study, they showed that various factors, such as knowledge about cryptocurrency, regulation by the government, or the speed of transactions can influence the trust of users in cryptocurrencies (Arli et al. 2020). Moreover, several other studies investigated the user perspective of cryptocurrency, also highlighting the importance of trust in this context. For example, Völter et al. (2021) have shown that end-user trust in blockchain technology is a crucial factor for the value proposition. The authors also emphasize the need for further research in this context. Another study by Marella et al. (2020) analyzes trust in cryptocurrency using Bitcoin as an example and identifies eleven attributes that have a significant impact on trust in the digital currency. In addition to factors such as openness and immutability, these also include security (Marella et al. 2020). Sas and Khairuddin (2015) also look at users' trust in Bitcoin and various characteristics such as decentralization or irreversible transactions as factors influencing trust in cryptocurrencies (2017). In addition, the researchers discuss the role of risk in dealing with cryptocurrency, such as in the context of dishonest traders (Sas and Khairuddin 2017). Another study focused on how trustworthiness of blockchain platforms can be communicated to end users and examined various design elements (Zavolokina et al. 2019).

In addition to research about the users' perspective on cryptocurrencies, research has addressed the acceptance and usage intention of online platforms and specifically online payment systems in recent years. While Pavlou (2003) identified trust and perceived risk as important predictors of user acceptance of e-commerce, these factors have also been identified as important aspects of online payment usage intention (i.e. Yang et al. 2015, Nguyen and Huynh 2018). Online payment is a process in which the medium of the Internet is used to make payments or manage finances and can be interchangeably used with e-payments (UNCTAD 2001). One of the most established platforms for online payments is PayPal that was introduced more than 20 years ago. Private individuals as well as companies can transfer money via PayPal without sharing further financial information except of the email address. PayPal is therefore used as a payment option for many online stores (PayPal 2021b). In addition, PayPal can also be used as a mobile payment app (Liu et al. 2019), which even accounts for more than half of PayPal's usage volume. Mobile payment

is understood as the payment of goods, services or bills through mobile devices such as smartphones (Dahlberg et al. 2008). Liu et al. (2019) conducted a meta-analysis including 61 studies looking at different factors that influence the usage patterns of mobile payment methods. The authors found that, particularly in countries with Western cultures, aspects such as perceived risk and trust have a major influence on the intention to use mobile payment options. In addition, a significant positive influence of perceived security on the intention to use mobile payment was demonstrated (Liu et al. 2019). A meta-analysis by Kalinic et al. (2019) also identified the mentioned influencing factors as important explanatory variables for the intention to use mobile payment systems.

2.1 Trust Transfer

We refer to the Trust-Transfer Model introduced by Stewart in 2003. Since many companies on the internet have problems generating trust among potential users, Stewart has developed a model to address this problem referring to a cognitive process. The Trust-Transfer Model describes how trust is transferred on the internet from a company already known to the user to a company or part of a company yet unknown to him. The number of links to a previously unknown website by a website known to the user increases the perceived interaction and perceived similarity between the two sites. A higher number of links between the websites leads to a greater perceived similarity by the users (Stewart 2003). According to Stewart (2006), this link between the website of a well-known and a less well-known company can lead to an increase in trust on the website of the less well-known company. At the same time, the model also warns of negative consequences related to trust on the website of the more well-known company. In addition, signals that lead the user to conclude that an unknown and a known website interact with each other increase trust in the unknown website and the intention to use it (Stewart 2003).

While Stewart (2003, 2006) considers the transfer of trust on the internet from company to company, further research has already shown that the model can also be applied to other contexts. For example, Belanche et al. (2014) confirmed that in the context of public administrations, there is a transfer of trust from provider as well as technology characteristics to electronic services, such as voting or license renewal. In addition, research by Wang et al. (2013) has shown that trust in web services can be transferred to trust in new, mobile services. Further, the transfer has been confirmed by other research and has already been demonstrated for financial service providers. While a study by Lee et al. (2007) was able to measure a transfer of customer trust in offline banks on its online banking and thus in the context of multiple channels, two further studies have also demonstrated the transfer in the context of cross-channel services. Both Lu et al. (2011) and Cao et al. (2018) conducted studies, confirming a transfer of trust from online payment to mobile payment, concluding that the transfer of trust increases the intention to use mobile payments. Since literature shows that the Trust-Transfer Model can be applied to financial service providers, in more detail online payments and mobile services, as well as in different contexts, we also adapt this model to the context of our study. PayPal's new service of now being able to trade cryptocurrency describes an extension of PayPal services that users are already familiar with. Thus, we use the Trust-Transfer Model to represent the transfer of trust from PayPal to PayPal's new service of trading cryptocurrency. In addition, we examine whether this model can also be extended by two trust-related attributes. i.e., perceived risk and security.

In the following, we present our hypotheses that are based on the principle of the Trust-Transfer Model and focus primarily on the transfer of different attributes from the payment service provider PayPal to the usage of cryptocurrency via PayPal and its influence on user intentions to use cryptocurrencies.

2.2 Trust

According to Chen (2006), the definition of trust in literature can be distinguished according to two schools of research. On the one hand, trust is defined as a belief, confidence, attitude, or expectation about the trustworthiness of another party. The other side holds that trust is "a behavioral intention or behavior that reflects a reliance on a partner and involves vulnerability and uncertainty on the part of the person who trusts" (Chen 2006). Furthermore, when considering trust, the relationship between trust and distrust and

corresponding unidimensional and bidimensional models should be mentioned (Moody et al. 2017). According to the unidimensional approach, trust and distrust can be seen as one component, each representing one end of a continuum (McKnight et al. 2002). In contrast, the bidimensional approach defines trust and distrust as different constructs with different valences (McKnight and Choudhury 2006). A hybrid approach is provided by Moody et al. (2017), who discuss that trust and distrust can coexist as independent components and that their continua are connected. In the context of our study, only trust is considered, being treated as an independent construct. Benevolence from the seller was identified as a main factor in generating trust (Moody et al. 2017) and trusting beliefs are further based on the attributes of integrity and competence (McKnight et al. 2017). Trust plays a crucial role in the context of information and communication technology, as the information levels of the various actors are often imbalanced. In online retailing, the temporal and spatial distance between the buyer and seller, which is unavoidable especially in cryptocurrency trading, increases information asymmetries and the associated risks, as well as the value of trust (Koh et al. 2012). When trading cryptocurrency, users must trust not only the online platform, but also the technology behind it. Ofori et al. (2017) published a study considering trust in an internet banking context and showing that significant predictors of trust can be information quality, service quality, privacy or security concerns. Also referring to trust transfer, Gong et al. (2020), looking at one of the largest Chinese third-party online payment platforms, have shown that trust in web payment can be transferred to trust for mobile payment (for both cognitive trust and emotional trust).

In addition to the transfer of trust, the influence of trust on intention formation also plays a significant role. Hence, trust in a trader or an online platform has been shown in previous studies to be an important indicator of users' intention to purchase (e.g. Kim et al. 2008, Boeuf and Senecal 2014). A study by Pavlou and Gefen (2004) confirmed that trust in the provider or an institution, such as PayPal, also increases users' trust in sellers distributing via this marketplace. This institution-based trust is the sociological dimension of trust and is concerned with structures that make the environment appear trustworthy (Keen 1999). The perception of these structures of an institutional environment can influence behavior and attitudes toward a seller (Keen 1999). Pavlou and Gefen (2004, p. 37) define institutional-based trust as "a buyer's perception that effective third-party institutional mechanisms are in place to facilitate transaction success." Former research identified trust to be a key driver for the user acceptance and adoption of blockchain technology and thus cryptocurrency (Fleischmann and Ivens 2019). Moreover, trust in cryptocurrencies is enhanced, when traded in a centralized location (Arli et al. 2020). In the context of this study, according to the Trust-Transfer Model, we therefore argue that trust in the institution PayPal (trust in source) also increases trust in trading cryptocurrencies via PayPal (trust in target), which in turn positively influences the intention to use cryptocurrencies via PayPal, as well as in general. In doing so, we focus on the trust in PayPal with regard to its previous function as an online payment service provider for the payments of medium and small amounts via national currencies. In contrast, cryptocurrency trading via PayPal represents a service that was not possible before and is therefore new to customers. Thus, the following hypotheses arise:

H1: Perceived trust in PayPal has a positive effect on perceived trust in cryptocurrencies when handled by PayPal.

H2: Perceived trust in cryptocurrencies when handled by PayPal has a positive effect on the intention to use a) cryptocurrencies when handled by PayPal and b) cryptocurrencies in general.

2.3 Perceived Risk

Referring to the Trust-Transfer Model, previous research assumes that other attributes that are related to trust, however, are not congruent to trust, should also be transferable between different objects (Teubner et al. 2019). In addition to trust, perceived risk has been identified to have a significant influence on the intention to use cryptocurrencies (Mendoza-Tello et al. 2019). Perceived risk is associated with uncertainties of behavioral or environmental nature (Pavlou 2003) and is used in many studies to explore users' purchase and trading behavior. Risk is defined as "the perception of uncertainties by consumers" and is therefore the uncertainty about possible disadvantages of a decision (Bhatnagar and Ghose 2004). Uncertainty can be understood as the potential negative consequences of buying a product or service, or for

example, as in this case, as unforeseen price developments in cryptocurrency trading. Nevertheless, users, especially when trading cryptocurrency, are aware of risks such as hacker attacks and, therefore, they may feel insecure about the transmission of personal or financial data (Hong and Cha 2013). In addition, the volatility of cryptocurrencies is seen as a potential risk and a reason why cryptocurrencies are not used (Cheah and Fry 2015). Volatility of a currency can be described as the inability to keep the prices or the rate of the currency stable (Ciaian and Rajcaniova 2016). Also, many cryptocurrencies have so far tended to be used via unknown websites and providers, resulting in a higher perceived risk. Also, perceived risk of online payments is an important aspect influencing users' behavior of online payment (Yang et al. 2015). In this context, we assume that perceived risk that users attribute to the known provider PayPal is transferred to the new service, here trading cryptocurrencies. Consequently, if users attribute a low risk to the use of PayPal in general, it can be assumed that these same users also attribute a low risk to cryptocurrencies when they are used via PayPal.

Furthermore, perceived risk exerts a negative influence on the intention to use a website (McKnight, Choudhury, Kacmar 2002). Also, Park et al. (2018) identified perceived risk having a significant negative impact on the intention to use mobile payment. Prior research in the context of cryptocurrency has shown that perceived risk negatively influences the behavioral intention (Gil-Cordero et al. 2020). Mendoza-Tello et al. (2019) identified a significant negative influence of perceived risk on the intention to use cryptocurrency, too. For example, cryptocurrency is seen as fraudulent and speculative (Arias-Oliva et al. 2019) due to its volatility (Mendoza-Tello 2019). Thus, perceived risk in using cryptocurrencies via PayPal is believed to exert a negative influence on the intention to use cryptocurrencies via PayPal. Furthermore, it is believed that the perceived risk of cryptocurrencies when using PayPal also negatively influences the overall usage intention of cryptocurrencies in general. We thus suppose:

H3: Perceived risk using PayPal has a positive effect on perceived risk of using cryptocurrencies when handled by PayPal.

H4: Perceived risk using cryptocurrencies when handled by PayPal has a negative effect on the intention to use a) cryptocurrencies when handled by PayPal and b) cryptocurrencies in general.

2.4 Perceived Security

While, on the one hand, risks associated with information and communications technology are important, they cannot be considered independently of security aspects. Therefore, perceived security corresponds to the subjectively perceived probability with which a user assumes that his or her personal data and information cannot be read, recorded, or manipulated by unauthorized third parties during transmission over the Internet and storage on servers (Flaviána and Guinalú 2006). In online payments, personal data must be disclosed in order to complete the payment process. However, when trading cryptocurrencies, payment transactions are usually encrypted and appropriate security measures are taken into account. Nevertheless, many users perceive trading cryptocurrencies as insecure (Rehman et al. 2020). On the other hand, problems with security are perceived by users in terms of product or service risk. This may arise from a lack of information about the product or service, as well as poor quality and different expectations. In this context, Rehman et al. (2020) have shown that information about the technology information of the provider of cryptocurrency can provide security to users. Thus, the main perceived risks related to cryptocurrency trading are security risks, such as also third-party service failure, user error (e.g., related to illegal activities), privacy loss, and counterparty fraud. Furthermore, security attacks could be carried out as wallet attacks on users, DDoS attacks on networks, or mining attacks (Conti et al. 2018). Chellappa and Pavlou (2002) show that perceived security depends on the perceived level of encryption, the perceived protection of data, and the perceived hurdle of authentication. Referring to the Trust-Transfer Model, it can be assumed that the perceived security that the user attributes to the known website is transferred to the unknown website, too (Stewart 2003). The transfer of the perceived security in this case is from an institution, more precisely from PayPal, to cryptocurrency. In this case, the transfer will not happen automatically, but will follow the same processes of establishment of institution-based trust as has been the case with online marketplaces (Pavlou and Gefen 2004).

In addition, security aspects contribute to better functionality of (payment) services (Tandon, Kiran and Sah 2018). Tandon et al. (2016) also confirmed users' security and privacy assessments as crucial parts of their opinion and behavior formation. The perceived security positively influences the intention to use a website (McKnight, Choudhury and Kacmar 2002). Consequently, in the considered case, it can be assumed that the perceived security of cryptocurrencies when using PayPal positively influences the intention to use cryptocurrencies via PayPal. Furthermore, it is hypothesized that the perceived security of cryptocurrencies when using PayPal positively influences the intention to use cryptocurrencies in general. Taking into account earlier research work as well as the Trust-Transfer Model, we thus summarize:

H5: Perceived security of PayPal has a positive effect on perceived security of cryptocurrencies when handled by PayPal.

H6: Perceived security of cryptocurrencies when handled by PayPal has a positive effect on the intention to use a) cryptocurrencies when handled by PayPal and b) cryptocurrencies in general.

Figure 1 summarizes the presented hypotheses H1-H6b:

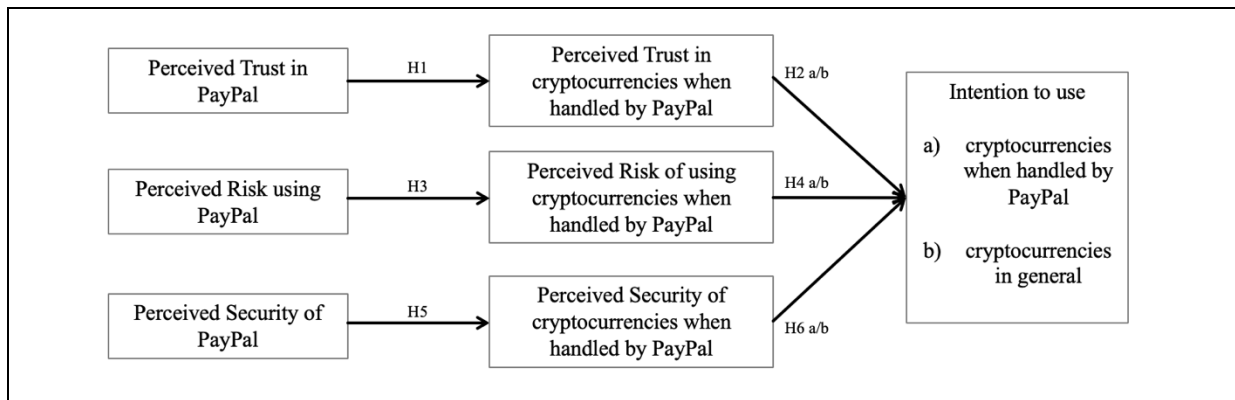


Figure 1. Research Model.

3 Methodology

In order to test the hypotheses of this study, we conducted an online study. We developed an online questionnaire, which was distributed in two different ways. On the one hand, the questionnaire was distributed on an online platform and via social media. On the other hand, the questionnaire was distributed via a larger social media channel that also frequently deals with financial topics. Thus, it can be assumed that the questionnaire was primarily distributed to subjects interested in finance. To ensure a suitable sample and control for possible influences, subjects were asked what prior experience they had in dealing with cryptocurrency. Also, the questionnaire included a general explanation of what cryptocurrencies are as well as their application at the beginning of the study, to ensure that all participants have the same understanding and knowledge of cryptocurrencies. Since Bitcoin is the best-known cryptocurrency, it was also listed as an example currency, so that the implications of this study can generally be related to this currency. Afterwards, the participants were shown an explanatory video which briefly explains the concrete use of cryptocurrency via PayPal for illustrative purpose. For this purpose, a video published by PayPal itself for the American market (PayPal 2020b) was supplemented with German subtitles for the survey in Germany.

Prior to further analysis of the data, data cleaning was performed to eliminate incomplete or erroneous and implausible data. In addition, "speeder" participants were eliminated, i.e., participants who needed less time than half of the median to answer the questions, so that it could be assumed that the participants concerned had not dealt with the questions intensively enough (Schendera 2011). After cleaning, the data set comprises N=534 random participants. A large proportion of participants (87%) have already used PayPal, while cryptocurrency was used by fewer participants (14%). Of the cryptocurrency users, most have already used PayPal (90%). However, we only included participants in our study, who have already used PayPal, but have not yet had any experience with the use of cryptocurrency in general, nor with the use of

cryptocurrency via the PayPal app. The reason for this is that the study aims to extend theoretical understanding and explore psychological effects regarding the usage intention of potential users in order to formulate implications and actions for cryptocurrency providers targeting non-users to attract them as future customers. Due to the different levels of experience between users and non-users, different results and therefore implications can be assumed. After this procedure, we obtained a data set of N=398 random German participants in total, which according to a power analysis in SPSS represents a sufficiently large sample size for the calculation of our model. The rather uneven gender distribution (58% male) can be explained by the fact that more men tend to use cryptocurrency than women (Coindesk 2015). In addition, the age structure of the participants shows particularities. The majority of the participants (93%) are under 30 years of age. This can be explained by the fact that both the online platform and social channel address a predominantly younger target group. Nevertheless, this is important for the further analysis of the data, as especially younger users mainly use cryptocurrencies (Bohr, Bashir 2014).

Furthermore, we relied on established constructs from previous research and adapted them accordingly for the context of our study. These constructs were first adapted in relation to PayPal and then also adapted in the relation to the use of cryptocurrency via PayPal. To measure perceived trust, a construct was combined using three items of a study by Kim et al. (2011) and two items of Lu et al. (2010) both analyzing the trustworthiness of websites. Our scale to capture perceived risk was based on a study of Featherman and Fuller (2003). Moreover, we adapted a construct of Kim et al. (2011) with four items to measure perceived security. Finally, we adapted the approaches of Cheng et al. (2006) and Venkatesh et al. (2012) to measure the intention to use. All items were measured via a seven-point Likert scale (1= "I totally disagree"; 7= "I totally agree") and are shown in Table 1 including the result of the explorative factor analysis.

Variable	Items	Factor Loadings
<i>Perceived Trust in PayPal</i> ($\alpha=.92$), (Kim et al. 2011, Lu et al. 2010)	PayPal is trustworthy.	.786
	I have confidence in PayPal.	.741
	PayPal is reliable.	.575
	PayPal is fair in its use of private user data.	.594
<i>Perceived Trust in cryptocurrencies when handled by PayPal</i> ($\alpha=.95$), (Kim et al. 2011, Lu et al. 2010)	Cryptocurrencies are trustworthy if they can be used at PayPal.	.930
	I have confidence in cryptocurrencies when they can be used at PayPal.	.974
	Cryptocurrencies that can be used at PayPal are reliable.	.857
	Payments in cryptocurrencies via PayPal are fair in their use of private user data.	.917
<i>Perceived Risk using PayPal</i> ($\alpha=.82$), (Featherman and Fuller 2003)	I consider it risky to use PayPal.	.796
	I think it is dangerous to use PayPal.	.739
	PayPal may not work well and may not process payments correctly.	.530
	If transaction errors occur, I am concerned that I may not be able to receive any compensation from PayPal.	.846
<i>Perceived Risk of using cryptocurrencies when handled by PayPal</i> ($\alpha=.87$), (Featherman and Fuller 2003)	I think it is risky to use cryptocurrencies if they can be used on PayPal.	.861
	I think it is dangerous to use cryptocurrencies if they can be used on PayPal.	.866
	Cryptocurrencies may not work well at PayPal and payments will not be processed correctly.	.704
	If transaction errors occur, I am afraid that if I use cryptocurrencies, I will not be able to receive compensation from PayPal.	.842
<i>Perceived Security of PayPal</i> ($\alpha=.86$), (Kim et al. 2011)	Using PayPal is safe.	.663
	Using PayPal is risk-free.	.692
	My privacy is guaranteed with PayPal.	.906
	PayPal protects my data.	.934
	Using cryptocurrencies with PayPal is safe.	.828

<i>Perceived Security of cryptocurrencies when handled by PayPal</i> ($\alpha=.88$), (Kim et al. 2011)	Using cryptocurrencies at PayPal is risk-free.	.752
	My privacy is guaranteed when using cryptocurrencies at PayPal.	.871
	My data is safe when using cryptocurrencies at PayPal.	.893
<i>Intention to use cryptocurrencies when handled by PayPal</i> ($\alpha=.94$), (Cheng et al. 2006, Venkatesh et al. 2012)	I would use cryptocurrencies at PayPal.	.957
	I intend to use cryptocurrencies at PayPal for online purchases.	.861
	I intend to save money with cryptocurrencies at PayPal.	.751
	I can imagine using cryptocurrencies at PayPal.	.970
<i>Intention to use cryptocurrencies</i> ($\alpha=.91$), (Cheng et al. 2006, Venkatesh et al. 2012)	I would use cryptocurrencies.	.848
	I intend to use cryptocurrencies for online purchases.	.759
	I intend to save with cryptocurrencies.	.676
	I can imagine using cryptocurrencies.	.976

Table 1. Measurement of the Scales.

In addition, we supposed that multicollinearity was not a problem, since variance inflation factors (VIF) were tested and all showed a measurement below the recommended threshold of 10 (Liu et al. 2003). All variables were measured via reflective scales. Also, the measurement models' internal consistencies were evaluated by calculating Cronbach's Alpha, meeting the required cut-off value of at least .7 by all scales (Hair et al. 2014), showing a value of .82 and above for all scales and therefore reflecting high levels of scale consistency (see Table 1). In addition, we assessed all scales for discriminant validity by applying Fornell and Larcker's (1981) criterion, indicating that discriminant validity should not be a problem because no scale shares more variance with any other scale than with its own indicators. Furthermore, we conducted the Kaiser-Meyer-Olkin Measure of sampling adequacy, resulting in values of at least .674 and above, which are considered as satisfying as they exceed a value of 0.5. In addition, the total variance explained shows a cumulative value of 72.052%, which also indicates a very good result. Furthermore, using Bartlett's Test of Sphericity, the Chi square values lay at 735.649 and above with significances of < 0.001 and 0.000 , also showing satisfying values.

To test our hypotheses, we calculated regression analyses using SPSS 27. Here, the data analysis can be divided into two steps. While in the first step the regressions for the consideration of the transfer of determinants from PayPal to cryptocurrency when handled by PayPal were considered, in a second step the influence of these determinants related to cryptocurrency when handled by PayPal on the intention to use a) cryptocurrency when handled by PayPal and b) cryptocurrency in general was considered.

4 Results

First, the results of transferring the attributes of PayPal to the use of cryptocurrency via PayPal (the first step of the research model) are presented.

Results show a positive influence of perceived trust in PayPal on trust in cryptocurrency when using PayPal ($F(1, 396)= 17.561, p<.001$). The R^2 (adjusted R^2) of the dependent variable shows a value of .042 (.04), indicating that at least 4% of the variance is explained by perceived trust in PayPal, which according to Cohen (1977) corresponds to a weak to medium effect. The assumption of H1 can be accepted due to the β -value of .206 and p -value of less than .001. Examining H3, we find that the perceived risk of using PayPal has an impact on the perceived risk of cryptocurrency when using PayPal ($F(1, 396)=79.628, p<.001$). R^2 (adjusted R^2) is .167 (.165) and H3 is considered accepted ($\beta=.409, p<.001$). Results of H5 show a significant impact of the perceived security of PayPal on the perceived security of cryptocurrency when using PayPal ($F(1, 396)=164.556, p<.001$). Moreover, an R^2 (adjusted R^2) of .294 (.292) was measured. H5 can as well be considered as accepted ($\beta=.542, p<.001$).

Next, the effects on the intention to use cryptocurrencies if handled by PayPal as well as in general (the second step of the research model) are presented. Testing for H2a shows that perceived trust in cryptocurrency when using PayPal has a significant effect on the intention to use cryptocurrency via PayPal ($F(1, 396)=244.488, p<.001$). The R^2 (adjusted R^2) shows a value of .382 (.38). H2a is therefore considered accepted ($\beta=.618, p<.001$). Furthermore, the result of H2b shows a significant influence of trust in cryptocurrency when using PayPal on the intention to use cryptocurrency in general ($F(1, 396)=111.042, p<.001$). With an R^2 (adjusted R^2) of .219 (.217), H2b can also be accepted ($\beta=.468, p<.001$). Considering the influence of the perceived risk of cryptocurrency when using PayPal on the intention to use cryptocurrency via PayPal also shows a significant effect ($F(1, 396)=95.554, p<.001$). With an R^2 (adjusted R^2) of .194 (.192) and a negative influence ($\beta=-.441, p<.001$), H4a can be confirmed. Additionally, the results of H4b show an influence of the perceived risk of cryptocurrency when using PayPal on the intention to use cryptocurrency in general ($F(1, 396)=22.348, p<.001$). With an R^2 (adjusted R^2) of .053 (.051), the hypothesis can be accepted ($\beta=-.231, p<.001$). Furthermore, the analysis shows an influence of the perceived security of cryptocurrency when using PayPal on the intention to use cryptocurrency via PayPal ($F(1, 396)=136.722, p<.001$). Thus, with an R^2 (adjusted R^2) of .257 (.255), H6a can be accepted ($\beta=.507, p<.001$). Additionally, testing H6b reveals that the perceived security of cryptocurrency when using PayPal has an influence on the intention to use cryptocurrency in general ($F(1, 396)=34.51, p<.001$). Results show an R^2 (adjusted R^2) of .08 (.078), confirming H6b ($\beta=.283, p<.001$). β - and F -values are summarized in Table 2.

	Stand. Coef.	F(1,396)
Trust-Transferring Hypotheses		
H1: Perceived trust in PayPal -> Perceived trust in cryptocurrencies if handled by PayPal	.206***	17.561
H3: Perceived risk using PayPal -> Perceived risk of using cryptocurrencies if handled by PayPal	.409***	79.628
H5: Perceived security of PayPal -> Perceived security of cryptocurrencies if handled by PayPal	.542***	164.556
Hypotheses concerning the Intention Behavior		
H2: Perceived trust in cryptocurrencies if handled by PayPal -> Intention to use a) cryptocurrencies if handled by PayPal b) cryptocurrencies in general	a) .618*** b) .468***	244.488 111.042
H4: Perceived risk of using cryptocurrencies if handled by PayPal -> Intention to use a) cryptocurrencies if handled by PayPal b) cryptocurrencies in general	a) -.441*** b) -.231***	95.554 22.348
H6: Perceived security of cryptocurrencies if handled by PayPal -> Intention to use a) cryptocurrencies if handled by PayPal b) cryptocurrencies in general	a) .507*** b) .283***	136.722 34.51
Note: *significant at $p < .05$; **significant at $p < 0.01$; ***significant at $p < .001$.		

Table 2 Results.

5 Discussion and Conclusion

In our research, we mainly addressed two questions focusing on the transfer of perceived trust, risk and security of PayPal on cryptocurrencies when handled by PayPal as well as the effect of these transferred determinants on the intention to use cryptocurrencies in general. The following discussion and implications for theory and practice are presented based on the two research questions.

5.1 Implications with Respect to the Transfer of Trust, Risk and Security

When considering the first research question, a transfer of all mentioned trust-related attributes from PayPal to cryptocurrency when used via PayPal was expected with respect to the Trust-Transfer Model (Stewart

2003). Surprisingly, it is not trust that has the strongest effect in the Trust-Transfer Model, but security followed by perceived risk. And while previous research examining the Trust-Transfer Model in the payment sector focuses primarily on the transfer of trust (e.g. Ofori et al. 2017, Gong et al. 2020) and numerous research studies concentrate foremost on perceived security and risk as essential determinants for the intention to use technologies and services (e.g., Bhatnagar and Ghose 2004; Tandon, Kiran and Sah; 2018; Park et al. 2018), we were also able to show the transfer of security and risk between service provider and payment method. Thus, we provide additional insight into the ways in which attributes such as perceived security, risk, and trust can be transferred, also justifying the consideration of extending the established Trust-Transfer Model to include additional determinants like security and risk. In addition, due to the lack of central regulation and the complex system behind the blockchain (Brezo and Bringas 2012), it seems that cryptocurrencies are perceived differently by users compared to many other currencies or technologies. As a result, users often have to engage more intensively with the system behind cryptocurrencies before understanding and using them (Arli et al. 2020), which can result in a greater involvement with cryptocurrencies compared to other currencies and technologies. In contrast to the uncertainties when dealing with cryptocurrency, previous studies have found that most users consider PayPal to be the most secure payment method available (Seidenschwarz et al. 2020). The transfers of security and risk from PayPal to cryptocurrencies measured in this study suggest that low security concerns are transferred to cryptocurrencies themselves as well. For cryptocurrency providers, this means that users pay more attention to the perceived security and risk of the provider when trading with cryptocurrency and no additional precautions need to be taken to communicate additional security and reduced risk concerning the trade with cryptocurrency itself.

5.2 Implications with Respect to the Intention to Use Cryptocurrencies

Looking now at the second research question and the influences that the transfer of trust attributes have on user behavior intentions, promising assumptions can be made for cryptocurrency providers here as well. Overall, trust and security of cryptocurrencies when traded via PayPal positively influence the intention to use cryptocurrencies via PayPal. Perceived risk, instead, diminishes this usage intention. While these results primarily confirm past research (e.g., Fleischmann and Ivens 2019; Rehman et al. 2020; Gil-Cordero et al. 2020; Pavlou 2003), new insight can be obtained for practice. Although the preceding attributes are attributed to cryptocurrencies via PayPal, a common increase of the intention to use cryptocurrency in general can be identified. Thus, synergy effects can be observed here, which not only benefit cryptocurrency use via PayPal, but also other cryptocurrency providers and the long-term adoption of cryptocurrency. Here, a general strengthening of the cryptocurrency market might be achieved. One reason for this could be that PayPal, as a brand with a high reputation, serves as a kind of security and trust anchor for cryptocurrency trading (Koufaris and Hampton-Sosa 2004; Casaló et al., 2007). Users may lose their fear and uncertainty to trade with cryptocurrency if a company/institution they trust and even already use themselves, enters the market. Thus, the perceived attributes of a new payment option (service) via a provider (company) are also transferred to the payment option itself. The prejudices and fear that existed previously may therefore play a lesser role, as users believe that this payment method must generally be secure if a trusted company offers it. Therefore, the payment service provider should pay particular attention to communicate the linkage of their platform and the currency to transfer their attributes and in particular minimize security concerns and perceived risk. With the increasing usability of cryptocurrencies via PayPal, the payment service provider can also benefit. The introduction in the US, e.g., has already shown that PayPal users log in more frequently if they also trade cryptocurrencies via the provider (PayPal 2021a). In addition to implications for practice, new findings for theory and research can also be identified. Results suggest that an extension of the classic Trust-Transfer Model with both trust-related attributes perceived risk and security was successful. With an expansion of the model, new knowledge can be gained about the extent to which users can transfer perception they have towards a (payment) service provider to new services of this payment provider and whether, and if so, which measures are required, to influence the general perception of this service by users. Thus, new theoretical insights could be gained by not only extending the context of the Trust-Transfer

Model (originally from company to company or service to service, but here also from company to service), but also by showing that besides trust, other trust-related determinants are essential for behavioral intention forming.

5.3 Further Research and Limitations

However, for further research it would be interesting to examine whether this extension can also be conducted with other, non-trust-related attributes. Also, although the Trust-Transfer Model was successfully extended in this study, the question arises whether this extension can be generalized and applied to other contexts. Furthermore, the empirical study focused on the most well-known and widely used cryptocurrency, Bitcoin. Since trust, security perception and risk assessment towards the provider are paramount for the intention to use cryptocurrencies, it can be assumed that the usage intention primarily depends on the providers and less on the cryptocurrencies used, which makes it even more important that a platform using cryptocurrencies publicly shows its close connection to this digital currency. But, at this point, the question arises to what extent the original idea of making cryptocurrencies independent of intermediaries still exists today, since service providers such as PayPal increasingly enter the cryptocurrency market. Although, on the one hand, they only offer an additional platform to use cryptocurrencies and there is still no interference from institutions such as banks, on the other hand, market players such as PayPal intervene in the cryptocurrency market and can thus fundamentally influence it, whereby also paving the way for future intermediaries.

In addition, the results of this work are not only interesting for payment service providers who, similar to PayPal, would like to open up to the trading and usage of cryptocurrencies on their platforms, but also for other organizations, networks or companies that offer the handling and trading of cryptocurrency via or on their platforms. For example, there is also an increasing number of companies which accept payments with cryptocurrencies, such as Tesla, or credit cards with which payments with cryptocurrencies are possible. Also, for governments, which offer or would like to offer cryptocurrencies as a national payment method in the future, the findings of this study can help to better assess and analyze usage behavior. Additional research could therefore examine how trust in the government and a country's economic situation might affect cryptocurrency usage. Also, a comparison between countries with strong economies compared to weak economies in terms of their cryptocurrency usage would be an additional way for future research studies to generate new insights that would allow predictions for future cryptocurrency usage.

Nevertheless, the present study also has a number of limitations. Since literature of trust is incredibly extensive, we tried to cover the main approaches for the context of our study. However, future research might dig deeper into the role of trust in our research context. Further research could investigate whether a transfer of (trust) attributes would also occur with other payment service providers, such as traditional house banks, or other cryptocurrency providers, such as social media platforms since in this study only one specific payment service provider is considered. This research could, thus, focus on the adoption of cryptocurrency by social media platforms, such as currently with Facebook. Additionally, research should be conducted across a broader age structure for examining how the transfer of trust attributes behaves across different age groups. Furthermore, only German-speaking participants were surveyed, who have already used PayPal, but have not yet had any experience with the use of cryptocurrency in general, nor with the use of cryptocurrency via the PayPal app, whose service is so far only possible for the American market. It is therefore not completely sure whether the intention of the non-users ultimately results in actual behavior. Especially for inexperienced non-users, although the same basic knowledge about cryptocurrency was guaranteed at the beginning of the study, their formation of intentions, also for general usage, could be reflected primarily by the perceived trust towards PayPal as one of the largest and most secure online payment service providers. However, we already discussed earlier the important implications that result of the choice of sample (especially for providers trying to reach new users).

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