Factors of digital payment adoption in hospitality businesses: A conceptual approach

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Abstract

Hospitality businesses might achieve a competitive advantage by adopting cryptocurrency payments. This study provides insight into the factors that influence hospitality businesses' intention to use new digital payments based on a conceptual approach. One of the contributions to the literature is in integrating an external variable – perceived security – into the Technology Acceptance Model. Perceived security is considered a strong predictor for a new payment technology adoption. This study also contributes to the academic research by illuminating potential directions for future empirical research.

Key words: digital payments, blockchain, new technology adoption, hospitality

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Introduction

Over the last decade, new technology and payment systems have altered business activities in various ways (Cabanillas et.al, 2014). Adoption of the Internet, social networks, mobile and electronic payments, blockchain technology and digital currencies are a driving force of development for many organizations. The hospitality industry is particularly proactive towards acceptance and use of new technologies (DiPietro and Wang, 2010; Baggio *et al.*, 2020). New technologies contribute to performance, competitive advantage and success of hospitality businesses (Nyheim *et al.*, 2004; Wang and Qualls, 2007; Heart and Pliskin, 2002; Spyridou, 2019), because travelling experience is a priority for many people, especially for the younger generation, who enjoy using new technologies. The millennial generation are eager to bring new technologies into their travelling experiences (DiPietro and Wang, 2010; Lou and LI, 2017; Paul, 2005); and they are spending more of their budget on international trips. Hence, new payment systems are gaining importance in recent years.

Blockchain is a distributed list of records connected using cryptography. Blockchain is resistant to modification of the records. Once recorded, the data within the blockchain cannot be altered retroactively without consensus of the network majority. Blockchain is typically managed by a peer-to-peer network. Bitcoin is the first blockchain. In 2008, a paper on bitcoin was published in cryptographic circles. In 2009, bitcoin blockchain was created and first bitcoins were mined. In 2010, bitcoin was first used in a transaction involving an exchange of 10 000 bitcoins for 2 pizzas. In 2011, other early cryptocurrencies started to appear.

Bitcoin, etherium, and other cryptocurrencies have emerged as an alternative form of money, independent of any particular national currency or geographic location. There are thousands of cryptocurrencies with an estimated value of USD 255.9 billion in May 2020 (CoinMarketCap.com, 23 May 2020), which is around 0.3 percent of the global GDP in 2019 (Statista, 2020). Cryptocurrencies allow payers and payees to directly send value to each other electronically and anonymously without the need to use the services of trusted third parties, like banks (Nakamoto, 2008). Cryptocurrencies have a potential to drastically change the existing retail system, hence it is important to understand the factors that influence their adoption (Jonker, 2018).

Accepting cryptocurrency payments could be a marketing tool that helps companies to stand out (Roussou and Stiakakis, 2016). Adoption of cryptocurrency payments is increasing rapidly, with companies such as Microsoft, Paypal, EBay, Dell, and Expedia now accepting bitcoin payments (Ussel, 2015). Hospitality businesses may also potentially achieve a competitive advantage by adopting cryptocurrency payments (Wang and Qualls, 2007), especially with the younger customers. The younger generation of travelers have an expectation of using some form of new technologies while travelling, examples include the norm of having a wireless connection in hotel rooms (DiPietro and Wang, 2010) and being able to book and pay for the hotel room online (Fotiadis and Stylos, 2017).

The purpose of this study is to provide insights into the factors that influence hospitality businesses' intention to adopt cryptocurrency payments. This study builds on top of the existing Technology Acceptance Model (TAM) by integrating an external variable – perceived security – into the model. Perceived security is considered a strong predictor for a new payment technology adoption (Folkinshtein and Lennon, 2017; Khalilzadeh *et al.* 2017; Liao and Cheung, 2012; Cheng *et al.* 2006; Shin *et al.* 2019)). Perceived security is crucial to understanding and predicting adoption of cryptocurrency payments. The literature does not explore it sufficiently, however, in the context of cryptocurrency payments or of the hospitality industry.

In general, there is a paucity of papers on adoption and usage of cryptocurrency payments (Jonker, 2018; Polasik *et al.*, 2015; Schuh and Shy, 2015; Tsanidis *et al.* 2015; Silinskyte, 2014). Most of the existing academic works study the adoption of cryptocurrencies by users, rather than by businesses. Additionally, a more intricate model that involves mediating effects of trust and perceived security would improve the existing literature, where many models are relatively less complex (Schuh and Shy, 2016; Korol and Fotiadis, 2016; Korol and Spyridou, 2020). Therefore, the academic contribution of this paper is filling the gap on the adoption of cryptocurrency payments by businesses in the hospitality industry. The contribution from the managerial viewpoint is providing the businesses with the awareness of the factors to consider when deciding on the adoption of cryptocurrency payments. For example, when the percentage of young adults that own cryptocurrencies or when perceived security of cryptocurrency payments improve, businesses that expand their payment options might gain competitive advantage.

The paper is structured as follows. Section 1 provides an overview of technology adoption models and the factors influencing adoption decisions on new payment technologies. Section 2 reviews the existing literature and provides the background for cryptocurrency payments. Section 3 develops the hypotheses regarding the factors affecting the intention to use cryptocurrency payments. Section 4 concludes with a discussion of the implications for theory and practice.

Literature Review

Technology acceptance theories

There are several classical models of behavioural decisions which analyse people's behaviour when they are faced with something novel (Pavloy, 2002a). One such model is the theory of reasoned actions (TRA), which explains a person's behaviour based on the relationship between beliefs, attitude, and intention (Fishbein and Ajzen, 1975). The technology acceptance model (TAM) is based on the TRA and aims to explain information technology and information systems adoption behaviour (Davis, 1989; Davis, Bagozzii and Warshaw, 1989, Munoz, 2008). The TAM is a well-established, influential and widely used model of information systems usage and acceptance, which is applied to a variety of studies on e-mail, spreadsheets, microcomputer usage, group support systems, expert systems, e-payment, mobile payment, and blockchain (Chen, 2008; Lin and Nguyen, 2011; Kim *et al.*, 2010; Cabanillas *et al.*, 2014; Lou and Li, 2017). The TAM states that adoption behaviour is determined by the intention to utilize a particular system determined by the perceived usefulness and ease of use. The TAM states that information technology users decide rationally whether to use the technology or not.

Intention to use a new technology depends on its perceived usefulness (PU) and perceived ease of use (PEU) of the technology. PU is defined as the degree to which a person perceives that adopting the system will boost his/her performance. PEU is defined as the degree to which a person believes that adopting the system will be effortless. This study uses the TAM as it provides a framework for assessing the effects of external variables on a system usage. The TAM became the base for several models of innovation technology acceptance, including the TAM₂ (Venkaresh & Davis, 2000), the Unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, Davis and Davis, 2003), the TAM₃ (Venkatesh and Bala, 2008), and the Mobile phone technology adoption model (MOPTAM; Renaud and Biljon, 2008).

Several primary constructs strongly influence acceptance of a new technology. The most important predictors of innovation adoption are individual differences (Zmud, 1979, Nelson, 1990, Agarwal and Prasad, 1999; Venkatesh, 2000, Mallat, 2007; Ondurus and Pigneur, 2006), the new technology characteristics (Ostlund, 1974; Tornatzky and Klein, 1982; Gatignon and Robertson, 1985; Davis, 1989;

Moor and Benbasat, 1991; Rogers, 1995) and social influences (Fishbein and Ajzen, 1975; Moore and Benbasat, 1991; Venkatesh and Davis, 2000; Lucas and Spittler, 2000; Venkatesh and Baia, 2008; Fennolar and Cuestas, 2010). In relation to a new payment system acceptance, perceived security (security, risk, trust) is especially relevant (Khalilzadeh *et al.*, 2017) and important for cryptocurrency payments adoption.

Cryptocurrency Payments

The established payment networks (e.g., Visa and Mastercard) and a broad range of alternative payments, including eWallets (e.g., Paypal, Google Checkout, and WebMoney), direct debit systems (typically via ACH, such as eBillMe), money transfer systems (e.g., Moneygram), all explicitly identify the payer in their transactions, and are centrally or quasicentrally administered (Pomarole *et al.*, 2013). On the other hand, cryptocurrency payment is pseudo anonymous, it does not explicitly identify the payer or the payee, transactions are irreversible but require a global peer-to-peer network (Pomarole *et al.*, 2013). Cryptocurrency is a “push-based” payment system—the user creates a transaction transferring a specific amount to the merchant and without the user creating a new transaction, no other amount can be taken. To make an analogy to the world of cash: with credit cards you give your wallet to the merchant and ask him to take out the amount you agreed upon, while you turn your back and do not look; with cryptocurrency you take some cash out of your wallet and hand it to the merchant (Folkinshtein and Lennon, 2017).

Blockchain technology and cryptocurrencies are widely recognized as pioneering technological innovations that contribute to shaping of a new market and network (Roussou and Stiakakis, 2016). Decreasing public confidence in the credibility of financial institutions and increasing interest in transactions without a third party mediation contribute to the growing popularity of cryptocurrencies (Roussou and Stiakakis, 2016), especially among the millennial generation (Lou and Li, 2017).

This growing popularity has led to multiple academic studies on the adoption of cryptocurrency payments. Baur *et al.* (2015) discuss user adoption on bitcoin as a method of payment. Using data from exploratory interviews, Baur *et al.* show that users consider ease of use to be still low, while the opinions on usefulness vary. Schuh and Shy (2016) discuss cryptocurrencies as a payment method using the data from 2014 – 2015 Survey of Consumer Payment Choice. Schuh and Shy show that only about 1% of the respondents own cryptocurrencies. About half of the cryptocurrency owners use them for payments, the rest use cryptocurrencies as financial investment.

The majority of studies on the adoption of cryptocurrency payments focus on the users, while there is limited research on this adoption by the merchants. Jonker (2018), using a large sample of online retailers, shows that about 2% of them accept payments in cryptocurrencies. Jonker also shows that the main factors driving the adoption are consumer demand (desire by users to pay with cryptocurrencies), lower transaction costs, and perceived efforts required for the adoption.

Cryptocurrencies facilitate fast, secure, anonymous, person-to-person payments via the internet, without time or space limitation. As blockchain technology increases in popularity, cryptocurrency payments continue to facilitate secure electronic commercial transactions. This paper focuses on cryptocurrency payment because it is an important innovation, for which adoption process is not yet understood.

Research Model and Hypothesis

Previous research has identified three principal external factors affecting technology acceptance: individual differences, technology characteristics and social influence (Davis, 1989; Moor and Benbasat, 1991; Agarwal and Prasad, 1999; Venkatesh and Davis, 2000; Venkatesh and Baia, 2008). Additionally, in relation to the acceptance of new payment systems, perceived security (security, risk, trust) is especially important (Khalilzadeh et al., 2017). An integrated research model proposed in this study focuses on the influence of cryptocurrency characteristics and perceived security constructs on behavioural intent.

Perceived ease of use and perceived usefulness

In this paper, we employ the TAM as a theoretical foundation and build on top of it with several constructs to understand cryptocurrency payment adoption. This paper seeks to extend the explanatory power and predictive accuracy of the TAM. Based on the TAM, the main factors relevant to cryptocurrency adoption are perceived ease of use and perceived usefulness (Folkinshtein and Lennon, 2017). Following the TAM sequential approach, we construct perceived usefulness and ease of use as the mediators of impact of other factors on behavioural intention. Among other possible factors, security, risk, convenience, and trust are the most relevant to cryptocurrencies (Davis, Bagozzi and Warshaw, 1989).

Hypothesis H1: Perceived ease of use positively influences intention to use cryptocurrency payment.

Hypothesis H2: Perceived usefulness positively influences intention to use cryptocurrency payment.

Perceived ease of use includes free participation, instant transfers, simple interface, linkage to traditional currencies, and relative complexity of bitcoin trading. Perceived usefulness includes control of own money, disintermediation, high speed of transfer, low cost of transfer, high transaction security, limited supply, international scope, lower merchant's cost, increased customer trust requirements, and higher price volatility (Folkinshtein and Lennon, 2017).

Perceived Security

Security is the protection against security threats. Perceived security is "the degree to which a customer believes that using a particular mobile payment procedure will be secure" (Shih, 2009, p.1346). In relation to a cryptocurrency, security threats include loss/hijack of a digital wallet, money loss due to volatility, etc. (Roussou and Stiakakis, 2016). Security has a strong direct and indirect effect on intention to use new payment technology in restaurants and plays a vital role in the context of a new digital environment (Khalilzadeh et al. 2017). Perceived security positively affects behavioural intent (Shih, 2009). Perceived security is a significant antecedent of trust in e-commerce and online shopping studies (Flavian and Guinallu, 2006; Kim, Ching and Lee, 2011).

Hypothesis H3: Perceived security of a cryptocurrency payment positively influences perceived usefulness.

Hypothesis H4: Perceived security of a cryptocurrency payment positively and directly influences trust.

Hypothesis H5: Perceived security of a cryptocurrency payment positively influences perceived ease of use.

Perceived Risk

Perceived risk is defined as "the consequence of a decision reflecting the variation of its eventual results" (Rao and Tractinsky, 2003) and as "the possibility that the use of innovation could not be safe" (Gerrard and Cunningham, 2003). Perceived risk includes viability, security risk, third party service failure risk, risk of user error, risk of privacy loss, risk of counterparty fraud, and risk of illicit association. Risk and uncertainty are the main reasons why users avoid a new technology adoption (Pikkarainen and Pikkarainen, Karjaluoto and Pahnla, 2004; Worthington, Edwards, 2000; Cheng et al. 2006).

Perceived risk is considered an attribute of perceived usefulness (Liao and Cheung, 2012). In relation to cryptocurrency, perceived risk is considered to be one of the three most important factors of adoption along with PU and PEO (Folkinshtein and Lennon, 2017; Tan, Eze, and Chong, 2009; Wang, Wang, Lin and Tang, 2003). Based on this literature, perceived risk is likely to have a direct effect on perceived security, trust, and perceived usefulness.

Hypothesis H6: Perceived risk of a cryptocurrency payment negatively impacts perceived security.

Hypothesis H7: Perceived risk of a cryptocurrency payment negatively impacts trust.

Hypothesis H8: Perceived risk of a cryptocurrency payment negatively impacts perceived usefulness.

Trust

In electronic transactions, trust is defined as “the psychological state leading to accept the vulnerability of a trustor, based on positive expectations of the trustee’s actions” (Singh and Sirdeshmukh, 2000) and “the willingness of the parties to be vulnerable to the actions of a virtual party” (Mayer *et al.*, 1995; Van Der Heijden, Verhagen and Creemers, 2003). Trust is an important construct in determining acceptance of new technologies such as e-commerce (Goles, Lee, Rao and Warren, 2009; Yang, Chandrees, Lin and Chao, 2009) and mobile payment adoption (Misra and Wickamasinghe, 2004).

Perceived risk is likely to affect trust. For example, online customers were shown to have a greater trust in an online store when the perceived risks were reduced (Warrington, Abgrab and Caldwell, 2000). Both perceived risk and trust are a major influence on adoption of payment services (Liebana-Cabanillas *et al.*, 2014). For example, mobile payments adoption has shown that risk is a strong influencer of trust and intention to use a new payment service (Chen, 2008; Yang *et al.*, 2012).

Trust was found to influence the attitude and intention to use a mobile payment (Chandra *et al.*, 2010; Shin, 2009; LU, Yang, CHau and Cao, 2012). Trust is also an antecedent of the ease of use (Chircu, Davis, and Kauffman, 2000; Pavlou, 2003). Technology savvy people show higher levels of trust in online applications (Ruiz, Izquierdo and Calderon, 2007; Flavian and Guinaliu, 2007). Trust positively affects behavioral intent (Shih, 2009).

Hypothesis H9: Trust of positively influences perceived usefulness of a cryptocurrency payment.

Convenience

Convenient transactions are the transactions that require less effort to perform (Teo *et al.*, 2015). Convenience is particularly important for mobile payments (Teo *et al.*, 2015; Kerviler *et al.*, 2016); it is also relevant for cryptocurrency payments, as they are performed using mobile phones. Convenience of cryptocurrency payments (and of mobile payments in general) might be due to the following factors. Cryptocurrency payments (1) remove the need to carry a wallet with cash or credit cards; (2) do not require entering a pin code (as opposed to some credit cards); (3) are readily available as the customers use their phones while waiting in the queue (Boden *et al.*, 2020). The convenience of a cryptocurrency payment for the customer can create incentives for hotels (or other vendors) to adopt this type of payment.

Hypothesis H10: Convenience of a cryptocurrency payment positively influences perceived ease of use.

Figure 1 below illustrates the hypothesized relationships between the variables.

Figure 1. Illustration of the hypothesized model.

Conclusion

This study applies the TAM to cryptocurrency payments adoption examining the factors that are more likely to affect behavioural intent. The existing theory suggests that adoption of cryptocurrency payments is affected by perceived usefulness, and perceived ease of use of these payments. In turn, trust, risk, and security are expected to affect perceived usefulness. Risk and convenience are expected to affect perceived ease of use. Risk and security might also affect trust, while risk might affect security. This paper proposes a model describing the effects of the above mentioned factors on the adoption cryptocurrency payments among merchants. The proposed model is based on the combination of the existing literature of technology acceptance and of the issues related to cryptocurrency payments.

An evident way of applying the proposed model to research is through surveys. The surveys might either cover all of the factors and test the entire model; or cover only some of the constructs (for example related to the effects of perceived risk on trust, security, and perceived usefulness) and test the relevant sections of the model. A limitation of a survey of merchants might be in the sample size, as it might be more difficult to find hospitality businesses that are aware of cryptocurrencies than to find such customers.

This paper might be beneficial for academics pursuing future research that might use survey data to empirically test the relationships hypnotized here. This paper might also be beneficial for the managers of hospitality businesses striving to attract new customers among the younger generation by adopting new forms of digital payments.

References

- Baggio, R., Micera, R., & Del Chiappa, G. (2020). Smart tourism destinations: a critical reflection. *Journal of Hospitality and Tourism Technology*, (forthcoming). doi: 10.1108/JHTT-01-2019-0011
- Baur A.W., Bühler J., Bick M., & Bonorden C.S. (2015) Cryptocurrencies as a Disruption? Empirical Findings on User Adoption and Future Potential of Bitcoin and Co. In: Janssen M. *et al.* (eds) Open and Big Data Management and Innovation. I3E 2015. Lecture Notes in Computer Science, vol 9373. Springer, Cham
- Boden, J., Maier, E. & Wilken, R. (2020). The effect of credit card versus mobile payment on convenience and consumers' willingness to pay. *Journal of Retailing and Consumer Services*, 52, 101910.
- CoinMarketCap.com, Retrieved from <https://coinmarketcap.com>, accessed on 23 May 2020.

- DiPietro, R. B., & Wang, Y. (2010). Key issues for ICT applications: impacts and implications for hospitality operations. *Worldwide Hospitality and Tourism Themes*, 2(1), 49-67.
- Fotiadis, A., & Stylos, N. (2017). The effects of online social networking on retail consumer dynamics in the attractions industry: The case of 'E-da' theme park, Taiwan. *Technological Forecasting and Social Change*, 124, 283-294.
- Gilbert, S., & Loi, H. (2018). Digital Currency Risk. *International Journal of Economics and Finance*, 10(2), 108.
- Heart, T., & Pliskin, N. (2002). Business-to-business eCommerce of information systems: Two cases of ASP-to-SME eRental. *INFOR: Information Systems and Operational Research*, 40(1), 23-34.
- Iglesias De Ussel, J. (2015). *Bitcoin: A new way to understand payment systems*. Cambridge, MA: Massachusetts Institute of Technology.
- Jonker, N. (2018). What drives bitcoin adoption by retailers? De Nederlandsche Bank, Working Paper No. 585, Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3134404
- Kerviler, G., Demoulin, N.T.M. & Zidda, P. (2016). Adoption of in-store mobile payment: Are preserved risk and convenience the only drivers? *Journal of Retailing and Consumer Services*, 31, 334-344.
- Korol, T., & Spyridou, A. (2020). Examining Ownership Equity as a Psychological Factor on Tourism Business Failure Forecasting. *Frontiers in Psychology*, 10, 3048.
- Korol, T., & Fotiadis, A. (2016). Applying Fuzzy Logic of Expert Knowledge for Accurate Predictive Algorithms of Customer Traffic Flows in Theme Parks. *International Journal of Information Technology & Decision Making*, 15(06), 1451-1468. doi: 10.1142/S0219622016500425
- Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. (2014). Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behavior*, 35, 464-478.
- Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCoy, D., Voelker, G. M., & Savage, S. (2013, October). A fistful of bitcoins: characterizing payments among men with no names. In *Proceedings of the 2013 conference on Internet measurement conference* (pp. 127-140).
- Nakamoto, S., & Bitcoin, A. (2008). A peer-to-peer electronic cash system. Bitcoin. Retrieved from: <https://bitcoin.org/bitcoin.pdf>, 4.
- Nyheim, P., McFadden, F., & Connolly, D. (2004). *Technology strategies for the hotel industry*. Pearson Higher Ed.
- Renaud, K., & Van Biljon, J. (2008, October). Predicting technology acceptance and adoption by the elderly: a qualitative study. In *Proceedings of the 2008 Annual research conference of the South African Institute of Computer Scientists and Information Technologists on IT research in developing countries: riding the wave of technology* (pp. 210-219).
- Roussou, I., & Stiakakis, E. (2016, June). Adoption of Digital Currencies by Companies in the European Union: A Research Model combining DOI and TAM. In the 4th International Conference on Contemporary Marketing Issues ICCMI June 22-24, 2016 Heraklion, Greece (p. 163).
- Schuh, S. & Shy, O. (2016). U.S. consumers' adoption and use of bitcoin and other virtual currencies. Federal Reserve Bank of Boston, Retrieved from: https://www.dnb.nl/en/binaries/Consumer%20VC%20paper_DNB_FINAL_corrected_tcm47-344530.pdf
- Shin, D., Fotiadis, A., & Yu, H. (2019). Prospectus and limitations of algorithmic governance: an ecological evaluation of algorithmic trends. *Digital Policy, Regulation and Governance*, 21(4), 369-383. doi: 10.1108/DPRG-03-2019-0017
- Spyridou, A. (2019). To Cheat or Not to Cheat. *Journal of the International Academy for Case Studies*, 25(2), 1-5.
- Teo, A.C., Tan, G.W.H., Ooi, K.B., Hew, T.S., Yew, K.T. (2015). The effects of convenience and speed in m-payment. *Industrial Management Data Systems*, 115 (2), 311-331.
- Statista, Global Gross Domestic Product (GDP) at current prices. Retrieved from:

<https://www.statista.com/statistics/268750/global-gross-domestic-product-gdp>, accessed on 23 May 2020.

Wang, Y., & Qualls, W. (2007). Towards a theoretical model of technology adoption in hospitality organizations. *International Journal of Hospitality Management*, 26(3), 560-573.

Warrington, T. B., Abgrab, N. J., & Caldwell, M. (2000). Building trust to develop competitive advantage in E-business relationships. *Competitiveness Review*, 10(2), 160-168.

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