

Article

The Determinants of PayTech's Success in the Mobile Payment Market—The Case of BLIK

Joanna Błach ^{1,*} and Monika Klimontowicz ²

¹ Department of Corporate Finance and Insurance, Faculty of Finance, University of Economics in Katowice, ul. 1 Maja 50, 40-287 Katowice, Poland

² Department of Banking and Financial Markets, Faculty of Finance, University of Economics in Katowice, ul. 1 Maja 50, 40-287 Katowice, Poland; monika.klimontowicz@ue.katowice.pl

* Correspondence: joanna.blach@ue.katowice.pl

Abstract: FinTech and its interaction with banking is widely discussed today as a new phenomenon notwithstanding the relationship between technology and financial services is not a new topic. Most of the research focuses on innovations and determinants of their adoptions including among other innovations in the payment system. The studies dedicated directly to PayTechs as a special kind of a FinTech entity and its market activity are a relatively new field of research. This paper aims to fill this gap. The multidimensional character of this exploratory research causes the necessity to apply various research methods, including both inductive and deductive methods, together with comparative analysis. The theoretical analysis conducted in the paper for defining PayTechs from the perspective of business model and market behavior was based on an in-depth literature review. In this section, the inductive method and comparative analysis were mostly applied. The empirical part of the paper includes the analysis of quantitative data published by the National Bank of Poland (NBP), Central Statistical Office (GUS), and Bank for International Settlements (BIS). The subject of the case is the Polish Payment Standard referred to as BLIK implemented in Poland in 2015 for mobile payments. The BLIK diffusion is measured by the number of entrants and acceptants as well as the scope of transactions while the adoption by the number of customers using BLIK in everyday transactions. The results present the market behavior of BLIK as an open business model and the key success factors of BLIK adoption and diffusion and the determinants for further open payment innovations' development. The newly developed definition of PayTechs, the identification of the major components of the PayTech open business model, as well as the indication of the key success factors of adoption and diffusion of m-payments, constitute the original contribution of the paper.

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1. Introduction

Dynamic changes in the technological, social, economic, and legal environment influence established paradigms of banks and other financial service providers operating in the market. Today, technological evolution has become a fundamental factor for the process of creating value for banks and their customers. New market players, which applied new business models and innovations based on modern technologies, redefine the way of fulfilling customers' needs. They are usually identified with FinTech. FinTech is one of the phenomena which are involving much interest and debate in modern finance, but still, it is not unequivocally defined, either in theory or in practice. Market participants and regulators use different terms for the same activity, or the same term for different ones (Schueffel 2016; Harasim and Mitrega-Niestrój 2018; Thakor 2020; Ehrentraud et al. 2020, p. 10).

The term FinTech as an acronym for financial technology, for the first time, was used by A. L. Bettinger for a combination of bank expertise with management techniques and

the use of computers (Schueffel 2016). Independently, the same term was used at the beginning of the 1990s as a name of one of Citigroup's projects which assumed the bank's technological cooperation with players outside the financial sector (Kerényi and Molnár 2017). Today's definitions stress different aspects and senses of this phenomenon referring to the technology itself or to entities that use technology and operate inside and outside of the traditional, regulated financial system and offer financial services. However, many definitions have a narrower approach to FinTech and emphasise the new market players (Table 1). The FinTechs are not only specialized startups (although they play a major role in the development of the "FinTech industry") but also grownups (maturing firms) that enable, enhance, and disrupt financial services using innovative technology.

Table 1. The selected definitions of FinTech.

Author	FinTech Definition
Arner et al. (2015)	the application of technology to finance
Micu and Micu (2016)	new sector in the finance industry that incorporates the whole plethora of technology that is used in finance to facilitate trades, corporate business or interaction and services provided to the retail customer
Kim et al. (2016)	service sector which uses mobile-centered IT technology to enhance the efficiency of the financial system; as a term it is compound of "finance" and "technology", and collectively refers to industrial changes forged from the convergence of financial services and IT
World Economic Forum (2017)	new entrants (understood as market participants outside the traditional financial system that recently entered a market, use innovative technologies, and change financial services' business models) that promised to rapidly reshape how financial products were structured, provisioned, and consumed
Das (2018)	any technology that eliminates or reduces the of costs financial intermediation
Dimler et al. (2018)	the industry in which financial services are changed with technology
KPMG (2018)	a portmanteau of finance and technology
Financial Stability Board (2017)	technology-enabled innovation in financial services which could lead to new business models, services, products, applications, processes in the area of financial services

The term FinTech includes three categories: fintech activities, enabling technologies, and policy enablers. Fintech activities can take various forms and may be performed in different sectors of the financial industry. As a result, alongside the term FinTech, which stands for Finance + Technology, other neologisms are appearing: InsurTech, PayTech, PropTech, WealthTech, RegTech, LegalTech, BigTech, etc. (Harasim and Mitreġa-Nieštróġ 2018; BBVA 2018). Enabling technologies are those that make innovation possible in the provision of financial services and, as such, form the backbone of fintech activities. Policy enablers refer to public policy measures and initiatives that support the development of fintech activities and the use of enabling technologies (Ehrentraud et al. 2020, pp. 1–2). Following this, in this work, we focus on FinTech activities in the retail payment market. The entities operating in this market are referred to as PayTechs (Harasim and Mitreġa-Nieštróġ 2018; Thakor 2020; Polasik et al. 2020). The vast majority of existing definitions mostly focus on technology in the field of payments with no reference to their business models and market activity (Thakor 2020). However, PayTechs as organisations can be an interesting subject of analysis, as they can compete, cooperate, or have a coopetitive relationship with other entities operating in the payment sector, such as banks and

technology companies. Thus, they should be defined as new market participants incorporating technology and new business models for payment methods' development and as a result reshaping the payment market. The dynamic growth of non-bank PayTech entities is strictly connected with the concept of "open banking" (Zachariadis and Ozcan 2016) and the second Payment Service Directive (PSD2), and particularly of its novel access allowance to bank accounts for a new category of entities providing payment services—third party providers (TPP), including non-bank entities (Drasch et al. 2018; Polasik et al. 2020).

Whereas FinTechs have already been a subject of studies focusing on factors of their development, cross-organisational cooperation, competition with banks, their impact on the stability of the banking sector, and blockchain technology usage to financial market applications, the field of PayTech entities were studied so far mainly in addition to other aspects of FinTech (Szpringer 2016; Gomber et al. 2017; PWC 2017; Grzywacz and Jagodzińska-Komar 2018; Folwarski 2018; Hill 2018; Górka 2018; Milic-Czerniak 2019; Polasik et al. 2020) or as an alternative payment innovations providers. In this case, the majority of studies focuses on innovation drivers and barriers of adoption, as well as on the relationship between mobile innovations and their impact on regions, financial inclusion, customers' well-being (Nejad 2016¹; Weichert 2017; Górka 2018; Szumski 2020; Tang et al. 2021). In the case of payment innovations, the extant literature characterizes particular types of new developments: e-wallets (Górka 2016; Yang et al. 2021; Daragmeh et al. 2021), online and mobile payments (Li et al. 2020; Hwang et al. 2021; Zhao and Bacao 2021) and digital currencies (Goodell et al. 2021; Civelek et al. 2021). These analyses are conducted mostly for selected countries or geographical locations, as cultural and demographic factors are important drivers of innovation adoption. Such studies, for the Polish payment market, were conducted recently by, e.g., Świecka et al. (2021), Buszko et al. (2019), Borowski-Beszta and Jakubowska (2018), or Chmielarz and Zborowski (2017).

To the best authors' knowledge in Q1 journals, only two scientific papers refer directly to PayTech as an entity. The first presents a case study and aims to assess the role of Financial Information Network and Operations PayTech Limited referred to as FINO in rural financial inclusion in India (Maitra and Upadhyay 2017). The second includes the results of quantitative analyses of the impact of the PSD2 directive on the development of the PayTech sector measured by the number of newly established PayTech companies in the European Union (Polasik et al. 2020). Table 2 presents the number of counts of the word PayTech being used in scientific article's titles, abstracts, and full texts searched as well as the number of definitions provided for the term. In reference to the proposed definition of PayTech and the lack of research conducted from the organizational perspective, the objective of this research is to analyze PayTech's key success factors from the perspective of a business model and a firm's market behavior. As PayTechs and their operating activity is thought to be a potential banking market disruptor their analysis remains the current issue.

Table 2. Counts of the word PayTech in data bases.

Sources	Hits in Title	AND/OR Abstract	AND/OR Full Text	Definition Provided
EBSCO	2	2	2	1
Emerald	0	0	0	0
Cambridge Journals	0	0	0	0
Oxford Journal— Economics & Finance	0	0	0	0
ProQuest	0	1	6	0
SAGE	0	0	0	0
SCOPUS	2	2	2	1
Springer Link	0	0	1	0

Wiley Online Library	0	0	2	0
Total corrected for duplicated sources	2	3	11	1

FinTech development is influenced by both external and internal factors. External factors include: technology developers, preferences of customers using financial services, other financial institutions, and the legal environment in which these entities operate (Alvarez and Barney 2013; Davidsson et al. 2018; Lee and Shin 2018; Ramoglou and Tsang 2016; Shane and Venkataraman 2000; Kliber et al. 2021). Moreover, external factors indicate technological progress, demographic trends, regulatory changes, and changes in the socio-cultural, economic, and political environment (Davidsson et al. 2018; Shane and Venkataraman 2000). The plethora of factors influencing FinTech's development leads us to the question, which of them are those of key importance in the case of PayTech. As a result, the first research question is formulated as follows:

Q1: What are the main external PayTech's success factors?

Among the internal factors of PayTechs' development, their organizational culture and structure allowing them to deploy new technologies faster than traditional banks, and thus address customers' expectations better, are mostly discussed (Davies et al. 2016; Jagtiani and John 2018; Leong et al. 2017; Saksonova and Kuzmina-Merlino 2017; Szpringer 2019; Vives 2019). PayTechs' operating activity results from the development of new technology, new organizational forms, the integration of internal and external ideas and the new pathways to enter the market what is relevant with the open innovation concept (Chesbrough 2003; Saebi and Foss 2014; Vanhaverbeke and Chesbrough 2014). This concept notes that the source of value is not only the innovation itself but the better business model applying it. It may be treated as the next generation of innovation models or the new variant of the innovation network model which is currently developing (Gassmann et al. 2010). The open innovation reflects the virtual networks of entities sharing information and knowledge for creating value based on innovations (Tidd et al. 2005; Huizingh 2011), emergent networks resulting from long-term cooperation (Tidd et al. 2005; Cowan et al. 2007; Rycroft and Kash 2014), and engineered (designed) networks established for creating and supporting innovations (Powell et al. 1996; van Aken and Weggeman 2000; Tidd et al. 2005; Dhanaraj and Parkhe 2006; Batterink et al. 2010). In reference to the main objective of the paper, we analyze open innovations from the business model perspective. A business model should enable gaining a competitive advantage over rivals and maintaining a desirable market position. An efficient business model is a long-term method of using resources in creating value for customers and other stakeholders. A business model may be defined as a philosophy of a given organisation's market activity and a conceptual tool expressing its business logic which usually means a simplified way that explains the relation between internal and external factors that influence reaching a given organisation's objectives and value creation. The review of business model definitions and components led to the conclusion that the ability to create and deliver the original value proposition for customers is its core foundation (Saebi and Foss 2014; Klimontowicz and Harasim 2019). The business model for open innovations benefits from the integration of external knowledge sources. Based on the literature review on open innovation and business models, in this paper, the open business model is defined as the architecture of a firm and its network of stakeholders established for creating, delivering, and developing value for customers to generate profitable and sustainable market competitive performance. Saebi and Foss (2014) study results stated that companies benefit differentially from adopting open innovation strategies what may be the result of companies' different business models matching the open innovations with business model dimensions. It inspired us to ask the second research question:

Q2: What elements of PayTech's business model are the key market success determinants?

To address the paper objective, the research is based on the case study approach. The case study analyzes key success factors of the Polish Payment Standard (PPS) referred to as BLIK operating mostly in the Polish retail m-payment market, which is one of the most innovative in Europe. The paper is structured as follows: Section 2 presents materials, methods, and the data collection process. Section 3 includes the results concerning the situation on the Polish retail payment market and BLIK characteristic, its role in developing mobile payments and business success factors. This part is based on descriptive statistics for selected market data. The paper is concluded by providing main findings and establishing the scope for further studies.

2. Materials and Methods

Defining PayTechs' key success factors from the perspective of a business model and a firm's market behavior requires analyzing the payment market landscape, as well as factors of diffusion and adoption of payments innovation. To address this objective, the research is based on the case study approach. Case study as a research method enables to make an in-depth analysis of particular innovation, searching for reasons and determinants of the innovation process, allowing to enrich the knowledge of non-conceptualized issues (Yin 2012), identifying the complex interactions between the technological and financial innovations, as well as the importance of the open innovation concept and value of business network in this regard. As recommended by Yin (2012) and Johansson (2007), the cases selected for analysis should be easy subjects, maximizing the transferred knowledge within a limited framework. The case study as a research method has been applied in many studies on innovation as analyzed by Goffin et al. (2019) and used by, e.g., Urbinati et al. (2020). It is also used to analyze financial innovation, e.g., Esty (1999, 2001), La Torre et al. (2019), Karagiannaki et al. (2017), Maitra and Upadhyay (2017).

Thus, following these researchers and having in mind the basic misunderstandings of case study research as pointed out by Flyvbjerg (2006), we have decided to analyze the Polish payment standards (PPS) referred to as BLIK which is the example of PayTech entity. BLIK was introduced in 2015 and since then is continuously increasing its market share and the scope of mobile payment solutions offered to the system participants. Currently, BLIK solutions are offered by 15 banks operating in Poland to 18.3 million users, who executed payments worth 56.9 PLN billion in 2020. In 2018, the market share of BLIK represented c.a. 95% of the total value of transactions executed via non-card payment schemes, while the other payments solutions had, respectively: YetiPay—2.84%, mPay—2.28%, SkyCash and Peopay—less than 1% market share (NBP 2019a, https://www.nbp.pl/systemplatniczy/system/system_platniczy_w_polsce.pdf, accessed on 10 July 2021, p. 62). In 2020, BLIK was the most popular solution used while making in-store mobile payments in Poland—38% of consumers used BLIK according to research provided by Statista (2021) (<https://www.statista.com/statistics/1101542/poland-financial-products-used-for-in-store-mobile-payments/> accessed on 15 August 2021). Contactless payments with a smartphone (Visa or MasterCard), as well as payments with a watch from Apple Pay, Google Pay, Garmin Pay, or Fitbit Pay were used by 27% consumers. It might mean that BLIK is able to compete successfully with such big market players. In 2019, BLIK signed the cooperation agreement with Mastercard, which enables BLIK contactless payments to be possible worldwide, in all POS terminals accepting Mastercard contactless payments (in July 2021 contactless payments were offered to the first customers of BLIK). Other agreements were signed with Adyen and PPRO (e-commerce partners), which provided the customers with BLIK payments in many global e-commerce platforms. In 2020, BLIK joined the European Mobile Payment Systems Association (EMPSA), which includes 14 mobile payment systems in Europe and unites 70 million mobile payment users. The EMPSA aims at enabling seamless mobile payment across Europe by offering roaming solutions among participating payment systems. (EMPSA 2021, <https://empsa.org/#news>, accessed on 14 August 2021).

Thus, the current BLIK market position in the Polish payments market, as well as its contribution to mobile payments development, justifies our focus on this example. Analyzing determinants of BLIK success factors from the perspective of a business model defined as the architecture of a firm and its network of stakeholders established for creating, delivering, and developing value for customers to generate profitable and sustainable market competitive performance will contribute to the open innovation theory in the field of organisational innovations, as well as developing research on the business model concepts. In our research, we have decided to focus on the macroeconomic environment, technological infrastructure, legislative framework, and socio-demographic conditions for the development of financial innovations in the Polish retail payment market, which is consistent with the determinants of payment innovations presented in previous research (e.g., Szpringer 2016; Harasim and Mitreġa-Niestrój 2018; Golubić 2019; Polasik et al. 2020). In this way, the retail payment market landscape is characterized by comparing the situation in 2014 (a year before the implementation of BLIK) and 2018 (covering the most recent data). Against this background, the detailed characteristics of the BLIK payment system is provided with an analysis of market data, illustrating its adoption and diffusion from its inception in 2015 till the first quarter of 2021 to identify the factors influencing this process, also in the context of the COVID-19 pandemic impact.

The triangulation of data sources is achieved by using various data providers: National Bank of Poland (NBP), Central Statistical Office (GUS), Bank for International Settlements (BIS) and other organizations concentrating on the development of the payment systems and instruments.

3. Results

3.1. The Retail Payment Market Landscape in Poland

Payment services and instruments have always been at the forefront of technological change and innovation. Since the 1970s, one may observe a developing stream of innovations that led to the transformation of payment processes resulting in better access, higher functionality, lower transaction costs, increased quality and efficiency as well as improved safety of the transactions. The payment sector is currently undergoing digital disruptions aiming at a faster and safer settlement of domestic payments, to meet the expectations of consumers.

The process of financial innovation is determined by many factors related to the general economic condition in the country, the development of the technological infrastructure, as well as the legislative environment and the attitude of the end-users towards the application of new payment solutions and instruments. Following the approach presented by (Polasik et al. 2020), we analyze the selected data illustrating the general economic condition and retail payment system in Poland in 2014 (a year before the introduction of BLIK) and 2018 (the most recent data available) (Table 3). As suggested by (Hernández-Murillo et al. 2010), the country level demographics are important for the diffusion of online banking innovation.

Poland with over 38 million inhabitants is the fifth biggest economy in the European Union. Although GDP is growing, it is still relatively low as compared to other European Union member states. As provided by Eurostat (Eurostat 2021, https://europa.eu/european-union/about-eu/figures/living_en#population, accessed on 11 August 2021), GDP per capita in PPS (purchasing power standard) calculated for Poland equals 71 and places Poland almost at the end of ranking (on the 20th place together with Hungary and Slovakia). Conversely, the richest country—Luxembourg—has GDP per capita in PPS over 260. The financial sector in Poland is dominated by credit institutions, which have over 70% of financial sector assets. In 2018, assets of the financial system as a percentage of GDP in Poland equaled 128.3%, while in the Euro area, it amounted to 466%. (NBP 2019a, Financial system in Poland, https://www.nbp.pl/en/systemfinansowy/fsd_2019.pdf, accessed on 10 July 2021, pp. 12,

16). Internet banking is gaining popularity in Poland—in 2019 over 47% of customers were using internet banking. However, this result is relatively low as compared to other European Union countries—Poland was ranked 19th in the EU with regard to the popularity of internet banking. Almost 58% of internet banking users accessed the internet via mobile applications (NBP 2019a, p. 31). Most internet banking operations include payments and transfers. Thus, the market share of cashless payments in Poland is growing over time (compare Table 3). In Poland, in 2018, the cashless retail payments were dominated by payment cards—representing above 62% of all transactions, followed by credit transfer—accounting for 37% of all transactions, while the remaining instruments (cheques, direct debits) were used in less than 1% of transactions (NBP 2019a).

Table 3. Selected macroeconomic and retail payment system data characteristics for Poland.

Specification	2014	2018
Total population (million)	38.48	38.41
GDP (PLN billion)	1720	2121
Credit institutions	679	647
in this: commercial banks	64	61
Number of current accounts for individual clients (million)	38.5	40.3
Deposits with access via internet (as % in total number of deposits)	59%	65%
Other institutions offering payment services	28	41
Payment cards (million)	36.1	41.2
ATMs (thousand)	20.5	22.8
POS terminals (thousand)	398.2	786.2
Credit transfer per capita	51.38	73.68
Card payments per capita	48.66	123.18
Cashless payments per capita (PLN)	972.66	1670.7
Cashless payments in total retail payments (%)	20	43
Contactless payments as part of card payments (%)	32	71

Source: own elaboration based on data provided by NBP (2021a, 2021b)

https://www.nbp.pl/systemplatniczy/system/system_platniczy_w_polsce.pdf, accessed on 8 July 2021 and GUS (2020a) <https://bdm.stat.gov.pl/>, accessed on 10 July 2021.

The main drivers of the digitalization of payment systems are technological developments. According to the Digital Economy and Society Index (DESI) for 2020, Poland was in 24th place with the index equaling 45%, while the EU-28 average was above 50% and the highest result for Finland reached 71% (European Commission 2020, <https://digital-strategy.ec.europa.eu/en/policies/desi>, accessed on 11 July 2021). This indicates the relatively smaller potential of the Polish economy for supporting the development of digital services and the society's lack of readiness to make use of the services offered in this way, including financial services. However, the banking sector in Poland has been classified as one of the 'digital champions' in the report prepared by Deloitte on digital banking maturity (Deloitte 2020, <https://www2.deloitte.com/pl/pl/pages/financial-services/articles/digital-banking-maturity-2020.html>, accessed on 10 July 2021). According to this survey, Polish banks are very well developed in terms of using digital technologies. Such a high score in the ranking was achieved even before the COVID-19 pandemic (e.g., in ranking for 2018), which had a significant impact on the development of digital bank channels and accelerated their implementation (in particular, solutions related to easing access to contactless payments and mobile banking lie in the centre of these developments).

Data illustrating internet access and the popularity of e-commerce in the Polish economy are presented in Table 4, which indicate the ease of access to the internet both

for households and enterprises, as well as the increasing tendency of using the internet as a channel for purchasing products and services (in the second half of 2020, the value of internet transactions in Poland reached 10.9 PLN billion, while in the second half of 2018, it was equal to 5.1 PLN billion, NBP 2021b). This leads to higher demand for e-payment solutions postulated both by the payers (merchants) and the payees (their customers) searching for safe, cheap, convenient, and fast payments for everyday purchases. This also signalizes the growing trust in the use of electronic services, including payment solutions within the information society. The development of retail mobile payments is linked to mobile access to internet. The situation in Poland is also steadily improving as in 2014 only 28.2% of households had a mobile broadband connection and in 2020 it increased to over 66%.

Table 4. Internet access as the key factor determining the development of m-payments.

Specification	2014	2020	Change
Households with access to internet at home	74.8%	90.4%	↑21%
Households with mobile broadband connection	28.2%	66.7%	↑136%
Individuals purchasing via internet	34.2%	60.9%	↑78%
Enterprises with access to internet	93.1%	98.6%	↑6%
Enterprises receiving orders via internet	9.5%	16.5%	↑74%

Source: own elaboration based on data provided by: GUS (2020b) <https://stat.gov.pl/obszary-tematyczne/nauka-i-technika-spoleczenstwo-informacyjne/spoleczenstwo-informacyjne/wykorzystanie-technologii-informacyjno-komunikacyjnych-w-jednostkach-administracji-publicznej-przedsiębiorstwach-i-gospodarstwach-domowych-w-2020-roku,3,19.html>, accessed on 10 July 2021 and GUS (2015) <https://stat.gov.pl/obszary-tematyczne/nauka-i-technika-spoleczenstwo-informacyjne/spoleczenstwo-informacyjne/spoleczenstwo-informacyjne-w-polsce-wyniki-badan-statystycznych-z-lat-2011-2015,1,9.html>, accessed on 16 August 2021.

Primary regulations for the payment system and payment schemes in Poland include: the Act on Financial Market Supervision, the Settlement Finality Act², the Payment Services Act³, the MIF Regulation⁴, the SCA Regulation⁵, the PSD2⁶ together with secondary legislation. A detailed analysis of the law regulations related to bank-FinTech cooperation, including the payment services is presented by Gebski (2021). Retail payment systems in Poland under the oversight of the President of NBP (National Central Bank) are classified as:

- systematically important retail payment systems: Elixir operated by the National Clearing House
- prominently important retail payment systems: Euro Elixir operated by the National Clearing House
- other retail payment systems:
 - instant payment system: Express Elixir operated by the National Clearing House, Blue Cash operated by Blue Media S.A.
 - card payment system: National Clearing System (KSR) operated by First Data Polska S.A., Inkart operated by the National Clearing House
 - mobile payment system: BLIK Mobile Payment System operated by Polish Payment Standard (PPS LCC)

The assignment to one of these categories depends on the selected criteria, such as: the financial impact, degree of market penetration, cross-border dimension, and settlement for other FMIs (NBP 2019b, payment system oversight policy, https://www.nbp.pl/en/system_platniczy/payment-system-oversight-policy-Oct-2019.pdf, accessed on 15 June 2021).

Innovations in retail payments in Poland began to emerge in the 2000s, when the first mobile payment solutions were launched—mPay by one of the first PayTechs operating

on the Polish market. Since that time, the new mobile payment solutions are regularly introduced to the market. Some of them are offered by PayTechs and used for micropayments, enabling fast and safe purchases of services via internet channels (tickets on buses, trains, events, and prepaid phones, e.g., mPay, SkyCash). Others are developed by banks and linked to their mobile banking applications (e.g., IKO, Peopay, BLIK). Recently, large international technological players: Google and Apple started offering e-payments for their customers (Google Pay, Apple Pay). Polish consumers may also make m-payments using smartwatches, e.g., Garmin Pay or Fitbit Pay offered by wearables producers Garmin and Fitbit. Another trend is linked to the development of the new payment solutions offered by non-financial and non-technology firms (e.g., grocery stores) to their customers, e.g., Lidl Pay or Żappka Pay. M-payments are also offered to Polish customers by the foreign PayTechs: Monese, N26, Revolut, Curve, DiPocket, iCard, and TransferWise (NBP 2021b). The development of such payments was accelerated by the adoption of the Payment Service Directive 2 (PSD2) in November 2015 (implemented in Poland in 2018), which created the opportunity for third-party providers (TPP) and local PayTechs to operate on a Pan-European level. The detailed analysis of the mobile payment systems in Poland is presented in the study by: Chmielarz and Luczak (2016) and the NBP reports (e.g., NBP 2021b). The brief characteristics of the most important retail mobile payments solutions in Poland is presented in Table 5.

Table 5. The most important retail mobile payments solutions in Poland.

Year	Mobile Payments System/Originator & Sector	Types of Payments	Application
2003	mPay/mPay S.A. (PayTech)	Remote	Public transport, parking payment, prepaid phones, online tickets
2010	Skycash/SkyCash Poland S.A. (PayTech)	Remote	Public transport, parking payment, prepaid phones, online tickets
2011	YetiPay/YetiPay sp. z o.o. (PayTech)	Remote	e-commerce, P2P
2013	IKO/Bank PKO BP (later used in BLIK) (banking sector)	Remote, contactless	POS, ATM, e-commerce, P2P
2013	Peopay/Bank Pekao S.A. (banking sector)	Remote, contactless	POS, ATM, e-commerce, P2P
2015	BLIK/PPS: cooperation of 6 banks (PayTech + banking sector)	Remote	POS, ATM, e-commerce, P2P
2016	Google Pay/Google (IT/PayTech)	Remote, contactless	POS, ATM, e-commerce
2018	Apple Pay/Apple (IT/PayTech)	Remote, contactless	POS, ATM, e-commerce

Source: own elaboration based on data provided by NBP (2019a)

https://www.nbp.pl/systemplatniczy/system/system_platniczy_w_polsce.pdf, accessed on 10 June 2021.

As indicated above, currently, the dominant player on the Polish retail payments market (excluding card schemes) is BLIK; thus, further analysis will be focused solely on this m-payments solution.

3.2. The Characteristics of BLIK and Its Market Behaviour

3.2.1. Evolution of BLIK as an Open Mobile Payment Standard

BLIK is one of the nationwide, universal mobile payment solutions that uses cutting-edge technologies (Figure 1). This open payment standard allows users to make payments and transfers by using smartphones with Internet access and the bank's app. The BLIK users may generate checks and make instant-money transfers to customers or different banks. Each transaction has a unique six-digit code that can be used for 2 min after it is generated. Users must also confirm each transaction in their bank's mobile app (BLIK 2021, www.blik.com, accessed on 10 July 2021).

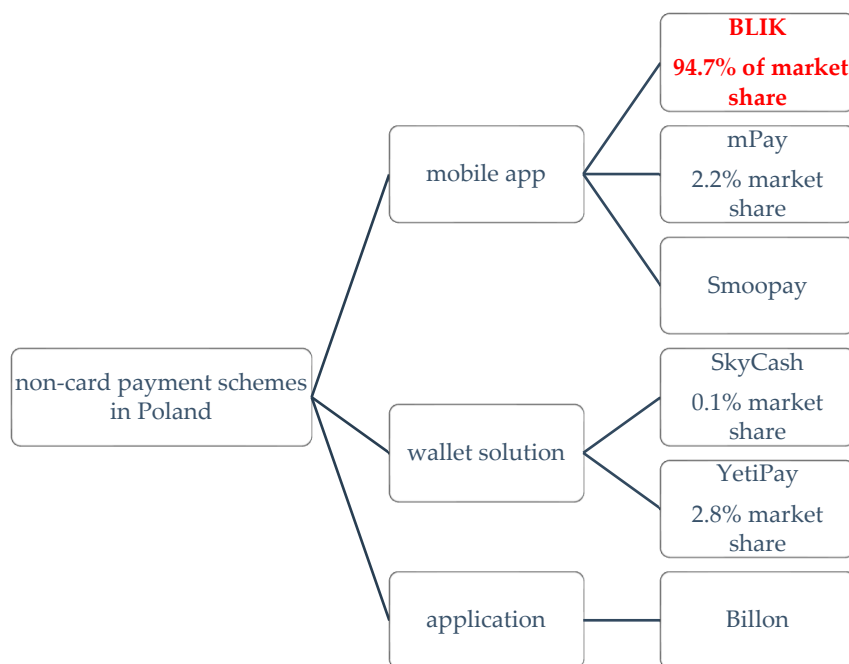


Figure 1. BLIK on the Polish retail payment market. Source: own elaboration based on information provided in the document NBP (2021a), list of payment systems under the oversight of the President of NBP; https://www.nbp.pl/en/system_platniczy/list-of-systems-and-schemes.pdf, accessed on 8 July 2021.

The system was developed by the Polish Payment Standard LCC (PPS) in 2015 and is an example of a PayTech's market success. BLIK was created as a response to the customers' needs who were searching for simple and convenient transfers between customers, banks, and acquirers. The original shareholders of PPS LCC were six major banks operating in Poland: Alior Bank, Bank Millennium, Santander Bank Polska, ING Bank Śląski, mBank, PKO Bank Polski. In 2020, Mastercard became the seventh shareholder of PPS (Table 6). It is worth noticing that the system is also available to (open for) customers of other banks, which are not shareholders of the PPS. Today, this group of banks consists of: Getin Bank, BNP Paribas, Credit Agricole, Bank Pekao S.A., SGB Bank, BOŚ Bank, Nest Bank, Noble Bank, Bank Pocztowy, PBS Bank, Cooperative Bank in Brodnica, and T-Mobile financial services. The number of banks offering BLIK payments is steadily growing from the original founders—six banks in 2015 to 15 banks in 2021.

Table 6. Milestones in the evolution of BLIK.

Year	Milestone
2013	The six largest Polish banks created Polish Payment Standard LCC (PPS): Alior Bank, Bank Millennium, Bank Zachodni WBK, ING Bank Śląski, mBank, PKO Bank Polski

2014	PPS received legal consent for the BLIK mobile payments system from the NBP (National Bank of Poland)
2015	09/02/2015 BLIK appeared on the Polish market BLIK payments are available to the customers of the six banks, the original founders of PPS LCC In half a year, BLIK achieved the first million of users
2016	Availability of BLIK in e-commerce sector reached 100% <i>Getin Bank</i> as seventh bank offers BLIK payments
2017	4.5 million Poles use regularly BLIK (more than a half of all mobile banking users) BNP Paribas (as the eighth bank) and Raiffeisen Polbank (as the ninth bank) offer BLIK payments
2018	Ninety percent of mobile banking users have access to BLIK Bank Pekao SA (as the 10th bank) and Credit Agricole Bank Polska S.A. (as the 11th bank) offer BLIK payments
2019	Number of payments in payment terminals increased by 340% year-on-year Transfers to telephone number increased by 200% PPS and Mastercard signed a strategic cooperation agreement—BLIK users may use proximity payments throughout the world PPS received the consent of the NBP to introduce the “request for payment” solution as part of the BLIK Payment Scheme Spółdzielcza Grupa Bankowa (SGB Bank) offers BLIK payments
2020	02/03/2020: BLIK can be used on international e-commerce websites that use the solutions offered by the global payment operators: Adyen and PPRO 09/03/2020: BLIK joined the European Mobile Payment Systems Association (EMPSA)—currently consisting of nine members with approximately 40 million users 15/04/2020: Mastercard became the seventh shareholder of PPS LCC Nest Bank (as the 12th bank), BPS Bank (as the 13th bank) and Bank Pocztowy S.A. (as the 14th bank) offer BLIK payments
2021	Cooperative Bank in Brodnica (as the 15th bank) and <i>BOŚ Bank</i> (as the 16th bank) offer BLIK payments July 2021: BLIK offers contactless payments

Source: own elaboration based on information available BLIK (2021), www.blik.com, accessed on 10 July 2021 and in NBP Reports (2015–2021): Informacja kwartalna o rozliczeniach i rozrachunkach międzybankowych for 2015, 2016, 2017, 2018, 2019, 2020 and 2021, <https://www.nbp.pl/home.aspx?f=/systemplatniczy/publikacje/rozrachunki.html>, accessed on 10 July 2021.

BLIK also works with the largest acquirers and payment agents, such as: Przelewy24, PayU, BlueMedia, DotPay, eCard, CashBill, FirstData, Service, PayTel, ITCard, and Mastercard. In this way, BLIK offers open access to a large and dynamic payment network. Currently, more than 90% of all users of mobile banking in Poland have the option of using BLIK. Around 70% of ATMs in Poland work with BLIK. Thanks to the cooperation with international players such as Mastercard, Adyen, and PPRO, BLIK payments may be used in the cross-border transfers.

Today, BLIK offers the possibility to execute the transactions via:

- online payments—eCommerce and mCommerce payments
- in-store payments—offering payments at POS terminals, cash register systems, vending and ticket machines
- deposits/withdrawals at ATMs and CDMs by using smartphones

- P2P transfers by using phone number—instant, interbank transfers, without using the 26-digit account number.

BLIK is being constantly developed so that it is as functional as possible for its users. For example, “BLIK One Click” remembers the shops where the user has already purchased something. This solution enables one-click shopping without having to enter BLIK passcodes. BLIK cheques can be used to send money to other people without the need for them to have a bank account or Internet access. One of the latest initiatives is the “request for payment” regarded as the most innovative and needed by users, both individuals and businesses. A person who uses BLIK in a mobile application will be able to send a transfer request to another user. The recipient will receive a notification of such a request in their bank’s mobile app and will be able to accept or reject the transaction thus putting it on hold. The request for payment will wait for the recipient to react for 72 h. If the request is ignored, the sender will receive the notification that the recipient did not respond.

The application of BLIK offers many opportunities for their users—entrepreneurs (merchants) and their clients, banks, and acquirers. For merchants, it allows offering their customers the option of using mobile payments, which in turn may increase their sales. The access to the system is quite simple, as the entrepreneurs have only to establish a partnership with one of the acquirers that currently works with BLIK and there is no need for a separate agreement with BLIK. For banks, it allows offering their clients simple, fast, convenient, and secure mobile payment solutions by adding BLIK to the existing banking mobile applications. For licensed acquirers, it offers access to the effective e-payment method. The described BLIK features make it possible to compete successfully with other market players, even such BigTech as Google or Apple. The brief characteristics of BLIK payments as compared to international competitors: Apple Pay (with 441 million daily users worldwide, Merchant Savvy 2020) and Google Pay (with 39 million daily users worldwide, Merchant Savvy 2020) are presented in Table 7. The main difference is that Apple Pay and Google Pay are linked to payment cards (Visa or Mastercard), they use NFC technology and do not offer the possibility to withdraw cash from ATMs or make P2P transfers.

Table 7. Comparison: BLIK vs Google Pay and Apple Pay.

Features	BLIK	Google Pay	Apple Pay
Start (in Poland)	2015	2016	2018
Devices	Smartphone or smartwatch with Android or iOS, tablets, laptops, computers	Smartphone or smartwatch with Android	Smartphone or smartwatch with iOS
Technology	6-digit codes and bank’s mobile application	Contactless payments using NFC (Near Field communication) technology	Contactless payments using NFC (Near Field communication) technology
Underlying financial instrument	Bank account and bank transfer	Payment card	Payment card
Bank’s acceptance	Required	Required	Required
Options	In-store payments On-line payments ATM cash withdrawals P2P transfers	In-store payments On-line payments	In-store payments On-line payments
Authorization	Code, fingerprint, PIN, password	Fingerprint, PIN, pattern, or password	FaceID or Fingerprint
Scope	Originally: domestic payments	International payments	International payments

Evolving towards international payments

However, BLIK, as with any mobile payment solution, has its shortfalls and risks for users. First of all, as a payment instrument based on the new information technology, its application is linked to cybersecurity and IT risk. The most common threats related to the use of mobile payment services include: phishing, malicious software, identity theft, thefts in online shops. Several risks related to mobile payments result from lack of awareness and trust in mobile payment providers, non-transparency of information, the lack or low level of customers' knowledge change, inappropriate consumer identification mechanisms.

3.2.2. BLIK Diffusion and Adoption

The diffusion and adoption of BLIK may be illustrated by the data presented in Table 8 provided for the end of the fourth quarter (Q4) of the consecutive years, following the inception of BLIK in February 2015. Additionally, data for the first quarter (Q1) 2021 were added to illustrate the dynamics of changes during the COVID-19 pandemic.

In the beginning, six banks—the shareholders of PPS LCC—were the participants in the BLIK system. Another nine banks joined the system in the following years. This cooperation illustrates a completely different approach to the activity in the banking sector, as these particular banks, which usually search for competitive advantage and the possibility to increase their market share, have decided to cooperate and take part in a joint initiative, combining their assets and efforts, sharing knowledge and information in order to achieve a goal for the mutual advantage. Such a value network, which is constantly evolving, is the crucial factor of the market success of BLIK as an m-payment innovation. This market success is confirmed by the market data illustrating the dynamic increase in the number of users (from 0.67 million in Q2/15 up to 18.3 million in Q1/20), the number of stores and POS accepting BLIK payments (from 200 thousand in Q2/15 to 1500 thousand in Q1/21) and the value of transactions (from 75 PLN million in Q2/15 up to 20.1 PLN billion in Q1/21).

Table 8. Market data for BLIK (Q2/2015–Q1/2021).

Specification	Q2/15	Q4/15	Q4/16	Q4/17	Q4/18	Q4/19	Q4/20	Q1/21
Banks	6	6	7	9	11	11	14	15
users (in million)	0.67	1.4	3.1	6.1	8.8	13.1	16.9	18.3
stores (in thousand)	84.87	136.8	185.3	255.4	384	476.2	611.4	632.2
POS (in thousand)	100.3	132.8	177.0	232.2	413.8	538.4	701.7	712.1
online stores (in thousand)	24.5	28	42.9	79.9	91.8	110.3	142.2	151.4
ATMs (in thousand)	6.1	14.3	15.9	17.2	19.8	20	20.2	19.8
number of transactions (in million)	0.267	0.615	3.8	12.0	33.7	71.9	140.1	153.1
value of transactions (in PLN million)	74.8	159	616.7	1660	4400	9600	18,800	20,100
daily number of transactions (in thousand)	2.94	6.68	41.64	130.6	366.4	782	1500	1700
daily value of transactions (in PLN million)	0.8	1.73	6.7	18.1	48.0	104.1	204.3	222.9
average value of transaction (in PLN)	279	259	161	138	131	133	134	131

Source: own elaboration based on NBP Reports (2015–2021): Informacja o rozliczeniach pieniężnych i rozrachunkach międzybankowych w latach 2015 2016 2017 2018 2019 2020.
<https://www.nbp.pl/home.aspx?f=/systemplatniczy/publikacje/rozrachunki.html>, accessed on 10 July 2021.

The dynamic development of BLIK payments was continued in 2020, probably partially due to the COVID-19 pandemic and related to social and economic restrictions imposed by the government aiming at the reduction of the rate of infections. Two lock-down periods in 2020 (April–May and October–December) led to the increase in e-commerce and online purchases, which was followed by the increased demand for e-

payments. During only 2020, the number of BLIK users increased by 29%, the number of transactions increased by 53%, and the value of transactions was at 52%. Although similar or even higher dynamic indexes were observed in the periods predeceasing the COVID-19 pandemic (e.g., in 2016 and 2017), this observation is consistent with the changes in the global situation with regard to the increase in the value of transactions via smartphone mobile payments. It is forecasted that the global value of m-payments will increase from 1.2 USD billion in 2019 and 2.0 USD billion in 2020 to 2.5 USD billion in 2021 and to 3 USD billion in 2022. The predicted growth between 2019 and 2024 is equal to 28%. (Statista 2020, Digital Market Outlook, <https://www.statista.com/chart/23470/global-transaction-value-forecast-of-smartphone-mobile-payments/>, accessed on 15 August 2021).

In the first quarter of 2015 (Q1/15), the value of BLIK transactions accounted for 30.1 PLN million; in Q3/17, it reached over 1 226 PLN million and in Q1/20 amounted to 10,306 PLN million. In the first quarter of 2021, the total value of BLIK transactions equaled 20,100 PLN million. The detailed analysis of the dynamic indexes in 2020 and 2021 indicates that higher rates of growth were observed in quarters with economic restrictions (close to 30% increase in Q2/20 as compared to Q1/20 and 30% increase in Q4/20 as compared to Q3/20).

Similar observations are illustrated by the data concerning the number of transactions executed via the BLIK system. In the first quarter of BLIK functioning, the number of transactions equaled 0.11 million; in Q2/16, it reached 1.28 million; in Q3/20, it reached 110.3 million. In the first quarter of 2021, the total number of executed transactions amounted to 153.1 million. The detailed information for the subsequent quarters of each year is presented in Figures 2 and 3.

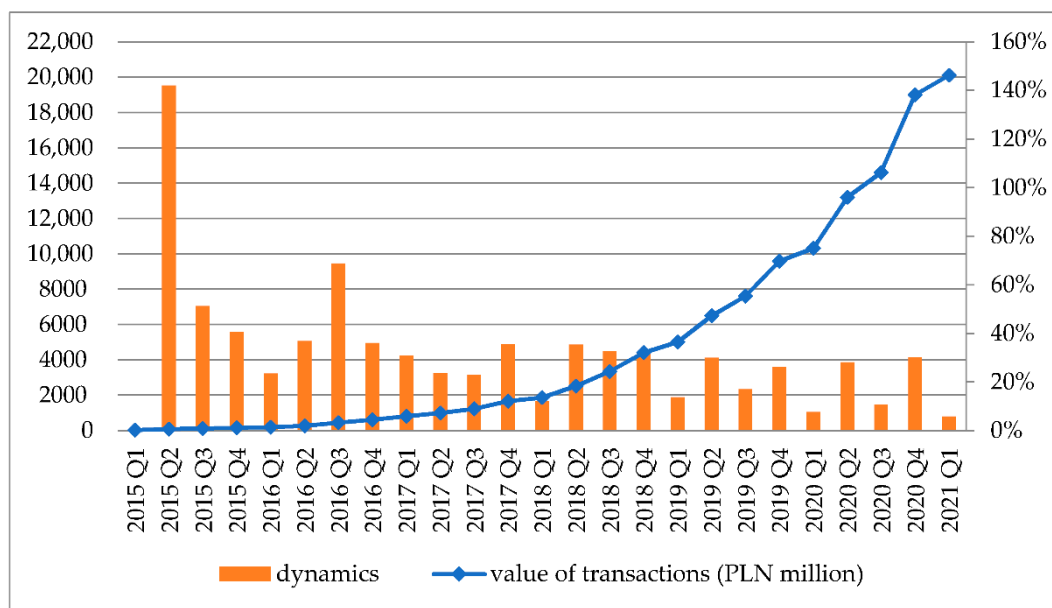


Figure 2. Value of BLIK transactions and its dynamics. Source: own elaboration based on NBP Reports (2015–2021): Informacja o rozliczeniach pieniężnych i rozrachunkach międzybankowych w latach 2015 2016 2017 2018 2019 2020 and 2021, <https://www.nbp.pl/home.aspx?f=/systemplatniczy/publikacje/rozrachunki.html>, accessed on 10 July 2021.

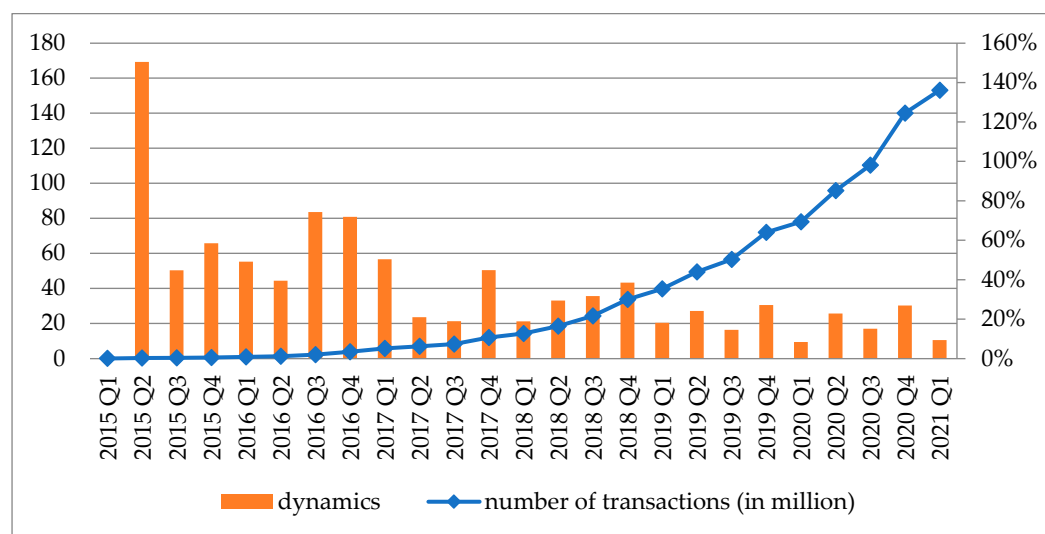


Figure 3. Number of transactions executed via BLIK and its dynamics. Source: own elaboration based on NBP Reports (2015–2021): Informacja o rozliczeniach pieniężnych i rozrachunkach międzybankowych w latach 2015 2016 2017 2018 2019 2020 and 2021, <https://www.nbp.pl/home.aspx?f=/systemplatniczy/publikacje/rozrachunki.html>, accessed on 10 July 2021.

Over the years, changes can be noticed in the way the customers are using BLIK payments (Figure 4). In the beginning—in 2015 ATM cash withdrawals dominated with 86% share in total transactions executed via BLIK. In this year, online payments and POS payments accounted for 6–7% of transactions. From this year, the importance of ATM transactions is regularly decreasing (to 4.7% in Q1/21), while the online payments and P2P transfers are growing. In the first quarter of 2021, online payments represented over 74% of all transactions and P2P transfers—12.2%. Interestingly, the average value of a transaction is gradually decreasing from 279 PLN in Q2/15 to 131 PLN in Q1/21, which can be linked to the increasing usage of BLIK P2P payments and small-scale transactions. These observations are in line with the general global tendency to reduce cash payments and replace them with m-payments, preferably contactless payments (Merchant Savvy 2020; Mastercard 2019).

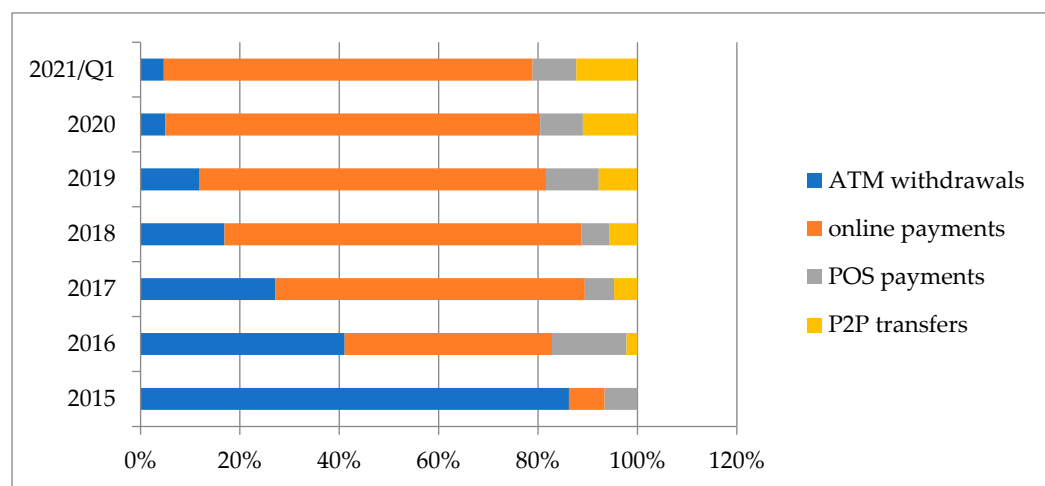


Figure 4. The structure of transaction in BLIK. Source: own elaboration based on NBP Reports (2015–2021): Informacja o rozliczeniach pieniężnych i rozrachunkach międzybankowych w latach 2015 2016 2017 2018 2019 2020 and 2021, <https://www.nbp.pl/home.aspx?f=/systemplatniczy/publikacje/rozrachunki.html>, accessed on 10 July 2021.

Currently, PPS is working on the implementation of contactless payments (without using the six-digit code and without credit or debit card) based on tokenization technology—Mastercard Digital Enablement Services (MDES) technology. Payments will be available on mobile devices with the NFC functioning on an Android system. This cooperation with Mastercard is another example of the open innovation format applied in the BLIK business model and should lead to the further development of this system.

BLIK was designed for original founders—six banks, payment institutions, and payment agents—and is still open to new participants. Payment solutions offered by BLIK are being continually developed and modified to be better adjusted to the users' needs. The presented data allow to classify BLIK as open business model which is an architecture of a firm and its network of stakeholders established for creating, delivering, and developing value for customers to generate profitable and sustainable market competitive performance (Figure 5).

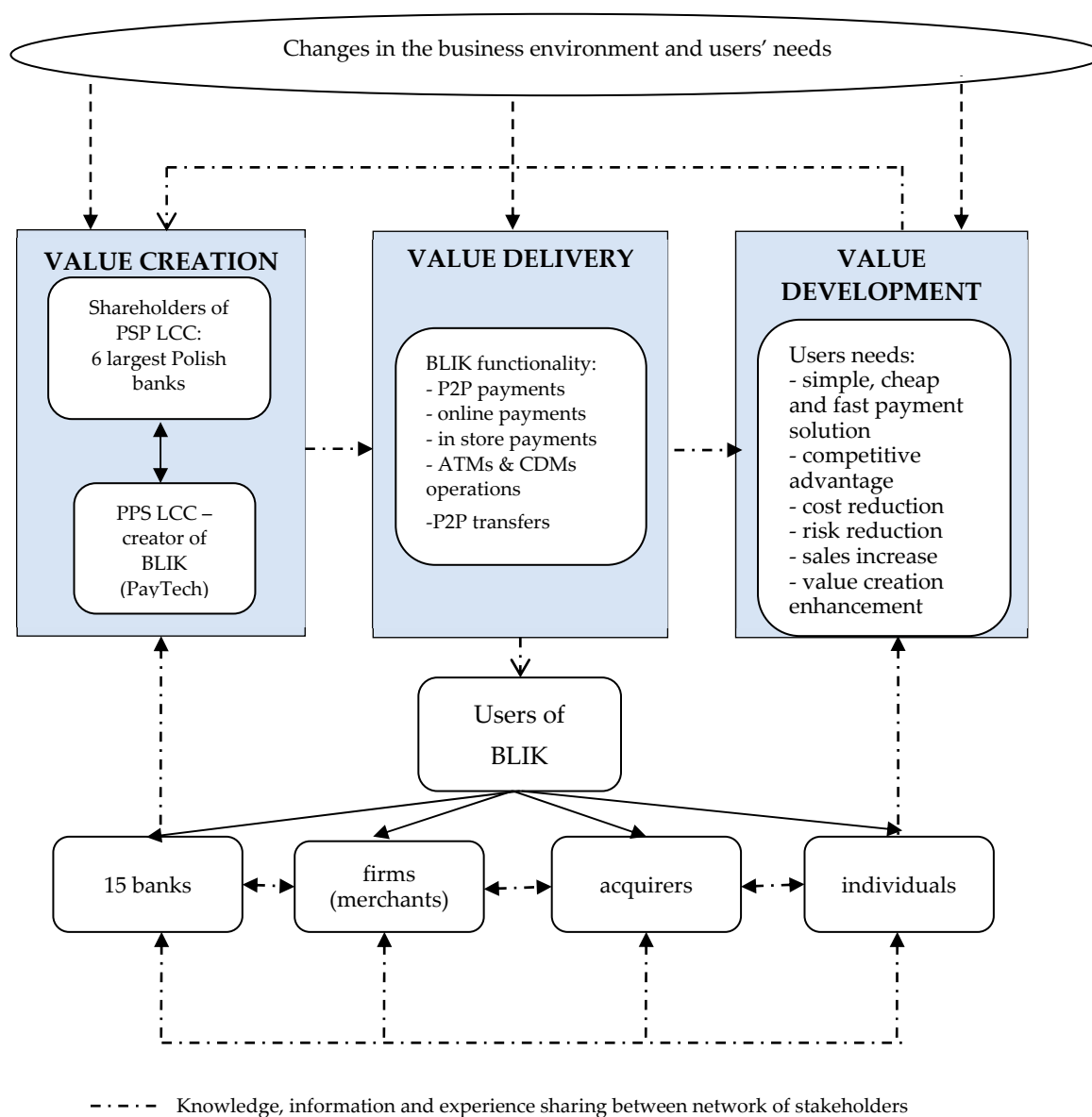


Figure 5. BLIK open business model architecture.

A brief summary of the most important determinants of BLIK market success as the example of PayTech is presented in Table 9. Success factors are both related to the business

environment (external success factors) and the special features of BLIK (internal success factors). However, there are also barriers to the further development of BLIK, which are mostly related to the business environment, remaining beyond the control of an individual entity.

Table 9. Determinants of BLIK market success.

	Success Drivers	Barriers to Success
External factors		Lack of financial knowledge and the limited acceptance of new payment solutions by the end-users
	Digitalization of financial services	Households and merchants' habits—preferences for cash payments or card payments and limited trust to payment innovations
	Popularization of smartphones, smartwatches, and tablets	Security and privacy concerns
	Development of e-commerce and m-commerce	Poor quality of mobile internet connection (instable internet connection reduces the convenience of usage)
	Increasing demand for m-payments	Strong competition from other m-payments providers: e.g., Google Pay, Apple Pay
	Decreasing costs of data transfer	Potential development of entirely new payment solutions based, e.g., on distributed ledger technology (DLT)
	Increasing number of internet and mobile banking users	Excessive regulatory burdens
	Increasing number of merchants accepting m-payments	
Internal factors	Simplicity and convenience—BLIK was implemented in already working m-banking apps	
	Speed and security (verification of user, access to app with PIN, fingerprint scan or password, one-time code)	Costs related to cybersecurity and fraud
	Special features: P2P transfers, request for risk management payment, one-click (continuous development)	Potential conflict of interest among participants of the open business model and the shareholders of BLIK
	Evolving towards cross-border payments	
	No extra costs for consumers	
	Adding value to existing m-banking solutions	
	Substitute for card and cash transactions	
	Open business model	

5. Conclusions

It is predicted that by 2023, over 1.3 billion people worldwide will use mobile payments apps (Merchant Savvy 2020). Mobile payments are particularly popular in many European and Asian countries, e.g., China, India, Denmark, Sweden, and South Korea. The number of PayTechs starting operating activity in payment markets worldwide is systematically increasing year by year. Concurrently, many of them are not able to be competitive enough to reach a satisfactory market position. That is why analysing PayTech's key success factors from the perspective of a business model and firm's market behavior seems to be a current and valuable issue. To achieve this goal, we have applied the case study approach, which is commonly used to analyze financial

innovations, including innovations in payments (Maitra and Upadhyay 2017; Esty 1999, 2001).

Following the list of success factors for payments innovations presented by (Polasik et al. 2020, Szpringer 2016, Harasim and Mitreǵa-Niestrój 2018, Golubić 2019; Hernández-Murillo et al. 2010), we have analyzed the most important determinants related to the macroeconomic environment, technological infrastructure, legislative framework, and socio-demographic conditions for the development of financial innovations in the Polish payment market. The analysis of market data confirmed the general tendency towards digitalization of payments instruments, which is consistent with findings discussed by the Bank for International Settlements (BIS 2020, <https://stats.bis.org/statx/toc/CPMI.html>, accessed on 8 July 2021).

The detailed analysis of BLIK business environment confirmed that among the most important external factors responsible for its market success are: the development of advanced information technology and improved access to the internet, the propensity of the customers to use financial innovations, including m-payments, and the easing of the regulatory barriers to enter the market. Opening the mobile payment solution for different market players caused that BLIK is constantly evolving not only in the number of system participants (from 6 to 15 banks) and users (up to 18.3 million within a 6 year period), but also in terms of implementation of new payment solutions (P2P, request for payment, contactless payments, cross-border payments). Additionally, the growing popularity of BLIK solutions observed in 2016–2019 was continued during the COVID-19 pandemic due to the increased demand for e-payment solutions.

As a result of the case study synthesis, the architecture of the BLIK open business model was established, which combines all stakeholders' share in the process of designing, delivering, and developing value not only for the end-users but also for all system's participants. The BLIK open business model architecture depicts the market success features with special attention paid to knowledge, information, and experience sharing. It may be treated as a roadmap or inspiration for the development of other PayTechs as well as cooperation between entities that usually compete in the market. This is also consistent with the findings provided by (Hernández-Murillo et al. 2010), indicating the importance of market competition as one of the major factors determining the adoption of financial innovations.

The development of BLIK as PayTech and its market success illustrated by the presented market data confirms the importance of cooperation among banks involved in the creation of payment innovation. Such cooperation results in an adequate value proposal not only for individuals (end-users) but also for other stakeholders including banks and merchants. From the end-user perspective, BLIK solutions are easily accessible via smartphones and have a very high level of security due to PINs, passwords, and biometrics applied to reduce the risk of unauthorized use. From the banking sector perspective, BLIK constitutes a new, relatively cheap, and more direct channel of rendering services to bank's clients with immediate effect on the bank's competitiveness. In addition, mobile banking apps are relatively cheap to be developed and modified according to the expectations and needs of the innovation users. Thus, the BLIK standard is very flexible and is able to evolve quickly by adding new solutions and options. Among the success factors, openness, cooperation, and flexibility must be stressed as key determinants for PayTech's success.

However, we should remember the potential threats that may limit further development of BLIK, such as the fierce competition on the retail payment market due to the activity of large global BigTechs entering the Polish market (e.g., Apple, Google), the increased cybersecurity and fraud risks which may make protecting the system more expensive, the potential conflict of interests among the PPS shareholders, which may lead to the lower efficiency of the system or the development of completely new, radical payment innovations that may revolutionize the retail market landscape (e.g., based on the distributed ledger technology (DLT)). From the customers' perspective and their

preferences for m-payments, security and privacy concerns, as well as related limited trust may remain the main barriers, as confirmed by many studies (e.g., Hwang et al. 2021; Pal et al. 2020; Szumski 2020; Chmielarz and Zborowski 2017; Mastercard 2019, https://newsroom.mastercard.com/eu/files/2019/06/Digital_Banking_Results_Mastercard_Overview_Countries_May_2019.pdf, accessed on 14 August 2021). Thus, to reduce these barriers, further actions should be taken both by PayTechs themselves but also by the state agencies and the supervisory institutions aiming at promoting cashless payments, increasing financial knowledge, improving access to mobile internet, easing the regulatory burdens and building trust to financial innovation.

The paper contributes to the debate on PayTechs and financial innovation by offering a new perspective on defining PayTechs, identifying the major components of the open business model, as well as by indicating the key success factors of PayTech based on the example of BLIK.

The limitation of the study stems from the case study methodology that links the analysis to one entity. On the other hand, the findings resulting from the case study analysis may be confronted with findings for similar studies. However, as indicated in the introduction, the PayTech-related analyses are relatively scarce. Thus, further studies in this field are expected to be developed in the near future.

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Notes

- ¹ Nejad (2016) analysed 121 research taking into account their scope, sample, data, methodology, and geographical region.
- ² Act of 24 August 2001 on Settlement Finality in Payment and Securities Settlement Systems and the Rules of Oversight of these Systems (Journal of Laws of 2016, item 1224, as amended).
- ³ Act of 19 August 2011 on payment services (Journal of Laws 2016, item 1572, as amended).
- ⁴ Multilateral Interchange Fee, Regulation (EU) No 2015/751 of the European Parliament and of the Council of 29 April 2015 on interchange fees for cardbased payment transactions (EU OJ L 123 of 19.05.2015, page 1).
- ⁵ Strong Customer Authentication, Commission Delegated Regulation (EU) 2018/389 of 27 November 2017 supplementing Directive (EU) 2015/2366 of the European Parliament and of the Council with regard to regulatory technical standards for strong customer authentication and common and secure open standards of communication (EU OJ L 69 of 13.03.2018, p. 23).
- ⁶ Payment Services Directive 2, Directive 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (EU OJ L 337 of 23.12.2015, page 35).

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