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## Online Payment Systems: Are We on the Same Page?

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## ONLINE PAYMENT SYSTEMS: ARE WE ON THE SAME PAGE?

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*Although scholars have enhanced our understanding of online payment systems (OPSs), our literature review shows that extant research has not fully addressed the way in which scholars have conceptualized OPSs and what roles organizations have played in establishing the OPSs. This study reviews the literature on OPSs and synthesizes the definitions of OPSs. This study also discusses the theoretical and practical implications of the roles of regulators, service providers, and technologies. Using the literature review method, we analyze the definitions of online payment systems from perspectives of academics, regulators, and practitioners. This study deepens our understanding of the concepts of OPSs by providing a conceptual framework of the roles of regulators, service providers, and technologies in shaping OPSs. Finally, this study goes beyond online shopping and the trust relationship in order to show a big picture of OPSs.*

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Keywords: Online payment; System; Regulator; Service provider; Technology

### INTRODUCTION

Over the past two decades, online payment systems (OPSs) have been viewed as one of the most important topics in information systems (Mallat, 2007; Holmström and Stalder, 2001) and marketing (Laforet and Li, 2005; D'Alessandro et al, 2012). The importance of OPSs is supported by the popularity and success of online retailing (Fang et al., 2014; Liao, 2017; Özkan et al., 2010; Rouibah et al., 2016; Zhang and Li, 2006). Many companies and governments have devoted a large amount of resources to the development of OPSs because the development of these systems is an essential aspect of e-commerce markets and results in customer satisfaction, cost reduction, and firm growth (Jaw et al., 2011). Indeed, OPSs have been viewed as an innovative way to move forward in the business world, indicating that the technology-driven transformation may continue to disrupt commerce at an accelerated pace in the future. Similarly, it has been argued that OPSs ensure that resources are provided by financial institutions to compensate customers against potential fraudulent seller behavior (Pavlou and Gefen, 2004). Scholars have enhanced our understanding of OPSs. Our literature review, however, shows that extant research still has not fully addressed how scholars have conceptualized OPSs and what roles each actor has played in establishing the OPSs. We found that extant research has paid particular attention to the adoption of OPSs (Jaw et al., 2011; Liao, 2017) and the role of the intention of businesses in using them (Rouibah et al., 2016; Zhu et al., 2017). A lack of knowledge about the definition of OPSs and the role of key actors in OPSs may make it difficult for managers to understand the benefits and costs of OPSs. Each actor in OPSs may have a different role when using resources and compiling strategies to gain competitive advantage. For example, banks, retailers, third-party payment platforms, and credit card companies may learn differently how to best manipulate the asset of online transaction technology for their own interests. This study seeks to answer the following questions: How have academics, regulators,

and service providers defined OPSs? What are the roles of regulators, service providers, and technology in developing OPSs?

**RESEARCH OBJECTIVE**

The main objective of this study is to review the literature on OPSs and outline definitions of OPSs that have been developed by three actors: academics, regulators, and service providers. Specifically, this study presents the different perspectives of the three actors in advancing our understanding of the concepts of OPSs, and in providing fresh insights into benefits and costs of OPSs. Although OPSs have become an influential and almost necessarily disruptive technology, we know remarkably little about the meanings of OPSs. Understanding the definitions proposed by academics and practitioners may help managers to grasp key aspects that could lead to achieving both short-term and long-term goals.

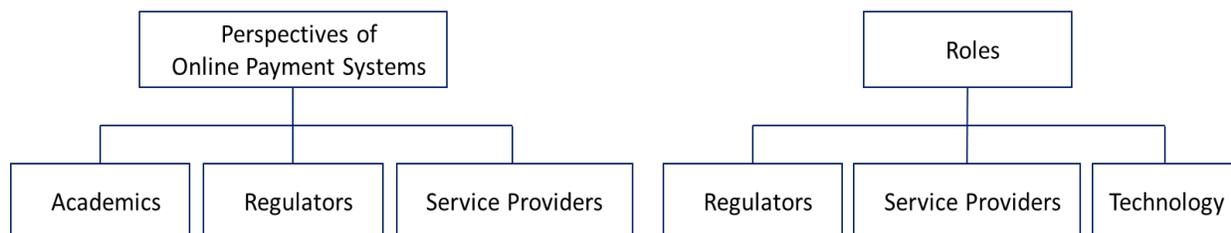
The other objective of this study is to discuss the role of the regulators, service providers, and technology in adopting and operating OPSs. As a result of the larger and more widely spread payment industry, many organizations find themselves shifting to the use of online payment. Given the theoretical and managerial importance of OPSs, academics have paid little attention to the role of regulators or practitioners in the past decades. There may be different roles that regulators and service providers are playing in accomplishing their goals. In this study, we view the key players in OPSs as: a regulator, a service provider, and technology.

In terms of methodology, this study relies on an in-depth literature review. The literature review has been carried out in an exploratory form in order to gain more insights in this field of research. We restricted our sample to referred journal articles, newspapers, legislative texts, conference working papers, and websites of private companies and regulators. We searched for relevant articles using keywords, such as online payment, digital payment, internet payment, and electronic payment. Regarding the regulators, we limited our attention to the role of regulators in the European Union and the United States. Our review process enabled us to synthesize and structure invaluable information on the online payment systems and processes.

**DEFINITIONS OF ONLINE PAYMENT SYSTEMS**

In this section, we discuss the definitions of OPSs from three perspectives: academics, regulators, and service providers. Figure 1 shows our conceptual framework.

*Figure 1. Conceptual Framework*



### Definitions Proposed By Academics

Our review of the literature shows that scholars have defined OPSs from different perspectives. Moreover, scholars have used different names for OPSs, including online payment, electronic payment, e-payment, digital payment, and internet payment. We found, however, that the definitions of OPSs include similar types of payment transaction and overlap in their discussion of the characteristics of OPSs.

Definitions of OPSs can be classified into three categories: (1) technology-oriented system, (2) the integration of multiple components, and (3) customer-focused system. In terms of the technology-oriented system, researchers have defined OPSs as a technology or a system. For example, Shon and Swatman (1998, p. 203) define payment systems as “any conventional or new payment system which enables financial transactions to be made securely from one organization or individual to another over the Internet”. Briggs and Brooks (2011, p. 1) describe an electronic payment system in a very similar way as “a form of IOS for monetary exchange, linking many organizations and individual users”. Khan et al. (2017, p. 257) use electronic payment and online payment interchangeably and define both as “a type of inter-organizational information system (IOS) for money related transactions, connecting numerous associations and individual clients”. Neuman and Medvinsky (1995) describe internet payment systems as electronic currencies and state that credit-debit instruments currently represent this form of payment. Abrazhevich (2004) divides electronic payment systems into electronic cash systems and account-based systems. In the account-based system, the money transfer is conducted by a payment service provider between the different parties. Payment systems can also be classified according to their payment or if they are conducted by a traditional banking institution or a third-party payment provider. Interestingly, Shon and Swatman (1998) classify payment systems into electronic payment systems and internet payment systems. They claim the difference between the two payment forms is that the electronic payments are using other transaction channels in a private or governmental environment, while internet payment serves as a transaction tool in internet-based payments.

OPSs have been viewed as the integration of multiple components. For example, Shon and Swatman (1998) suggest that OPS is an integrated system made up of six components: third-party based systems, card-based systems, secure web server-based systems, electronic token-based systems, financial Electronic Data Interchange (EDI) systems, and micropayment-based systems. Similarly, Kaur and Pathak (2015) include six different types of payments in their definition of e-payment systems: credit cards, debit cards, smart cards, digital wallet, electronic check, and electronic cash. Neuman and Medvinsky (1995) claim that online payment environments refer to eleven components: security, reliability, scalability, anonymity, acceptability, customer base, flexibility, convertibility, efficiency, ease of integration with applications, and ease of use. Similarly, OECD (2012) distinguishes between online payment forms and mobile payment forms. Online payment transactions include six components: account-based systems, credit cards, debit cards, mediating services, automated mechanisms for bill payments, online wallets and electronic currency systems. In contrast, mobile payment solutions refer to mobile contactless payments and mobile remote payments (OECD, 2012). Regarding the customer-focused system, researchers argue that online payment is based on the relationship between a customer and a supplier. Ogedebe and Babatunde, P. (2012, p. 3104)

describe e-payments as a “payment system for buying and selling goods or services offered through the internet or any type of electronic fund transfer”. Similarly, Mehta and Striapunina (2017, p. 7) define digital payments as “payments for consumer products and services which are made over the internet, mobile payments at Point-of-Sale (POS) via smartphone applications as well as cross-border Peer-to-Peer transfers between private users”. They explicitly exclude business to business payments, online bank transfers, and the point of sale transactions based on mobile card readers from their definition.

Overall, we found that researchers assume that OPSs connect two or more parties amongst each other. Specifically, some researchers have focused on exploring the different forms of technology while others have stressed the factors that may motivate individuals or firms to adopt OPSs. In addition, we found that a major focus of research is placed on enterprises and customers, not regulators. Most researchers use explicit terms to describe what OPSs are mainly used for, such as fund transfer, monetary exchange or payment.

### Definitions Proposed By Regulators

In this section, we focus on analyzing the definitions proposed by regulators in two regions: the European Union (EU) and the United States. In the European Union, the European Parliament and European Council define OPSs as a “funds transfer system with formal and standardised arrangements and common rules for the processing, clearing and/or settlement of payment transactions” (EPEC, 2015, p. 57). In their payment system, payment instruments are issued, money is remitted, and payments are initiated (EPEC, 2015). The European Parliament and Council classifies service providers into six different categories: Credit Institutions, Electronic Money Institutions, Post Office Giro Institutions, Payment Institutions, National Central Banks and Authorities of EU member states (EPEC, 2015). Similarly, the European Central Bank defines electronic money as “a monetary value, represented by a claim on the issuer, which is [...] stored on an electronic device [...]; issued upon receipt of funds in an amount not less in value than the monetary value received; and [...] accepted as a means of payment by undertakings other than the issuer” (ECB, 2009, p.11). A transfer of money can be carried out by a hardware-based product while the purchasing power resides in a personal physical device (ECB, 2019). Although a real-time connection to a server is not essential in such a system, this is the basis of the functionality of a software-based product. The online payments are electronically initiated, processed, and received in the form of digital information (ECB, 2019).

In the U.S., the Federal Reserve Banks described a payment system as a set of technologies, rules, practices, and standards necessary for the functioning of OPSs and their services (FRB, 2019). An electronic device can be used to authorize a payment, whereas such a device can be a code, card, or other means of access to a consumer’s account (U.S. Government Publishing Office, 2018). Using this definition, online payments would be considered one of the means of conducting electronic fund transfers. According to the U.S. Government Publishing Office, OPSs should be viewed as any transfer of funds which is initiated through an electronic terminal, computer or magnetic tape, or telephonic instrument (U.S. Government Publishing Office, 2009). This definition would then include point-of-sale transfers, direct deposits or

withdrawals of funds, automated teller machine transactions, and transfers initiated by telephone (U.S. Government Publishing Office, 2009).

In sum, in contrast to academic authors, regulators seem to rather focus on authorization, standardized arrangements and rules than on technology. There is a broad consensus that the legal aspect of OPSs is important to be mentioned in a definition. The U.S. Government Publishing Office is the only source to include automated teller machines and transfers initiated by telephone in their elements of OPSs, instead of focusing on techniques more typical for OPSs like credit/debit cards or peer-to-peer payments.

### Definitions Proposed By Service Providers

In this study, ‘service providers’ refers to providers of payment infrastructure, software, and know-how. The service providers consist of three groups: non-regulating financial institutions, providers specializing in online payments, and other providers. The service providers consider OPSs to have three dimensions: processes and procedures, components and steps, and the integration of the two dimensions.

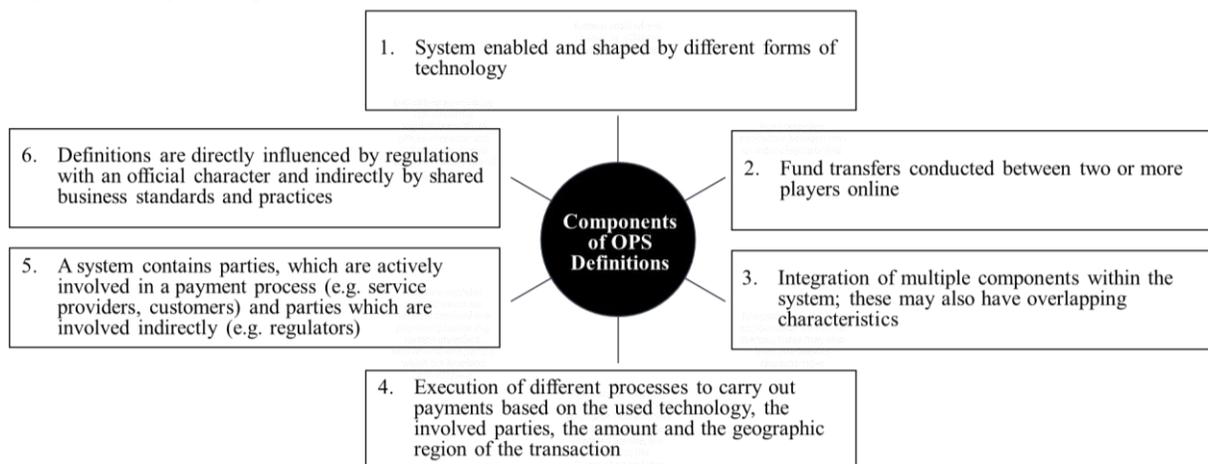
First, in terms of processes and procedures, the service provider First Data defines the payment system as a set of procedures and instructions used for the settlement of obligations and the transfer of ownership arising from the exchange of services and goods (First Data, 2012). Similarly, Paymill company describes OPSs as an electronic payment system, which is an E-payment system or an online payment system that enables a company to process any cashless payment through electronic methods (Paymill, 2019). Second, regarding the components and steps, E-Complish, an infrastructure provider, argues that OPSs encompass the entire process for accepting card payments and include a payment terminal, an electronic cash register, and other devices connected to the payment terminal (E-Complish, 2019). More broadly, the Bank for International Settlements, a financial institution that publishes voluntarily, claims that OPSs consist of a set of instruments, banking procedures, and interbank funds transfer systems that ensure the circulation of money (BIS, 2003). Third, in terms of the integration of the two previous dimensions, Securion Pay, a provider of card payment services, defines OPSs as an electronic payment used to pay for goods or services on the internet (Securion Pay, 2019). OPSs include all financial operations using electronic devices, such as computers, smartphones, and tablets (Securion Pay, 2019). By contrast, AT Integrated company, a web development and design company, views OPSs as money that is exchanged electronically and involves the use of computer networks and the Internet (AT Integrated, 2012). The online payment can be done from a checking account, credit card, or other clearing house, like paypal (AT Integrated, 2012). Moreover, Payments Canada, a Canadian non-profit organization, defines OPSs as payments initiated by a customer online for the purchase of services and goods that result in a credit to a customer account at a financial institution (Payments Canada, 2019). Online payments include Person-to-Person transactions and online e-wallet, operated through online services and providers (Payments Canada, 2019).

In sum, we found that service providers have used more specific and direct terms in their definitions in comparison to academics or regulators. The key words, including money and

payment, are frequently used in the definitions of providers. The use of easily understandable words may be caused by the aim of addressing potential customers.

Figure 2 presents a summary of key components of OPSs definitions proposed by service providers, regulators and academics.

*Figure 2. Key Components of OPS Definitions*



## **ROLE OF REGULATORS IN ONLINE PAYMENT SYSTEMS**

The success of OPSs is heavily dependent on regulators who have the power to support as well as to restrict technological progress (Wiener, 2004). One of the roles of regulators in payment systems is to establish a secure business environment for providers and users. A lower level of regulations may help to foster competition and innovation. Therefore, it is important for regulators to try to maintain a balance between allowing the freedom required to develop technologies and the need to address security and trust-related issues (Capgemini and BNP Paribas, 2017). One of the challenges for regulators is the speed at which technological progress is occurring. Pacing problems may occur when a regulatory gap develops because of the slow adaption to change by regulatory agencies (Eggers and Turley, 2018). Standardized regulatory approaches are often slow in reaction to change and are cost-intensive (Hogan and Newton, 2015).

Digitalization causes former boundaries between different business fields to diminish and increases the connection between business fields like the retail, banking, and transportation industries (Claus, 2019). Different regulations apply to the payment process depending on whether it is a transaction between private users or whether a banking or non-banking related institution is part of the payment process (OECD, 2012). In an interconnected global economy, the harmonization of different payment systems across national borders remains a critical task for regulators (Capgemini and BNP Paribas, 2018).

The reduction of risks is also crucial for the development of a more secure cyber environment. The need for trust in OPSs is an important basis on which to establish a safe business environment, indicating regulators should manage critical activities, such as storing, sharing, and processing customer data and assets (Grasshoff et al., 2018). It is also important to

develop anti-money laundering and anti-tax evasion measures, which would help to prevent the misuse of technical possibilities (Ioannides, 2016). Regulators also need to develop counter-terrorist financing regulations in order to operate OPSs efficiently (JCESA, 2012). For example, the European Union (EU) developed the Single Euro Payments Area (SEPA) in 2014 to reduce the complexity of the EU payment environment (European Commission, 2019). In addition, the EU has operated the General Data Protection Regulation (GDPR) since 2018, in order to increase consumer data protection rights within Europe and to harmonize prior regulatory approaches (European Parliament and European Council, 2015).

Industry-driven regulatory approaches have been developed by multiple providers of online payment solutions. For example, the Payment Card Industry Data Security Standards (PCI DSS) and its payment card providers are currently using security principles in the payment systems. These payment card providers include American Express, Discover Financial Services, JCB International, MasterCard, and Visa Inc. (Payment Card Industry Security Standards Council, 2018). Similarly, several companies, such as American Express, Discover, JCB, Mastercard, UnionPay, and Visa, are working together to foster standardization within the industry and ensure the interoperability of different transaction forms (EMVCo, 2018).

## **ROLE OF SERVICE PROVIDERS IN ONLINE PAYMENT SYSTEMS**

Service providers have played different roles, sometimes on the same side as merchants, customers and regulators, and sometimes against them. In the first place, service providers offer infrastructures that help their clients successfully run their current business models and develop new products (Nagasubramanian and Rajagopalan 2012). Moreover, service providers enable their clients to reduce costs and gain a competitive advantage (Lowry et al., 2006).

Service providers have been working to increase convenience for their customers to help them overcome barriers, such as limited availability, complexity, queues, or time and place (Bezhovski 2016). One of the roles of the service providers is to hedge risks on both the merchant's and the customer's sides by ensuring information confidentiality and data integrity, and to ensure that end-user implementation requirements are met (El Ismaili et al., 2014). It can be argued that service providers not only provide necessary infrastructure for a fee, but even proactively communicate to and collaborate with vendors.

Service providers also collaborate with regulators to help them achieve individual or mutual goals, such as correct accounting (Azih and Nwagwu, 2015) or spreading innovation (Kovács and David, 2016). According to Suwunniponth (2016), service providers have the power to increase the acceptance of online payment technologies and ensure steady innovation and development (Suwunniponth 2016). Furthermore, service providers can assist developing countries by enabling their citizens to have access to online commerce (Adeyeye 2008).

## **ROLE OF TECHNOLOGIES IN ONLINE PAYMENT SYSTEMS**

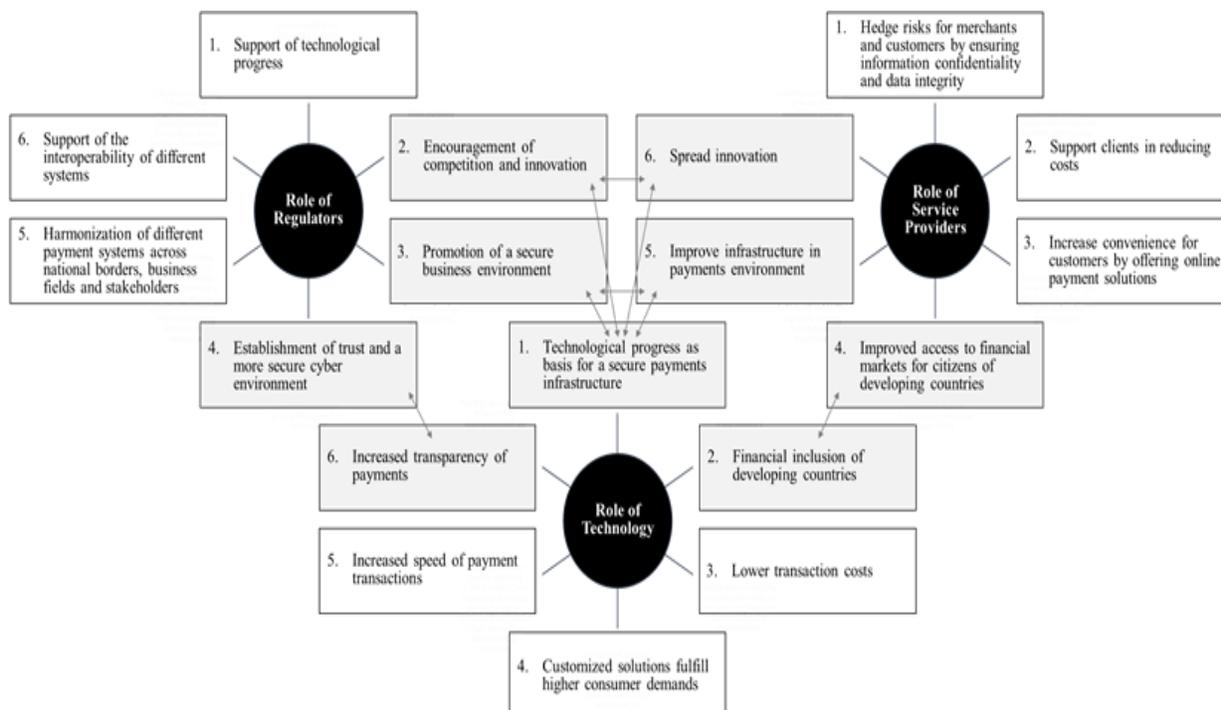
It is crucial to use advanced technologies and increase digitalization within the OPS world (Diermeier and Goecke, 2017). In OPS, financial transactions can be carried out electronically over the Internet or through other access points (Klapper, 2017). One of the best

examples of financial technology institutions are FinTech companies. The production and delivery of banking services and products of FinTech companies are mainly based on innovation-driven technologies (ECB, 2018). Technology-based OPSs can help lower transaction costs while at the same time increasing the transparency of payments (European Parliament, 2017). Moreover, technology-based OPSs assist firms in quickly identifying a business model and developing best practices and skills. This is especially true in countries with a weaker banking system which leverage digital financial services as a way to develop their own financial system (Bill & Melinda Gates Foundation, 2013).

Non-bank financial institutions also enter the financial market to develop technology-based payment systems. The non-bank financial institution is a payment provider without a full banking license, which offers additional payment services, such as money transmission or consulting (World Bank, 2019). In sum, the development of technologies enables OPSs to be more customized and to fulfill higher customer demands (IFC, 2017). Technologies also increase the transparency and the speed of payment transactions between traditional banks and non-banking financial institutions (Klapper and Singer, 2014).

The summary table in Figure 3 is showing the role of regulators, service providers and technology in OPSs.

Figure 3. Role of Regulators, Service Providers and Technology in OPSs



## CONCLUSION

The purpose of this study was to review the literature on online payment systems. We found that there are different roles that regulators, service providers, and technologies have played in establishing the OPSs. Our results show that OPSs have been defined from three perspectives: academics, regulators, and service providers. Our recommendation is that academics, regulators, and practitioners should consider their different perspectives of OPSs and develop relevant policies and systems. We would like this study to serve as a starting point for further research on the versatility of OPSs. We encourage interested readers to investigate the consequences of the diverging points of view in today's business environment. Moreover, since this paper only considers regulators in the European Union and the United States, we suggest elaborating the role of regulators of OPSs in other countries or regions, especially in developing countries.

This study contributes to the literature on information systems, management, and marketing in three ways. First, this study draws on the insights of academics, regulators, and practitioners to clarify the definitions of OPSs. The study also advances our understanding of the concept of OPSs. Second, this study provides a conceptual framework of the roles of regulators, service providers, and technologies. Although there has been a need for scholars to explore how OPSs have been theorized, the literature on OPSs has centered on the response of customers in the context of online shopping (Fang et al., 2014; Liao, 2017; Rouibah et al., 2016). Third, this study goes beyond online shopping and the trust relationship in order to show a big picture of OPSs.

## REFERENCES

- Abrazhevich, D. (2004). Electronic payment systems: A user-centered perspective and interaction design, Technische Universiteit Eindhoven.
- Adeyeye, M. (2008). E-commerce, business methods and evaluation of payment methods in Nigeria. *Electronic Journal of Information Systems Evaluation*, 11(1), 45-50.
- AT Integrated (2012). What is online payment and how to accept payments online. Retrieved January 30, 2019 from <https://www.atintegrated.com/e-commerce/what-is-online-payment>
- Azih, N., & Nwagwu, L. (2015). Role of e-payment system in promoting accountability in government ministries as perceived by accounting education graduates and accountants in ministry of finance of Ebonyi state. *Journal of Education and Practice*, 6(26), 87-92.
- Bezhovski, Z. (2016). The Future of the Mobile Payment as Electronic Payment System. *European Journal of Business and Management*, 8(8), 127-132.
- Bill & Melinda Gates Foundation (2013). Fighting poverty, profitably. Transforming the economics of payments to build sustainable, inclusive financial systems. Special Report.
- BIS (2003). A glossary of terms used in payments and settlement systems. Working Paper of the Committee on Payment and Settlement Systems, Bank for International Settlements.
- Briggs, A., & Brooks, L. (2011). Electronic payment systems in development in a developing country: The role of institutional arrangements. *The Electronic Journal on Information Systems in Developing Countries*, 49(3), 1-16.
- Capgemini, & BNP Paribas (2017). World Payments Report 2017.

- Capgemini, & BNP Paribas (2018). World Payments Report 2018.
- Claus, K. (2019). How convergence is transforming payment services. Retrieved January 30, 2019 from [https://www.ey.com/en\\_gl/digital/how-convergence-is-transforming-payment-services](https://www.ey.com/en_gl/digital/how-convergence-is-transforming-payment-services)
- D'Alessandro, S., Girardi, A., & Tiangsoongnern, L. (2012). Perceived risk and trust as antecedents of online purchasing behavior in the USA gemstone industry. *Asia Pacific Journal of Marketing and Logistics*, 24(3), 433–460.
- Diermeier, M., & Goecke, H. (2017). Productivity, technology diffusion and digitization. *CESifo Forum*, 18(1), 26-32.
- ECB (2004). E-payments without frontiers. ECB Conference, European Central Bank, 2004.
- ECB (2009). Glossary of Terms Related to Payment, Clearing and Settlement Systems. European Central Bank
- ECB (2018). Guide to assessments of fintech credit institution license applications. European Central Bank.
- ECB (2019). Electronic Money. European Central Bank. Retrieved January 30, 2019 from [https://www.ecb.europa.eu/stats/money\\_credit\\_banking/electronic\\_money/html/index.en.html?fbclid=IwAR0i92ziaD0cy7js8yq3EsPyrCjYE026XXHpMo7KUQCj3UCUdLiPOK uKdHs](https://www.ecb.europa.eu/stats/money_credit_banking/electronic_money/html/index.en.html?fbclid=IwAR0i92ziaD0cy7js8yq3EsPyrCjYE026XXHpMo7KUQCj3UCUdLiPOK uKdHs)
- E-Complish. Payment System. Payment Processing Glossary. Retrieved January 30, 2019 from <https://www.e-complish.com/resource-center/payment-processing-glossary/#P>
- Eggers, W. D., & Turley, M. (2018). The future of regulation. Deloitte Center for Government Insights.
- El Ismaili, H., Houmani, H., Madroumi, H. (2014). A secure electronic transaction payment protocol design and implementation. *International Journal of Advanced Computer Science and Applications*, 5(5), 172-180.
- EMVCo (2018). Overview of EMVCo. Retrieved January 30, 2019: <https://www.emvco.com/about/overview/>
- EPEC (2015). Directive (EU) 2015/2366 of the European Parliament and of the council, European Parliament and European Council.
- European Commission (2019). Single euro payments area (SEPA). European Commission. Retrieved January 30, 2019 from [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/single-euro-payments-area-sepa\\_en](https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/single-euro-payments-area-sepa_en)
- European Parliament (2017). Report on FinTech: the influence of technology on the future of the financial sector (2016/2243(INI)). Retrieved January 30, 2019 from <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A8-2017-0176+0+DOC+WORD+V0//EN>
- Fang, Y., Qureshi, I., Sun, H., McCole, P., Ramsey, E., & Lim, K. H. (2014). Trust, satisfaction, and online repurchase intention: The moderating role of perceived effectiveness of e-commerce institutional mechanisms. *Mis Quarterly*, 38(2). 407-427.
- First Data (2012). Payments Industry Glossary. First Data Corporation. Retrieved January 30, 2019 from <https://www.firstdata.com/downloads/thought-leadership/Payments-Glossary.pdf>
- FRB (2019). Faster Payments Task Force (FPTF) and Secure Payments Task Force (SPTF). Federal Reserve Banks. Retrieved January 30, 2019 from <https://fedpaymentsimprovement.org/resources/glossary>

- Grasshoff, G., Bohmayr, W., Papritz, M., Leiendecker, J., Domard, F., Bizimis, L. (2018). Banking's Cybersecurity Blind Spot - and How to Fix It. The Boston Consulting Group. QuoScient.
- Hogan, M., & Newton, N. (2015). Report on Strategic U.S. Government Engagement in International Standardization to Achieve U.S. Objectives for Cybersecurity. National Institute of Standards and Technology.
- Holmström, J., & Stalder, F. (2001). Drifting technologies and multi-purpose networks: the case of the Swedish cashcard. *Information and Organization*, 11(3), 187-206.
- IFC (2017). Digital financial services: Challenges and opportunities for emerging market banks. Encompass, International Finance Corporation, (42).
- Ioannides, I. (2016). The Inclusion of Financial Services in EU Free Trade and Association Agreements: Effects on Money Laundering, Tax Evasion and Avoidance. European Parliamentary Research Service, Brussels
- Jaw, C., Oliver, S.Y., & Gehrt, K.C. (2011). The determinants of the adoption of online payment services: Integrating customer experiences and perceptions into the technology acceptance model. *International Journal of Arts & Sciences*, 4(22), 255.
- JCESA (2012). Report on the application of AML/CTF obligations to, and the AML/CTF supervision of e-money issuers, agents and distributors in Europe. Joint Committee of the European Supervisory Authorities.
- Kaur, K., & Pathak, A. (2015). E-payment system on e-commerce in Indi. *International Journal of Engineering Research and Applications*, 5(2), 79-87.
- Khan, B. U. I., Olanrewaju, R. F., Baba, A. M., Langoo, A. A., & Assad, S. (2017). A compendious study of online payment systems: Past developments, present impact, and future considerations. *International Journal of Advanced Computer Science and Applications*, 8(5), 256–271.
- Klapper, L. (2017). How digital payments can benefit entrepreneurs. doi: 10.15185/izawol.396
- Klapper, L., & Singer, D. (2014). The opportunities of digitizing payments: How digitization of payments, transfers, and remittances contributes to the G20 goals of broad-based economic growth, financial inclusion, and women's economic empowerment. World Bank [Database Online]. Washington DC.
- Kovács, L., & David, S. (2016). Fraud risk in electronic payment transactions. *Journal of Money Laundering Control*, 19(2), 148-157.
- Laforet, S., & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China, *International Journal of Bank Marketing*, 23(5), 362-380.
- Liao, T.-H. (2017). Online shopping post-payment dissonance: Dissonance reduction strategy using online consumer social experiences. *International Journal of Information Management*, 37(6), 520–538.
- Lowry, P. B., Wells, T. M., Moody, G. D., Humphreys, S., & Kettles, D. (2006). Online payment gateways used to facilitate e-commerce transactions and improve risk management. *Communications of the Association for Information Systems (CAIS)*, 17(6), 1-48.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments—A qualitative study. *Journal of Strategic Information Systems*, 16, 413-432.
- Mehta, D., & Striapunina, K. (2017). Statista Report 2017. Statista GmbH Hamburg. Retrieved January 30, 2019 from <https://www.statista.com/study/45600/statista-report-fintech/>
- Nagasubramanian, R., & Rajagopalan, S. P. (2012). Payment gateway—Innovation in multiple payments. *International Journal of Computer Applications*, 59(16), 33-43.

- Neuman, B., & Medvinsky, G. (1995). Requirements for Network Payment: The Net Cheque™ Perspective. Proceedings of IEEE Comcon'95, San Francisco. University of Southern California. Information Sciences Institute.
- OECD (2012). Report on consumer protection in online and mobile payments, OECD Digital Economy Papers, 204.
- Ogedebe, P., & Babatunde, P. (2012). E-payment: prospects and challenges in Nigerian public sector. *International Journal of Modern Engineering Research*, 2(5), 3104-3106.
- Ozkan, S., Bindusara, G., & Hackney, R. (2010). Facilitating the adoption of e-payment systems: theoretical constructs and empirical analysis. *Journal of Enterprise Information Management*, 23(3), 305-325.
- Pavlou, P. A., & Gefen, D. (2004). Building effective online marketplaces with institution-based trust. *Information Systems Research*, 15(1), 37-59.
- Payment Card Industry Security Standards Council (2018). About Us. PCI Security Standards Council. Retrieved January 30, 2019 from [https://www.pcisecuritystandards.org/about\\_us/](https://www.pcisecuritystandards.org/about_us/)
- Payments Canada. Payments Glossary. Retrieved January 30, 2019 from <https://www.payments.ca/resources/payments-glossary>
- Paymill. Glossary. E-Payment System. Retrieved January 30, 2019 from <https://www.paymill.com/en/glossary/e-payment-system/>
- Rouibah, K., Lowry, P. B., & Hwang, Y. (2016). The effects of perceived enjoyment and perceived risks on trust formation and intentions to use online payment systems: New perspectives from an Arab country. *Electronic Commerce Research and Applications*, 19, 33-43.
- Securion Pay. How to define e-payments? Retrieved January 30, 2019 from <https://securionpay.com/blog/how-to-define-e-payments/>
- Shon, T., & Swatman, P. (1998). Identifying effectiveness criteria for Internet payment systems. *Internet Research: Electronic Networking Applications and Policy*, 8(3), 202-218.
- Suwuniponth. W. (2016). Customers' intention to use electronic payment system for purchasing. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 10(12), 3864-3869.
- U.S. Government Publishing Office (2009). United States Code. Title 15-Commerce and Trade. Definitions. Retrieved January 30, 2019 from <https://www.govinfo.gov/content/pkg/USCODE-2009-title15/html/USCODE-2009-title15-chap41.htm>
- U.S. Government Publishing Office (2018). Code of Federal Regulations: Title 12-Banks and Banking Definitions. Retrieved January 30, 2019 from <https://www.govinfo.gov/app/collection/cfr/2018/>
- Wiener, J. (2004). The Regulation of Technology, and the Technology of Regulation. *Technology in Society*, (26), 483-500.
- World Bank (2019). Nonbanking financial institution. Retrieved January 30, 2019 from <http://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/nonbank-financial-institution>
- Zhang, H., & Li, H. (2006). Factors affecting payment choices in online auctions: A study of eBay traders. *Decision Support Systems*, 42(2), 1076-1088.

Zhu, D. H., Lan, L. Y., & Chang, Y. P. (2017). Understanding the intention to continue use of a mobile payment provider: An examination of alipay wallet in China. *International Journal of Business and Information*, 12(4), 369–390.