DOI: https://doi.org/10.30525/2256-0742/2022-8-1-148-158

IMPROVING THE LEVEL OF ECONOMIC EFFECTIVENESS OF ELECTRONIC PAYMENT SERVICES IN A GLOBAL DIGITAL ECONOMY

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Abstract. Digitalization ensured a revolutionary change in the ways of delivering and consuming financial services, in particular payment services. One of the key prerequisites for the sustainable operation and development of e-payment systems is the achievement of a high level of effectiveness of e-payment services (EPS), which occurs in the global context of building a digital economy. *The goal of the research* is to develop the conceptual framework and identify the key areas for improving the economic effectiveness of e-payment services in a global digital economy. *The theoretical framework* of the research includes: the best practices in the sphere of digital technology, digitalization and digital transformations; a concept of digital economy, determining its structure, technological "core" and contours, and functional features. An enhanced role of the Internet as a general economic infrastructure, being the key for the global quality of digital economy, has been taken into consideration. *The methodology of the research* is based on an evolutionary approach and includes: historical, systemic and structural, functional, and comparative analysis. *The results of the research* are represented by a number of theoretical, conceptual and practical provisions. Above all, the essence of FinTech was clarified and the key areas of its development were identified; the crucial importance of the problem of economic effectiveness for this sphere of digital technology was substantiated. The paper identified the essence and specific features of PayTech, which transformed the ways to carry out payment transactions and provide the respective services. The purpose and key components of e-payment systems were clarified as well as the specific features to ensure EPS in various aspects. The attention was drawn to the issues of effective EPS in terms of the provider (related to ensuring mass retail payments using Internet and mobile technologies). Taking into consideration different description models of payment operation, the emphasis was laid on the technological model and functionality of e-payment systems, which demonstrated an integrated approach to achieving the high quality and effectiveness of EPS. Taking into account the external and internal prerequisites to accomplish this, the following strategic areas for improving the economic effectiveness of EPS were identified: 1) enhancing the risk management quality; 2) innovation development; 3) development of the ecosystem of EPS delivery. *Practical recommendations* on the intensification of e-payment systems include: governmental support activities for EPS providers; proposals on enhancing the innovative function of regulatory "sandboxes" and expanding the use of the technologies which ensure the compliance with regulatory standards (SupTech and RegTech). *Value/originality*: the paper specified and identified the focus areas and activities to improve the economic effectiveness of EPS delivery, which is of strategic importance in the global digital economy, being of particular value for future studies.

Key words: digital technologies, digital economy, globalization, electronic payment systems, electronic payment services, effectiveness.

JEL Classification: E42, F01, F30, G14, L86

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1. Introduction

Building a digital economy is one of the main trends in the social and economic development, which embraces all spheres of human life. The introduction of digital technologies (digitalization) leads to profound transformations of economic systems, changes the forms of economic organization, market mechanisms, business models, ways of delivering various services. This requires considering the issues of their economic effectiveness in conditions of a new technological pattern that is digital economy, which influences the level of meeting the social needs.

The application of digital technologies in financial sector, which has been termed "FinTech", ensured faster and cheaper access to a wide range of financial services, removing physical barriers and eliminating the need for traditional mediators, and deeply transforming the financial sector. Digital payment technologies (PayTech), which acquired infrastructural quality, particularly in the context of the development of other digital economy branches, became one of the major trends in FinTech. A surge in demand for electronic payment services (EPS – in singular and plural forms) created a demand for electronic payment system (e-payment system), which turned into an integral element of modern payment infrastructure. Apart from the bank cards, an increased use is being made of electronic currencies, contactless payment tools, payment means using Internet and mobile technologies, which operate based on special services and applications.

Electronic payment systems connect multiple participants and ensure sophisticated technological operations related to the movement of huge flows of payment information and data. At the same time, electronic payment system operation is imperatively regulated at the national and international levels, which involves the compliance with a wide range of regulatory standards supplemented by the increasing security requirements. Furthermore, a pressing concern of the new market of EPS is fraud, various types of which can result in significant losses. On the other hand, along with an increasing demand for EPS, consumers have increasingly higher expectations of the quality of such services, which includes reliability, high speed, timeliness, full scope and security when effecting the payment as well as minimization of risks. All of these things put "pressure" on expenditures incurred by EPS providers; however, in the environment of increased competitiveness, a rise in the cost of such services is limited.

Therefore, one of the critical problems of the sustainable operation and development of electronic payment system is to raise the level of economic effectiveness of EPS, which encompasses not only its benefits to EPS providers (PayTech companies), but also ensuring a high quality of EPS for the consumers and compliance with all regulatory standards and requirements in the sphere of security and risk minimization. Addressing the problem of the effective delivery of EPS becomes more complicated as the payment industry more and more enters the international market in the context of the formation of the global digital economy. The effectiveness should be considered as a precondition for further development and unleashing the potential of electronic payment systems in the global economy.

2. Literature review

The digitalization of the sphere of financial services and development of FinTech raise great interest among the scientific community, which is demonstrated by the increasing number of studies covering a wide spectrum of areas (E. Milian, M. de Spinola, M. de Carvalho, 2019). Digital economy is globalizing and is considered as E-Globalization (G. Zekos, 2021). FinTech is being developed in line with the global trends in digital transformations and it becomes a new foundation for economic globalization (J. Hill, 2018). Like other areas of digital economy, FinTech is characterized by a high level of internationalization and globalization, which provides the necessary context for its development (O. Manta, 2021).

Along with an unprecedented growth, the formation of the scientific concept of FinTech takes place; there is a great discussion about its essence, components, specific features, operation, advantages, disadvantages, development trends and opportunities for consumers and business entities (P. Schueffel, 2016; E. Milian, M. de Spinola, M. de Carvalho, 2019). FinTech provided new opportunities not only for the population, but also for business in multiple economic branches; therefore, it is increasingly regarded as a standalone industry (sector) (H. Knewtson, Z. Rosenbaum, 2020). The application of digital technologies transforms the approaches to the delivery and obtaining of financial services, models and mechanisms for the access to financial resources by business entities and individuals (H. Bollaert, F. Lopez-de-Silanes, A. Schwienbacher, 2021). FinTech expansion made it a powerful force for the transformation of the financial sector, which forced financial institutions to adapt to technological changes (J. Hill, 2018). FinTech does not destroy the financial industry, but streamlines it on account of wider use of digital technologies to provide financial services (Y. Wang, S. Xiuping, Q. Zhang, 2021; A. Thankor, 2020). Naturally, it raises concerns about financial institutions and stability (D. Fung, W. Lee, J. Yeh, F. Yuen, 2020). However, they only emphasize the need to adapt regulation systems and create the adequate legal and financial conditions

as well as to monitor FinTech (S. Omarova, 2021). The approaches to the regulation of this sphere are still being developed, particularly in terms of the requirements to cybersecurity, privacy, anti-fraud policies. In order to develop FinTech, the governments might apply "regulatory sandboxes", which are also related to business incubation (A. Alaassar, A.-L. Mention, T. Aas, 2021) and fostering the innovations (S. Wang, X. Tu, H. Chai, Q. Sun, , J. Wu, H. Cai, F.-Y. Wang, 2020). At the same time, FinTech itself should also be considered as a promising trend in entrepreneurship and innovations (A.-L. Mention, 2019).

The transition from paper forms of money to non-cash electronic ones is a global trend. Electronic payment systems become a part of market mechanisms, providing huge opportunities for sellers and consumers. The recognition of PayTech is growing with an increase in the level of user friendliness, reliability and security (E. W. K. See-To, E. W. T. Ngai, 2019). In recent years, an introduction of mobile technologies into PayTech sphere has gained greater momentum, which has proven their usefulness and benefit to consumers (I. R. De Luna, F. Liébana-Cabanillas, J. Sánchez-Fernández, F. Muñoz-Leiva, 2019). The use of the modern electronic payment system provides opportunities for new business types and models. New payment mechanisms are being embedded into companies' websites and turn into a must-have element of business (S. Meng, X. He, X. Tian, 2021). The application of electronic (digital) payments enables business entities to expand their activities and increase market share, save time and resources as well as to diversify a range of the services delivered to consumers. Therefore, this raises the question of the effectiveness of electronic payment systems themselves (M. Nasr, M. Farrag, 2020). PayTech are spreading rapidly under the influence of e-commerce development, displacing banks or spurring innovative transformations of traditional payment systems and mechanisms (M. Yao, H. Di, X. Zheng, X. Xu, 2018). The growing importance of electronic payments for the population and business entities imposes high requirements for the effectiveness, which concerns the cost and quality of EPS. There is an increasing trend towards the establishment of holistic ecosystems of EPS delivery, supplementing them with various services, which also makes it more difficult to ensure effective electronic payment system delivery (I. Lee, Y. J. Shin, 2018).

The development of PayTech faces a lot of challenges. Electronic payment systems take a great deal of e-commerce risks, particularly those related to fraud, breach of security and sensitive data (M. Braun, J. McAndrews, W. Roberds, R. Sullivan, 2008). The elimination of threats and minimization of risks make risk management more critical (L. Trautman, 2013). The development of PayTech requires profound changes in regulatory systems, which turned to be much larger in scale than in other FinTech areas (J. Julapa, J. Kose, 2018). The national regulation of PayTech as well as international one is currently being actively developed, particularly to ensure the international payments (A. B. Radnejad, O. Osiyevskyy, O. Scheibel, 2021). However, the establishment of regulatory environment leads to the increased business expenditures on compliance with the requirements. Therefore, government support is very important. The world experience shows that it is reasonable to use such its forms as "regulatory sandboxes" (M. Polasik, A. Huterska, R. Iftikhar, Š. Mikula, 2020).

Despite considerable attention to the development of PayTech and electronic payment systems, the academic community has not yet proposed clear conceptual principles for improving the level of economic effectiveness of EPS delivery; and its primary strategic areas in conditions of the global digital economy have not been identified. It is particularly important in the context of the increased international payments and intensified competition on the market of EPS delivery.

3. The research objective

The goal of the research is to develop the conceptual framework and identify the key areas for improving the economic effectiveness of EPS delivery in a global digital economy. Taking into account different varieties of electronic payment systems, it should be noted that this paper is focused on electronic payment systems which ensure mass retail payments using Internet and mobile technologies, and the issues of the effectiveness are considered in terms of EPS providers.

4. Theoretical framwork and methodology

The theoretical framework of the research, above all, includes the bulk of the study pertaining to the digital technology, digitalization and digital transformations in the economy and its specific sectors. The next element of the theoretical framework is the concept of digital economy which emerged in the mid-1990s along with the use of the following concepts: concept of information, Internet (web), postindustrial, network economy and knowledge economy. The research takes into account a complex structure of digital economy related to the migration of multiple processes, types of business on the Internet and development of its new forms and trends. The digital infrastructure (predominantly websites, and digital platforms), digital service markets (encompassing software and hardware), new activities related to the Internet of people and Internet of things, and new technological

trends (blockchain, artificial intelligence, etc.) emerged around the technological "core" (computer hardware, network hardware, and data centers). Further, an outline of industries appeared, where the use of the Internet resulted in the emergence of new forms and models of organizations, including: e-trade (e-shops, e-malls), e-trading, e-procurement, e-auctions, e-banking, e-insurance, e-logistics, e-health (e-medicine), e-education, e-tourism (e-travel), e-media, etc. that are described using the concepts of e-business and e-commerce, providing an insight into the structure of digital economy, which, however, is not limited to the sphere of using the Internet, but is also associated with the Forth industrial revolution, the use of "smart" things, transport, etc. A new infrastructure (e-infrastructure) emerges in multiple spheres, as well as ancillary activities (e.g., e-marketing); there is an intensive digitalization of individual industrial sectors (e-agriculture, e-farming, e-factory, etc.), scientific activities (e-science), social services (e-social), and government activities (e-government). The paper considered specific fields of using digital technologies, for example, FinTech, MedTech, EdTech, etc. Therefore, the research took into account the functional features of digital economy (forms of communication, automation of processes and procedures, application of intelligent technologies, dissemination of digital platforms, growing amount of data and flow of information, etc.), and its technological trends, which led to further development of digital forms of the organization of economic systems and ensuring the processes.

The Internet turned into a global infrastructure of the economy, which enabled to innovatively develop social communications and relations, create new economic mechanisms, share data and information. It is the evolvement of the internet that became an impetus for the formation of digital economy in the spatial, transactional and organizational aspects, which covered many things in the context of the process globalization. This formed a basis for building the global markets, production, supply and innovation chains. Taking into account a new quality of information space, digital economy should be considered as global economy, because it: became a basis for the formation of the worldwide virtual environment; transformed the global markets of goods, services, labor, capital, and information; encompasses global and multinational industries, where the influence of the global environment becomes a determining factor; became a basis for the integration of various national systems, particularly in the financial sector. This is mainly due to the development of international payment infrastructure.

The research is methodologically grounded on the evolutionary approach, historical, system-structural, functional and comparative methods of analysis. The empirical base of the research was to study the global trends in the development of digital economy, FinTech, electronic payment systems, as well as the trends in the development of national and international markets of EPS, regulatory requirements in different countries, consumer demands, innovative technologies, payment ecosystems, best practices of individual PayTech companies in the sphere of risk management and innovations.

5. General explanations

Therefore, the financial sector is being rapidly transformed on account of FinTech, the development of which is fostered by boosted e-commerce and e-business that create demand for financial services, especially payment ones. Consequently, it creates prerequisites for the expansion of digital economy, saturating it with the required services and attracting investments.

FinTech is understood as: 1) cross-sectoral industry which ensures financial transactions on various markets of goods, services and capitals; 2) a set of digital financial technologies which are supple-mented with the relevant infrastructure; 3) a system of the markets of specific financial services and information products; 4) a sphere of entrepreneurship and innovations (technological, service, and product). The main purpose of FinTech is to change the method of financial service delivery and the ways of financial resource obtaining to enhance their consumer value. This determines the key objects of digital transformation (organizational models, processes and procedures, etc.), and forms new value chains. The value is created using the specific technological base (web and mobile technologies, artificial intelligence, blockchain, Big Data, Internet of things, cloud computations, biometric technologies, etc.), digital infrastructure (networks, data centers, digital platforms, etc.) and institutions (national and international legislation). FinTech encompasses a wide range of financial services and access to financial resources in different segments (B2B, B2C, P2P, P2B, B2P). The key areas of the application of financial technologies are: payments and transfers (PayTech); remote bank services; web banking (neobanking); financial marketplaces; crediting; investment (asset) management; insurance (InsurTech); personal finances (electronic wallet); digital (electronic) currencies, in particular cryptocurrencies; digital crowdfunding. Such a variety of areas brings together a wide range of FinTech subjects (providers), as follows: traditional financial institutions (banks, insurance companies); FinTech companies (startups); BigTech companies (search engines, online platforms, social networks, media and messengers, hardware producers). Making fundamental

changes, FinTech "undermine" traditional markets, which is particularly related to the implementation of innovative technologies, emergence of electronic currencies, customization of financial services, democratization of financial resources, and it brings about new business models of FinTech and other companies and regulatory environment. Digital finances have significant advantages, but also have certain problematic aspects, particularly those associated with risks. The importance of financial services determines social and economic implications of FinTech, the assessment of which highlights its enhancing functions in the economy (infrastructural, transformational, promotional, etc.). An expansion of FinTech is mostly international and related to trade and capital flows as well as a globalization of financial resource markets. Along with an adaptation of the national systems for the regulation of digital finances, there is a formation of international regulation.

The problem of economic efficiency is central to the development of FinTech. This is primarily because it became a part of value chains, which depend on the economic parameters of financial service delivery. The value of the services themselves results from this factor. The effectiveness determines: 1) digital advantages and satisfaction of the demands of consumers and business entities that use FinTech; 2) the level of the pursuance of interests of FinTech companies; 3) an amount of positive effects of FinTech on the economy and possible minimization of the adverse effects of its development.

One of the largest segments of digital finances is PayTech, aimed to transform the ways of carrying out payment transactions and delivering payment services (covering payments and transfers of funds). An increase in the number, scope and varieties of electronic payment transactions, owing to PayTech, is an evidence of its growing importance. The traditional payment tools are rapidly replaced by digital or electronic (e-payment) ones, which creates a new payment mechanism in the economy. This is more and more the case of cross-border payments, and it evolves in the context of the globalization of digital economy.

Despite the reduction of payments caused by the decline in the economy due to the COVID-19 pandemic, McKinsey predicted sustainable growth by 2025. The predicted dynamics of the scope of Global Payment Revenues is as follows (trillions of US Dollars): 2011 – 1.2; 2015 – 1.5; 2019 – 2.0; 2020 – 1.9; 2021 (assessment) – 2.0; 2025 (forecast) – 2.6 (Bruno, Denecker, Niederkorn, 2021). BCG predicts that the market of electronic payments will have positive dynamics, particularly in retail trend (Table 1) (Sénant, Ampenberger, Mathur, etc., 2021).

Table 1
Income from global payments (forecasts), trillions US Dollars

	2015	2019	2020	2025	2030
Totally	1.1	1.5	1.5	2.1	2.9
Wholesale trade	0.3	0.4	0.4	0.5	0.7
Retail trade	0.8	1.1	1.1	1.6	2.2

Source: Boston Consulting Group

A transfer from the noncash electronic payments has been going on for a long time in the global payment activity, and COVID-19 pandemic also fosters it. In the structure of global income from FinTech, the scope of payment segment for the period of 2016–2019 grew by 100% and amounted to about 8% (6% – non-bank and 2% – bank) (Palandrani, 2019). The scope of the world market of electronic payments in 2020 was estimated at 58.30 billion US dollars. It is expected that, within the period from 2021 till 2028, it will grow at an average annual rate of 19.4%, which will be facilitated by the increased Internet penetration, spread of smartphones, and growth of e-commerce (Freshfields Bruckhaus Deringer LLP, 2021). The number of PayTech companies, payment services and their users are steadily increasing. Over 80% of financial institutions, dealing with payment transactions, cooperate with FinTech companies. In particular, non-monetary financial institutions (non-MFIs) expand their activities. It is clearly demonstrated by the example of EU (Table 2) (Statistical Data Warehouse, 2021).

The main thing that electronic payment systems ensure is timely, rapid, reliable, secure and full transfer of funds (value, equivalent) from one subject to the other one for settlements on liabilities. Meeting the social needs, electronic payment systems ensure the delivery of EPS and the related services, including non-financial services, and they also organize payment processes (inter-account transfers). Based on the

Table 2
Number of payment transactions involving non-MFIs in EU

	2016	2017	2018	2019	2020
Total number of payments (millions)	95,404.5	103,080	112.311	122.089	127.093
Increase in the number of payments (annual percentage changes)	-	8.1	9	8.7	4.1
Number per capita	214.3	231.2	251.5	272.8	283.7
Number per overnight deposit held by non-MFIs	137.2	147.3	160.6	171.3	174.2

Source: European Central Bank

recreated tools and mechanisms, they implement the set-out procedure for the transfer of funds. Technically speaking, it includes a transfer of payment information, processing and storage of the relevant data based on the complex of special software solutions and digital infrastructure, which ensures the transfer of funds. Therefore, the market of EPS is closely linked to the markets of technologies, digital services, data, etc., and it also creates huge opportunities for innovations. Electronic payment systems can be of different types (by purpose, level, entities who use them, payment tools, etc.), functionality and industrial focus, which determines the composition of their elements and infrastructure. Apart from the traditional financial institutions, there emerged new independent EPS market participants – providers of payment services, being non-financial institutions, in particular payment processors and gateways.

The electronic payment involves a transfer of funds from the payer's bank account to the payee's bank account using electronic payment systems, which replace all other mediators. The payment transaction is considered as a stage of commodity-money exchange, which consists in the transfer of monetary value using certain tools in return for the liability. The tools which ensure the electronic payments – the guidelines exchanged between the providers of payment services and bank with no need to process paper-based payments.

EPS is considered as the performance by its provider of the transaction with the application of payment tools, which is carried out using electronic payment systems and results in the transfer of monetary funds from the payer to the payee. Electronic payment systems ensure different types of payment services (card payments, online and mobile payments, direct debiting, standing order, etc.). The comparison between the electronic payment transactions and the traditional ones makes it possible to determine the specific features of their carrying out and significant advantages (high speed, remoteness, low cost, transparency, convenience, etc.); but, at the same time, there are certain challenges, particularly related to risks. However, the level of reliability and security of electronic payments is rapidly increasing.

The issues of effectiveness is mostly considered in terms of the payment processor, which is an independent (non-banking) licensed institution that provides EPS. The following entities take part in the payment transaction: buyer of the certain goods (payer, card owner), seller (merchant), issuing bank (payer's bank, which issued the card), acquiring bank (seller's bank), payment gateway, which ensures payments under online card-not-present transactions (the gateway encrypts and transmits online payment data to the processor) and payment processor, which ensures the transaction by routing and transmitting the information on the transaction (payment data).

The electronic payment transaction is described by different models, in particular: legal model, which takes into account the specifics of a certain jurisdiction or international regulatory system; functionally-transactional model, which describes the functions and interaction between the participants; economic model, which clarifies the participants' interests; technological model, which clarifies the peculiarities of the use of digital technologies. The application of these models enables to give full consideration to the problems of ensuring the economic effectiveness of EPS. In order to carry out the transactions, electronic payment system interacts with the external systems of different level (national or international), including: card, clearing, credit, and settlement systems which create common payment infrastructure. Their parameters and parameters of interaction have a significant impact on the effectiveness of EPS delivery, taking into account regulatory factors.

Various technologies (data repositories; distributed data processing; transaction managers; technologies in the field of cybersecurity, identification, analysis and verification of data; artificial intelligence, etc.), electronic forms of payment tools, application software (data storage systems, document management systems, bank applications, data analysis software packages, etc.) are used within the framework of electronic payment system that ensures their functionality (procedures to identify persons, establish communication with banks, verify accounts, transmit transaction data, comply with security requirements, generate reports, etc.). Therefore, technological model of electronic payment systems enables to identify the areas of improving the effectiveness of EPS, including on the basis of innovations, encompassing various technological components: special software (to issue invoices, process payments, carry out analytics, verification, consulting, etc.); web application and mobile applications as well as mobile services; digital models of certain payment tools; various information products; data management infrastructure. Within the range of electronic payment system functionality to ensure different ways of payment, technical (speed, reliability, etc.), institutional (quality of procedures) and economic (yield income, losses from risks, costs on the implementation of procedures and compliance with requirements, etc.) parameters are taken into consideration, as well as various factors of effectiveness (impact of regulatory standards, level of requirements, standards in the sphere of security, fraud level, etc.).

The economic effectiveness of EPS is an integrated entity and it encompasses the procedures to carry out the transaction itself as well as to comply with various

requirements, rules, and provision of security in all its aspects. The primary goal of electronic payment system defines the basic criteria for achieving and assessing the effectiveness of EPS delivery, and the integrity of its understanding gives rise to a myriad of criteria, the assessment of which can be used to speak about the quality of such services. The effectiveness of EPS delivery can be assessed absolutely as total results and relatively (income to expenses), and also taking into consideration an impact of various profitability and costs (losses) factors. The issues of improving the economic effectiveness of EPS delivery are of strategic importance for their providers. The increased competition, higher quality demands of consumers and business entities, growing level of regulatory requirements, the rise in fraud, etc. – all this puts "pressure" on the profitability, especially when electronic payment systems become an element of the global digital economy.

In terms of the provider, we should highlight the aforementioned external prerequisites for ensuring the economic effectiveness of EPS delivery (overall payment infrastructure) as well as the internal ones (management, technological, organizational, social, intellectual, and innovative factors of PayTech companies). The basic principles of achieving the effectiveness are: complete fulfillment of regulatory requirements, rules and standards, taking into consideration the specific features of different jurisdictions and international regulatory environment; the focus on the increasing demand requirements and better technological, service and product achievements; taking into consideration the global trends in the development of digital economy and FinTech; an increase in the level of technologization and intellectualization of EPS delivery.

The strategic areas of improving the effectiveness of EPS delivery take into account an impact of the external prerequisites and the need to adapt the companies to them on account of internal changes. These areas are the subject to the overall strategy of the company's development and are being developed within the framework of the selected business model. In terms of the strategy, it is necessary to envisage different scenarios of the change in market conditions, regulatory environment, technological advances, trends in digitalization and transformations within the framework of the global digital economy. Marketing is of particular relevance in the context of improving the effectiveness of EPS delivery, encompassing analytical activities and leadership in the development of innovations. Ensuring the high level of cybersecurity and data protection as well as adapting to the updated regulatory requirements became imperative and permanent for electronic payment systems, which is enhanced by the internalization of the providers' activities. Taking into consideration the need to properly meet the requirements which are altered, the measures taken to minimize the costs on satisfying this need are critical, as follows: implementation of special technological solutions; targeted training of specialists; development of external partnership, in particular with other providers of EPS; proactive introduction of higher cybersecurity standards, etc.

The key areas of improving the effectiveness of EPS delivery are focused on the intensification of the payment transaction itself as well as an increase in the value for the consumer, which is also related to the diversification of services and products (Figure 1). Apart from the payment processors, the

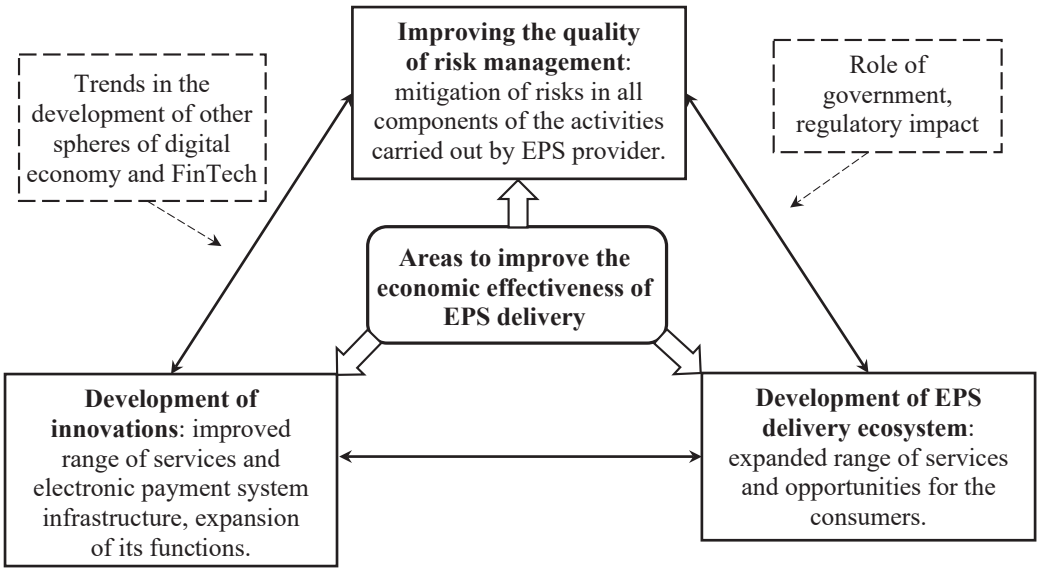

Figure 1. Strategic areas to improve the economic effectiveness of EPS delivery

Source: developed by the authors

recommendations proposed will be also useful for others, in particular payment gateways.

Due to objective reasons, electronic payment systems constantly face a wide range of various risks, and their minimization is a part of the value for the consumer and factor in the maximization of profit for the provider. Therefore, risk management is of paramount importance and becomes central to improving the effectiveness of EPS delivery. Risk management encompasses all aspects of the activities of PayTech companies; it is aimed at mitigating the impact of risks and reducing the costs incurred in connection with them when optimizing the costs on the respective activities, which requires systemic approach at the company level. In particular, it should cover various threats and types of risks of financial as well as non-financial nature (transactional, technical, reputational, compliance, credit, fraud, chargeback, and cybersecurity risks), which depend on a wide range of factors (special solutions, software, staff competencies, partnership, etc.), that also require systemic concept, taking into account market specifics of EPS and industries that are serviced. Risk minimization is a competitive advantage of the companies, which links risk management to marketing. The low level of risks should be associated with a high quality of EPS delivery ecosystem, and their minimization becomes a mandatory area for the introduction of innovations.

The rapid development of PayTech is associated with a high-speed emergence of a large amount of innovations, including financial and auxiliary services, procedures for carrying out payment transaction, information products, various software solutions, digital technologies and infrastructure of electronic payment systems. Innovations become imperative, and their development is one of the strategic areas to improve the effectiveness. The innovations can be aimed at increasing the profit on account of the creation of new value as well as at the optimization, minimization of costs, elimination of problems and defects, which has a direct impact on the effectiveness. Innovations become more and more powerful tool for enhancing the activities and attracting new clients, which is related to the companies with different market strategies. The provider of EPS operates in a complex system of relationships with partners, which requires taking into consideration cluster interactions and chain nature of innovations. Envisaging an expansion of the range of services provided to the consumers, the development of innovations is a basic way of developing the EPS ecosystem, and it also includes such a critical component of the companies' activities as risk minimization.

The improvement of the effectiveness of EPS should take into consideration the effectiveness of the innovative activity itself, which becomes increasingly complex due to the dynamism of the market and technologies. The internal and external aspects of the development of innovations require the respective strategic management, which should include all stages of the creation of innovation, organization of these processes as well as comprehensive development of the companies' innovative capabilities and ensuring the promotion of innovations. Due to the too high innovative risk, the innovative activities should include risk management. Under modern conditions, it is expedient to use the models of open innovation, which provides for an active interaction with the consumers of EPS that can be associated with a high quality of their ecosystems and mitigates the innovative risk.

PayTech moves towards the platform approach, which allows for the development of integral ecosystems of EPS delivery, expanding the range of financial and auxiliary services provided to the consumers as well as offering additional information products and tools which are customized according to their requests (including business entity's requests as a user). It is a new approach to the creation of value, and it requires an expansion of functional capabilities of electronic payment systems and cluster partnerships. The creation of more complex multifunctional electronic payment system provides for the relevant innovative activity. An introduction of a wide range of services and tools for the user (for example, online shop) requires the appropriate support from EPS provider (development of technology, provision of facilities, maintenance support, upgrading, compliance, etc.), At the same time, such comprehensive financial and technological service should meet market requirements for a range of services, capabilities, quality and prices, while complying with even more complex set of regulatory standards. It not only transforms the company's business model, but also requires the appropriate strategic management and marketing, and needs to be considered in terms of effectiveness, which depends on the purposes and configuration of the ecosystem. Building the payment systems requires consideration to be given to the trends in the development of digital economy and demands for EPS.

The proposed areas to improve the effectiveness of EPS delivery enable to improve the methodology for creating new or enhancing the existing electronic payment systems, while allowing for their complication in terms of functions, resources, business processes, etc. Regulatory policy naturally has a great impact on the strategic areas of improving the effectiveness of EPS delivery. The government plays an important role in developing PayTech, promoting innovations, and minimizing external risks. In order to address multiple challenges faced by electronic payment systems, the market of which is still under

Table 3
Possible government activities to support PayTech companies to improve the economic effectiveness of EPS delivery

Areas	Activities	Impact on effectiveness
1. Development of ecosystem of EPS delivery	Supporting the promotion o digital platforms, enhancing the profitability of auxiliary financial and information services; development of digital infrastructure and clusters for PayTech;	Penetration to the new markets; expansion of the sources of obtaining the profit; enhancing the consumer service quality; sustainable development of enterprises.
2. Development of innovations	Creation of the targeted technological platforms; public-private partnership for the development of innovations, particularly in social sphere; government grants, innovative patents; special platforms for startups aimed to attract venture investments and raise other funds;	Expansion of the range of services and information services which are proposed; advancement of technological base; opening new spheres of activities; reduction of costs on innovations and an increase in the profitability of activities.
3. Enhancing the quality of risk management	Supporting the cooperation in the risk management sphere; promoting the development of specific technologies and software tool; sharing data on frauds and other risks; assistance in introducing international standards in the sphere of risks;	Enhancing the consumer service quality; reduction of costs and losses; stability of obtaining the profit; reduction of costs on security; expanding the opportunities for partnership.

Source: developed by the authors

development, it is reasonable for the government to create special modes, for example, in the form of regulatory "sandboxes", within which the companies obtain favorable conditions and are able to adapt to regulatory requirements.

6. Discussion and practical recommendations

The intensification of electronic payment systems should be considered in the broad context, taking into consideration the development of other industries of digital economy and FinTech spheres. Within the framework of the proposed strategic areas of EPS, it is critical: 1) to identify the potential sources of risk increase and trends in the altering regulatory requirements; 2) to prioritize the innovative activities aimed to enhance payment and auxiliary services, electronic payment system infrastructure, risk management tools and RegTech; 4) to develop technological systems to support the development and promotion of large-scale innovations, taking into account the specific features of the industries of digital economy; 5) to determine possible configurations of the ecosystem of EPS delivery in relation to specific industrial markets. The specified areas to improve the economic effectiveness of EPS delivery are a basis for the development of government activities to support PayTech companies (Table 3).

The proactive national position in respect of the development of electronic payment systems will enable to achieve greater participation in the development of this industry and create integrated structural solutions to regulate it, which is required to adapt the existing systems of government regulation, encompassing all its components (legal basis, licensing, overcoming market "gaps", elimination of risks, etc.). In terms of the government support to enhance the effectiveness of EPS delivery, it is proposed to focus on the application of regulatory (normative) "sandboxes", development of SupTech (the use of technologies by the government for supervisory purposes) and RegTech (the use of technologies by the government for regulatory purposes, and by business – to comply with the requirements). Concerning the regulatory "sandboxes", the emphasis should be laid on the need to take into consideration not only their capabilities and advantages, but also the defects and restrictions, as well as on ensuring their special purpose in some individual cases. In particular, it is related to fostering various innovations, at the same time, searching for the new approaches to the regulation of electronic payment systems, learning to minimize potential risks (especially those related to regulation), and ensuring an introduction of international standards. In order to enhance the innovative function of regulatory "sandboxes", it id proposed: to supplement them with special modes of government support for technological innovations; to establish communication between startups in PayTech and other areas of FinTech, which develop and test their products, as well as communication between universities; to create technological platform and knowledge bases aimed to create innovations in EPS sphere; to provide additional counseling and training for business. Government support through the regulatory "sandboxes" should be supplemented with other kinds of benefits and R&D support.

Taking into account that government regulation, control and standards impose an additional burden on business, new means to facilitate the collection and processing of normative data is an economically reasonable response to the complication of regulatory systems on account of the process automation in different aspects (report submission, transaction

monitoring, compliance control, audits, risk management, etc.). The advantages of SupTech and RegTech can be considered in terms of the government as a tool for regulation, and in terms of business entities – as a way to optimize mandatory processes. It is critical to expand the application of SupTech and RegTech in this sphere as well as: 1) to promote partnership between business entities and government to advance such technologies; 2) to facilitate innovation-driven activities of business entities related to the creation of their own RegTech; 3) to preventively create SupTech and RegTech for the innovations promoted on the market; 4) to create conditions for easier adaptation by business entities of national SupTech and RegTech, especially those related to the international standards, in particular on account of testing modes; 5) to disseminate the global and national progressive experience in the use of SupTech and RegTech, to facilitate the expansion of best practices and training. Unleashing the potential of electronic payment systems in the global digital economy is impossible without the promotion of international SupTech and RegTech, as well as enhanced international cooperation in the area of building the institutional and technical infrastructure of EPS delivery.

8. Conclusion

Digital economy turned to be one of the key trends in social and economic transformations. One of its major trends is FinTech, which encompassed various financial services, payments, crediting, etc. The development of electronic payment systems, which create the appropriate infrastructure of the global digital economy, becomes especially important for e-commerce. Taking into account the increasing consumer demands for electronic payment systems, high level of competition and regulatory requirements, the problem of improving the economic effectiveness of EPS delivery becomes the most critical, especially at the international level. From the standpoint of the providers, three strategic areas to improve the effectiveness of EPS delivery have been identified: enhancing risk management quality; development of innovations; development of the ecosystem of EPS delivery. All of them are closely related to the company development strategy and marketing, which acquires new social and economic quality. While implementing the above-mentioned areas, its relation to the development of other spheres of digital economy and FinTech should be taken into consideration, in particular in terms of potential risks and priorities for innovations. It also enables to determine special government support activities for PayTech companies. In terms of the effectiveness of EPS delivery, it is proposed to focus on the application of regulatory "sandboxes", development of SupTech and RegTech, the importance of which is expected to be studied in the future papers.

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