**An overview of the emerging financial technologies and adoption of the concept of open innovation in the financial services**

**Assoc. Prof. Dimitar Јovevski, Ph.D.**

University ‘Ss. Cyril and Methodius’ in Skopje

Faculty of Economics – Skopje

e-mail: djovevski@eccf.ukim.edu.mk

**Tanja Kamenjarska**

University ‘Ss. Cyril and Methodius’ in Skopje

Faculty of Economics – Skopje

e-mail: kamenjarska@eccf.ukim.edu.mk

**Abstract**

Nowadays, the art of innovation and its expressiveness play an essential role in the process of gaining a competitive advantage and improving financial performance. This paper discusses the basic concepts, importance, and upswing of the open innovation model in the modern economy. Moreover, it tries to differentiate the concepts of open and closed innovation in organizations. Open Innovation in the banking sector is tightly linked with the concept of open banking, which allows third-party developers to design and implement innovative applications or services with the use of open application programming interfaces (APIs). For the banks to improve their market position and enhance the competitive edge, they are imposed to digitalize their business process by building a collaborative climate with the fintech companies and third-party organizations. This paper aims to explore diverse approaches of developing a tech-driven strategy that amalgamates information technologies within the business operations to successfully meet the business requirements and needs of the company. We further attempt to provide a concise explanation of the recent technology trends in the financial services in several countries including the SEE region. Considering the increased demand for the implementation of technological innovations in the financial sector, we stress the importance of forming collaborative relationships with external stakeholders and incorporating the outside intellectual capital within organizations’ boundaries. To deal with the ever-changing customer requirements, financial institutions should incorporate technology as part of their central business activities. This will result in increased productivity and efficiency, timely service delivery, enhanced customer retention, multi-channel distribution network, higher levels of competitiveness in the market and better overall financial performance.

***Keywords:*** *open innovation, FinTech, digital transformation, financial institutions*

***JEL classification:*** *O32, O36, G2, N2*

**INTRODUCTION**

The powerful evolution of the tech industry in the past decade has significantly influenced many businesses around the world to redirect their services, marketing techniques or simply increase the technological mojo of the company. Entrepreneurs continuously search for an innovative way of reaching the attention of today’s tech-savvy customers. The remarkable amplification of introducing high-tech systems has brought numerous enhancements to the organization processes themselves together with a wide range of technical skills and competencies of company’s labor. The potential peril of job losses and possible decrease in the country's workforce is offset by an ongoing drive towards greater productivity, savings and performance in the businesses. Business strategies and models were dramatically reshaped due to the tremendous growth of the IT industry and the increased need for continuous adaptation to the latest technology trends. The necessity for modernization of the core legacy systems, the lengthy experience of getting a claim and slow underwriting process are only some of the reasons why banks have tried to keep up with these changing technology trends. Well-designed information systems are critical to the banks’ growth and development. Continuous digitalization of products and services in the banking industry lead to radical transformation of the whole customer experience, providing a wide variety of choices and improved transparency of the purchasing process. In that manner, bank have started to implement and acquaint customers with new technologies such as effective chatbots which provide personalized client service. In order to be a top performer in the banking industry, many companies tirelessly race to find different ways of innovation that will reduce turnaround times and improve governance within the organization itself. One of those approaches is the open innovation model which embraces the external cooperation in the process of technological advancement within organization and involves other parties in the process of developing new product and services that helps employees focus their attention on the real business objectives while creating new revenue streams. Despite these recent developments, the banking industry is still considered to be one of the least innovative industries when it comes to introducing new technologies for bettering the client’s experience. Thus, boosting technology in today’s dynamic business world is inevitable step to success. Over the years, the global banking industry noticed remarkable changes due to the major trends in the state-of-art information technology and the use of business intelligence as a tool for improving business strategy and lead to better financial performances and increase employee’s productivity.  Recently, the number of businesses that seek for an innovative way of engaging with today’s tech-savvy customers is drastically increasing. Despite the raised awareness amongst many banks about the importance of the ITs and their impact on the business operations, the banking industry is having hard time following emerging technology trends. The low degree of digitalization in the banking industry can be seen as opportunity for the first companies that will expand the use of IT in their business strategy, making them top performers and leaders in the market. Analogous to that, the main objective of the research is to explore various approaches of developing a tech-driven strategy that will promote the open innovation model as key to meet banking businesses requirements and needs, to determine which possible factors that hinder the adoption of open innovation in the banking industry, conduct a comparative analysis regarding the recent developments and use of Fintech technologies and activities with particular emphasis on banking. Furthermore, a detailed overview of the limited scientific findings in this field is presented, by directing the attention on provoking critical discourse among scholars and businesses regarding this phenomenon.

**THEORETICAL AND EMPIRICAL FINDINGS OF THE OPEN INNOVATION MODEL IN THE MODERN ECONOMY**

Over the last decade, open innovation has been considered as one of the most analyzed topics in the management field (Chesbrough, 2003a; Christensen et al. 2005; Gassmann, 2006; Vanhaverbeke, 2006). The concept of open innovation plays a significant role in many organizations lately, due to the increased need of gaining competitive advantage and survival of the business. Hence, open innovation is a distributed innovation process which includes knowledge streams that are carried out beyond organization boundaries (Chesbrough and Bogers, 2014). In this context, West and Gallagher (2006) interpret open innovation as: “systematically encouraging and exploring a wide range of internal and external sources for innovation opportunities, consciously integrating that exploration with firm capabilities and resources, and broadly exploiting those opportunities through multiple channels.” One of the most important tasks for the company is to integrate the accumulated external knowledge and skills into company’s structure and processes (Koschatzky, 2001). Numerous authors have reported a great prominence of the joint collaboration (Martovoy and Dos Santos, 2012; Mention and Martovoy, 2013) and development of financial services or products with the outside help of consumers themselves (Akamavi, 2005; Fasnacht, 2009; Martovoy and Dos Santos, 2012; Martovoy et al., 2012; Mention and Martovoy, 2013; Oliveira and von Hippel, 2011, Akamavi, 2005; Gerstlberger et al., 2010). In order to decrease the cost of producing current financial services, Nofie (2011) suggest that the financial institutions should direct their attention in the arrival of new product or enhanced processes. This is also supported by Porter (2004) who stresses the importance of innovation, product improvement and processes enhancement. Lack of obtained results regarding the impact of open innovation practices by the cooperation with consumers, employees, suppliers, partners, communities, academicians, competitors in financial firms as front-line innovators (Akamavi, 2005; Martovoy et al., 2012) has highlighted the significance of motivating discussion of the uninvestigated opportunities and future challenges on the open innovation. It is also noted that with the launch of innovative services, the financial sector has undergone a major change regarding deregulation (Akamavi, 2005). The positive impact of financial innovation in an economy can undoubtfully stimulate additional savings, better the investment decisions (Tufano, 2003; Berger, 2003; Frame and White, 2004) and encourage economic growth. This is also supported by Arora (2003) who stresses the importance of bank transformation. Yildirim and Philppatos (2007) conduct a study of the banking companies in 11 Latin American countries. They emphasise the fact that increased competition between banks can result in engagement of the banks in the process of differentiation, by continuously innovating their products and services. Similarly, they find that banks which have high degree of foreign investment in bank capital tend to be more competitive. On the other side, Ferreira, Manso, and Silva (2010) observed that private ownership encourages innovation in organizations. The internet banking as one of the more popular products within the banking sector is known to provide relatively low risk, high efficiency, high return and low-cost advantages. Various studies across US and Europe obtain results that suggest that in order for banks to better their financial performance they should implement e-applications that require advanced technologies. These studies also show that e-banking is statistically significant in explaining the increase in the overall performance of banks and is positively correlated with the intensification of competition in the banking industy (Pigni et al., 2002; Arnaboldi and Claeys, 2008; Ciciretti et al., 2009; Weigelt and Sarkar, 2012. For instance, Hua G. (2009) carry out a research to examine user’s perception and attitudes toward the internet banking services in China. They find that perceived ease of use of website and the privacy policy provided have significant impact on user's adoption of online banking. The financial innovation as concept is classified in three groups depending on the place in the organization where the innovation occurs (Vargas, 2007). First is the process innovation which signifies the enhancement of processes in means of decreasing the average time of their execution and developing new, more efficient ones that will advance process performance in benefit of bettering the offer of existing financial products and services. Further, the organizational innovation represents the initiation of new organizational structures that serve as intermediaries in the institutions where core processes are facilitated. Lastly, product innovation refers to the expansion of product and service assortment in terms of reaching more customer segments and meeting business and market requirements. Evidently, processes that focus on improving fundamental capabilities of banks will encourage competitive banking environment. This is encompassed by Padhy (2007) who investigates the influence of technological progress in the banking industry where the dominant focus of the discussion is the future of the banking services.

**THE CONCEPT OF OPEN INNOVATION IN THE FINANCIAL SEVICES**

Customers and employees are considered as core assets and top influencers of change in the businesses. Over the years, managers have made major efforts to transform the hierarchical and traditional bureaucratic structures in the financial services and have triggered revolutionary digital transformation which has opened dilemmas regarding the challenges related to the development of customer-oriented organizational culture that is directed on adoption of the open innovation model in the financial services. This has resulted in changes in the legal and regulatory frameworks, implementation of innovative transition strategies (Fasnacht, 2009; Huo & Hong, 2013), and increased need of openness in the financial services. In order to be able to respond to the dynamic ever-changing environment, companies focus on integrating the intellectual capital and set of management skills and expertise of external stakeholders (Enkel et al., 2009; Fasnacht, 2009; Teece, 2010; Tornjanski et al., 2014). Analogus to that, the realization of the expected benefits of such innovations will bring competitive advantage to businesses.The concept of open innovation highlights the prominence of incorporating expertise of stakeholders and academicians regarding financial innovation and developing collaborations with external entities in order to respond to the dynamic business climate (Fasnacht, 2009; Huff et al., 2013).

*Figure 1. Open vs closed innovation model*



Source: Chesbrough et al. (2006)” Open innovation: Researching a new paradigm”

As shown in Figure 1, projects may enter or exit at various points and in various ways and is possible for them to be initiated from either internal or external technology sources. While the outside-in portion assumes that new technology can enter into the process at various stages, the inside-out part implies that projects can make their way to market in many ways as well, such as out licensing or via a spin-off venture company (Chesbrough, 2014). Furthermore, in the closed innovation model the innovative process take place exclusively within the boundaries of the company and is characterized with internal R&D activities. As Chesbrough (2006) suggests, this concept is given the name “closed” because there is only one possible way for a project to enter and exit. This implies that heavy investments in R&D and hiring qualified staff are two inevitable actions as innovative ideas are strictly under control of the company. Moreover, Figure 2 extends the differentiation between these two models by providing an overview of the basic principles of the closed vs open innovation. While closed innovation relies on the postulate that know-how, highly qualified staff and R&D itself are exclusively concentrated within the boundaries of the firm, the open innovation suggests that the internal knowledge and R&D are combined with the expertise and R&D of the external environment. Closed innovation follows the principle that the first company that will introduce an innovation in the market will win, in opposite, open innovation suggests that a better business model is better than getting to market first.

*Figure 2. Closed vs Open innovation principles*

|  |  |
| --- | --- |
| Closed Innovation Principles | Open Innovation Principles |
| The smart people in our field work for us.  | Not all the smart people work for us. We need to work with smart people inside ​ and outside our company.  |
| To profit from R&D, we must discover it, develop it, and ship it ourselves. | External R&D can create significant value; internal R&D is needed to claim some portion of that value. |
| If we discover it ourselves, we will get it to market first. | We don’t have to originate the research to profit from it. |
| The company that gets an innovation to market first will win.  | Building a better business model is better than getting to market first. |
| If we create the most and the best ideas in the industry, we will win. | If we make the best use of internal and external ideas, we will win. |
| We should control our innovation process, so that our competitors don’t profit from our ideas. | We should profit from others’ use of our innovation project, and we should buy others’ IP whenever it advances our own business model.   |

Source: Chesbrough (2003a; 2003b).

Due to the increased availability of highly skilled and qualified external specialists, many companies started to extend the closed innovation with open innovation. This lets organizations to open their doors to the external environment, leaving the new and fresh knowledge flow inside the company. The open innovation represents a bridge between the present and the prospective future of the banks that enable the distribution of the bank's products, services and offers by encapsulating the external intellectual knowledge from third-party players, academic institutions, customers, start-ups, newcomers or competitors within the bank operations. Novel security rules and regulations, Big Data, and the overall need for providing on-demand customer experience ha have obligated **banks to revise the current and implement new innovative ways of working. The open innovation brings numerous benefits for the banks such as accumulating the expertise and intellectual property of the startups as they** reciprocally receive financial and logistics support to meet the objectives of the business. The concept of open banking which is also known as "open bank data” is tightly linked with the open innovation in means of providing open access to third-party financial service to the financial data of the banks and other financial institutions with the use of APIs. Open banking is turning into a significant wellspring of innovation that is ready to reshape the banking sector. For instance, by introducing e-contracts with the help of AI or launch applications that automate the core business processes, banks can deliver service to more customers which will result in improved UX. Furthermore, banks that are focused on the development and implementation of open innovation strategies are prone to increase the perceived customer value, reduce costs, and improve overall financial performance.

**COMPARATIVE ANALYSIS OF FINTECH INNOVATIONS AND TECHNOLOGIES IN SELECTED COUNTRIES**

To gain a better understanding of the technology trends and innovations in the financial services, a brief overview of the leading FinTech products and services in selected countries of the SEE region and in Switzerland, Sweden, USA, Netherlands and UK as global innovation forces is presented on Figure 3, alongside with the Global Innovation Index and the World and Region Rank in innovativeness.

*Figure 3. Comparison of GII and FinTech products and services in selected countries*

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| --- | --- | --- | --- |
| **Country** | **GII** | **World/Region Rank** | **FinTech products and services** |
| Albania | 30.34 | 83/39 EUR | Digital payment services, Contactless Credit Card (BKT), “Final Card” (Union), Mobile bill payment, Treasury payments, Services allows all customers to recharge their accounts at all the mobile operators through e-banking, m-banking and ATMs or real time payments for third parties, through respective agreements between banks and service providers |
| Bulgaria | 40.35 | 40/27 EUR | HCE, Personal finance management applications and accounting services within the e-banking system host card emulation (HCE), PFM and accounting services within transactional system and gamification, CRM systems, Data and analytics solutions and Virtualisation |
| Croatia | 37.82 | 44/29 EUR | Mobile payments, HCE, SaaS-based IT systems, Cybersecurity solutions, Analytical systems, Cloud services |
| Greece | 38.90 | 41/28 EUR | AI, Application Programming Interfaces – APIs, Distributed Ledge Technology-DLT, Electronic Identification-eID, Investments, RegTech, Account Information Service Providers (AISPs), E-wallets, Payments |
| North Macedonia | 35.29 | 59/36 EUR | Variety of loan options, including lines of credit, short-term loans, instalment loans, merchant cash advances and microloans |
| Romania | 45.51 | 54/33 EUR | Online invoice financing platforms, Cloud-based mobile POS solution provider, Open banking API provider, Payment system for live interactions on the phone and Skype calls etc. |
| Slovenia | 45.25 | 31/20 EUR | Bitcoin Hub, Contactless cards, E-invoicing, Mobile banking applications, CRM and BPM, HRC |
| Turkey | 36.95 | 49/5 NAWA | Payment processing (eg, e-point of sale, money remittance, invoice payment), E-money issuance, E-wallet applications |
| [Switzerland](https://www.theglobaleconomy.com/Switzerland/GII_Index/) | 67.24 | 1/1 EUR | Mobile/online payment services, Account information services and crowd-funding platforms, Compliance tools for financial institutions |
| [Sweden](https://www.theglobaleconomy.com/Sweden/GII_Index/) | 63.65 | 2/2 EUR | Banking services, Payment and payment settlement services, Lending, Biometrics and Cryptocurrency |
| [USA](https://www.theglobaleconomy.com/USA/GII_Index/) | 61.73 | 3/1 NAC | Payments, Lending, Financial education and literacy, Financial advisory and robo-advisory services, Digital currency services |
| [Netherlands](https://www.theglobaleconomy.com/Netherlands/GII_Index/) | 61.44 | 4/3 EUR | iDeal, Adyen, Credit platforms focusing on business loans for small and medium-sized enterprises (SMEs) |
| [UK](https://www.theglobaleconomy.com/United-Kingdom/GII_Index/) | 61.30 | 5/4 EUR | Payment acceptance services allow card payments, Online lenders enabling credit to be made available at better rates to consumers, Roboadvice |

Source:Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2019; Mondaq, FinTech Comparative Guide, 2020; Albanian Association of Banks, 2020; Deloitte, FinTech in the CEE region Report, 2016; Bank of Greece, FinTech Innovation Hub Annual Report, 2019.

Notes: World Bank Income Group Classification (July 2018): EUR = Europe; NAWA = Northern Africa and Western Asia; NAC = Northern America.

**Largest global innovation forces**

The largest global innovation forces are considered to be Switzerland with GII of 67.24 in 2019 making it the worldwide top performer in this segment. From Figure 3, it can be noticed that Switzerland’s most frequently used FinTech products and services are the mobile/online payment services, account information services and crowd-funding platforms, compliance tools for financial institutions. Sweden with GII of 63.65 ranked on 2nd place globally and 2nd place in Europe mostly develops FinTech technologies for banking services, payment and payment settlement services, lending, biometrics, and cryptocurrency. USA with GII of 61.7, the world’s third-largest innovation force and 1st in NAC appears to focus their attention on developing technologies that help the payment process, lending, financial education and literacy, financial advisory, and robo-advisory services, digital currency services. Netherlands with GII of 61.44 and ranked 4th worldwide or 3rd in Europe offers products and services such as iDeal, Adyen, credit platforms focusing on business loans for small and medium-sized enterprises (SMEs). Lastly, UK as 5th largest world innovator and 4th in Europe with GII of 61.30 uses technologies that enhance payment acceptance services that allow card payments, online lenders enabling credit to be made available at better rates to consumers, roboadvice etc.

**Albania**

In the recent years, Albanian banks have undergone a significant digital transformation. Currently, banks are offering wide variety of digital banking platforms with multiple functionalities and greater UI/UX design (Albanian Association of Banks, 2017). Evidently, the most used banking service in Albania is the e-payment which over the years has gained significant attention amongst users. Similarly, Albanian banks have introduced many mobile banking applications from which users can easily check their financial data such as savings, deposits, and most importantly, make transactions and money transfers. One of the recent innovations in FinTech services is customer authentication. Banks implement electronic signatures; customer authentication using ID cards, two-factor OTP (dynamic password) which is valid and can be used for one login session, or even employ fingerprint identification. The last is mostly used by elder people in direction of security enhancement and providing better access to banking services to this market segment. Other technologies that are the contactless credit card (BKT), cards that allow customers to make debt payment or money transfer services which are decreasing the transfer processing time (Albanian Association of Banks, 2017).

**Bulgaria**

In the Global Competitiveness Report, Bulgaria has had a significant rank rise from 74th place in 2012 to 54th in 2015-2016 and 49th in 2019 (Global Competitiveness Report, 2019). The country’s domestic market is estimated to have 7.1 million inhabitants and the percent of internet users in the age rank of 16 to 74 years old is 55% which is lower than the CEE average of 68% (Deloitte, 2016). The low internet penetration rate is perceived as a threat to the development of FinTech technologies. The Bulgarian National Bank, the Financial Supervision Commission, and the Bulgarian Deposit Insurance Fund are the main constituents of the financial regulatory authorities in Bulgaria. Over the years, Bulgarian banks have introduced innovative products and services such as host card emulation (HCE), PFM, and accounting services within the transactional system and gamification (Deloitte, 2016). The gamification also performs analysis of user’s behavior where it allows users to save money and get in-app rewards. The Bulgarian banks dominantly focus their attention on bettering payments-facilitating technologies. On the other hand, they have fully developed e-banking systems, as well as CRM systems, data and analytics solutions, and virtualization. One of the major opportunities in the FinTech sector is a fact that the Bulgarian society has a significant and positive reaction in terms of using the contactless payment terminals, implemented by the banks in 2016. Except for the smart cards, inhabitants are introduced to the G-wallet which is an NFC technology that is allowing inhabitants to pay for products and services with their mobile phones. Also, Bulgarian banks perform activities that are related to the implementation of HCE technology, various personal finance management applications, and accounting services. The FinTech sector is considered to be lagging behind the most innovative economies as observed in the Global Innovation Report (World Intellectual Property Organization, 2020). This is due to the strict tax regulations in the IT sector. For Bulgarian banks to enhance the FinTech technologies and their performance, it is recommended recruitment and ongoing and solid counseling with IT specialists by implementing their ICT expertise within the bank’s operations. This only stresses the importance of developing an open climate and adopting the concept of open innovation to business operations.

**Croatia**

The Croatian GII is 37.82 in 2019 and it is ranked on 44th place globally and 29th in Europe (World Intellectual Property Organization, 2020). The FinTech sector in the country consists and conveniently use mobile payments, HCE, SaaS-based IT systems, cybersecurity solutions, analytical systems, cloud services. The company “Oradian” uses SaaS-based IT systems that are dedicated to serve potential clients to establish microfinance institutions in short period of time, usually within a few days (Deloitte, 2016). Although the technological maturity in the country is on a subordinate level and the е-banking penetration in Croatia is among the lowest in CEE region (Statista, 2020), Croatian customers have 36% trust in banks ratio in 2012, which is on relatively high level compared to the region (36% in Slovenia, 34% in Bulgaria, 30% in Romania, 27% in Hungary) (Deloitte, 2016).

**Greece**

The Greek GII is 38.90 in 2019, positioning the country in the 41st world rank and 28th place in Europe. The Bank of Greece (BoG) in 2019 has launched the “FinTech Innovation Hub” which aims to encourage innovation in the financial services and this practical case of adopting the open innovation model has been targeting new, regulated or unregulated, technology companies to offer products such as implementing Artificial Intelligence (AI), Application Programming Interfaces (APIs) and Distributed Ledger Technology (DLT), crypto assets, electronic identification techniques and cloud outsourcing (Bank of Greece, 2019) which are dominantly focused on making a technological transformation in the banking sector. Greece has provided a quality example for the countries in the region by implementing the Directive (EU) 2015/2366 (PSD2) which stimulated companies to focus their attention on business strategies that lead to the introduction of new, technology-driven financial products and services (Bank of Greece, 2019).

**North Macedonia**

The Republic of North Macedonia is ranked on 59th place in the Global Innovation Report and 36th in Europe with a score of 35.29. In 2019 the National Bank of the Republic of North Macedonia (NBRNM) introduced the Innovation Gateway as an amalgamating body that integrates and provides necessary information regarding the innovation activities in the financial sector. The platform aims to stimulate the development of innovative activities in the financial services by serving as an intermediator between fintech companies, NBRNM, and other relevant authorities. The Innovation Gateway invigorates trust and discourse among stakeholders and permits fintech firms to engage with the National Bank of the Republic of North Macedonia (NBRNM, 2020). The Alternative Financial Services Association of North Macedonia integrates the financial technologies offered by the organizations and external entities, administering financial services to the citizens of North Macedonia. The country is ranked in 10th place in 2019 and down to 17th in 2020 in the “Doing Business rankings”. As stated in the Doing Business report, regulation plays a crucial role in the development of the private sectors and stimulate a competitive business environment. The report also provides a few critical recommendations (World Bank, 2020):

* Lower barriers to start-ups are associated with a smaller [informal sector](https://en.wikipedia.org/wiki/Informal_sector).
* Lower costs of entry encourage [entrepreneurship](https://en.wikipedia.org/wiki/Entrepreneurship), enhance firm [productivity](https://en.wikipedia.org/wiki/Productivity), and reduce corruption.
* A simple start-up translates into greater [employment](https://en.wikipedia.org/wiki/Employment) opportunities.

 **Slovenia**

Slovenia has been maintaining a relatively stable position as for a GII of 45.25, world rank of 31st place, and 20th in Europe (Figure 3). The county had a decrease in the global “Doing Business” ranking, from 29th place in 2016 to 37th in 2020 (World Bank, 2020). The number of individuals that made a purchase over the Internet in the last 12 months grew from 51% in 2018 to 56% in 2019 as of the population in the age range of 16 to 74 years old (Eurostat, 2019). Slovenian actions for innovativeness in financial services has been widely recognized. In 2001 the Slovenian joint-venture “Moneta”, implemented Global System for Mobile Communication (GSM) technology as a payment method through the mobile phone. Similarly, m-Bills has been introduced in the function of a mobile wallet. Lately, Slovenia has gained worldwide attention, due to the implementation of Bitcoin exchange technology known as Bitstamp which had 20,76% share of the total Bitcoin market trading in USD between the period of April 2020 to September 2020(Bitcoinity, 2020). Slovenia’s Bitcoin-enabled Point-Of-Sale technology is seen as a major opportunity in the FinTech sector. Nowadays, the banks use contactless cards, e-invoicing through the E-Invoice System, mobile banking applications, fingerprint recognition CRM and BPM, HRC, Advanced Automated “Tele” Machines (ATM), etc. Due to the high speed of innovativeness in the FinTech sector, the regulatory and legal framework should continuously change which is also proven by the statement that regulates Bitcoin status by the Slovenian Ministry of Finance in 2013 (The Law Library of Congress, 2014). All of the abovementioned innovations have opened a huge potential for the Slovenian banks to employ advanced technologies in the future such as biometrics, real-time analytics.

*Figure 4.* *Projection of FinTech market indicators in selected countries*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **Indicator** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| Albania | TVDPa | 264 | 423 | 680 | 979 | 1.422 | 2.037 | 2.941 | 4.066 |
| Users DPb | 0.81 | 0.90 | 1.02 | 1.05 | 1.09 | 1.10 | 1.14 | 1.15 |
| avTVUdpc | 324 | 471 | 666 | 930 | 1.299 | 1.849 | 2.591 | 3.543 |
| avALTFId | 4.66 | 5.03 | 5.58 | 5.42 | 6.02 | 6.58 | 7.14 | 7.70 |
| Bosnia | TVDP | 261 | 320 | 383 | 384 | 455 | 512 | 559 | 599 |
| Users DP | 0.89 | 0.98 | 1.12 | 1.19 | 1.28 | 1.33 | 1.37 | 1.39 |
| avTVUdp | 294 | 328 | 343 | 323 | 357 | 385 | 407 | 432 |
| avALTFI | 4.85 | 5.40 | 6.23 | 6.23 | 7.12 | 7.94 | 8.75 | 9.51 |
| Bulgaria | TVDP | 671 | 836 | 1.032 | 1.232 | 1.432 | 1.633 | 1.833 | 2.967 |
| Users DP | 1.76 | 2.05 | 2.42 | 2.78 | 3.05 | 3.30 | 3.55 | 3.73 |
| avTVUdp | 318 | 407 | 427 | 444 | 469 | 495 | 516 | 796 |
| avALTFI | 22.07 | 30.28 | 38.90 | 41.78 | 45.49 | 49.08 | 52.41 | 53.01 |
| Croatia | TVDP | 911 | 1.186 | 1.666 | 2.097 | 3.221 | 4.485 | 6.128 | 8.221 |
| Users DP | 1.49 | 1.69 | 2.07 | 2.25 | 2.41 | 2.51 | 2.59 | 2.61 |
| avTVUdp | 612 | 704 | 803 | 932 | 1.334 | 1.788 | 2.370 | 3.153 |
| avALTFI | 10.11 | 11.41 | 12.65 | 13.34 | 14.37 | 15.45 | 16.64 | 17.83 |
| Greece | TVDP | 3.785 | 4.213 | 4.727 | 4.421 | 5.350 | 6.103 | 6.770 | 7.457 |
| Users DP | 4.26 | 4.52 | 4.91 | 5.24 | 5.54 | 5.73 | 6.13 | 6.08 |
| avTVUdp | 889 | 931 | 963 | 844 | 966 | 1.065 | 1.104 | 1.227 |
| avALTFI | 16.96 | 19.78 | 24.54 | 23.33 | 28.90 | 32.37 | 35.57 | 38.68 |
| North Macedonia | TVDP | 175 | 269 | 423 | 605 | 888 | 1.195 | 1.584 | 2.103 |
| Users DP | 0.46 | 0.54 | 0.69 | 0.76 | 0.82 | 0.87 | 0.90 | 0.91 |
| avTVUdp | 40.85 | 42.64 | 43.95 | 41.01 | 43.15 | 45.18 | 46.70 | 47.71 |
| avALTFI | 40.85 | 42.64 | 43.95 | 41.01 | 43.41 | 45.18 | 46.70 | 46.71 |
| Serbia | TVDP | 733 | 811 | 912 | 808 | 1.030 | 1.224 | 1.424 | 1.669 |
| Users DP | 2.51 | 2.78 | 3.08 | 3.34 | 3.65 | 3.90 | 4.06 | 4.11 |
| avTVUdp | 292 | 292 | 297 | 242 | 283 | 314 | 351 | 406 |
| avALTFI | 10.78 | 12.43 | 14.12 | 13.02 | 14.92 | 16.60 | 18.25 | 19.74 |

Source:Statista, FinTech database, 2020.

Notes: a TVDP= Total Transaction Value in the Digital Payments in million US$; c UsersDP= Number of users in the Digital Payment Segment; d avTVUdp = Average Transaction Value per User in Digital Payments in US$; e avTVU = Average Transaction Value per User in Alternative Financing in US$.

Projections show that Croatia is expected to yield the highest total transaction value in digital payments, or 8.221 million US$ by 2024 followed by Greece with an expected 7.457 million US$ and Albania with 4.066 million US$ (Figure 4). This is because Croatia has the largest number of users in the digital payment segment by the year of 2019, taken into consideration the total population of the countries, or 4.1 million inhabitants (World Population Prospects, 2019) out of which 2.07 million are active in the digital payment segment or 50.11% of the total population. Next is Greece with 10.47 million of inhabitants in 2019 out of which 4.91 million use digital payments or 46.88% of the total population, followed by Albania (35.40%), Serbia (35.11%), Bulgaria (34.57%), Bosnia (33.92%) and North Macedonia (33.11%). The projections also show that the average transaction value per user in digital payments is expected to increase in all of the countries from 2020 to 2024. Similar projections apply to the Average Transaction Value per User in Alternative Financing, per se. This can be explained by the fact that an increasing number of individuals tend to use financial channels, processes, or instruments beyond the highly regulated banks and capital markets with traditional finance system, due to the benefits of flexibility and ease of use. Even though projections and the number of adopted Fintech innovations are showing progress and improvement, the analyzed countries in the SEE region are lagging behind the leading global innovation forces.

**CONCLUSION**

This paper expands the contemporary knowledge within the financial services sector and amongst scholars by promoting a dialogue of the importance of incorporating external intellectual capital within firm boundaries especially when the CoVid-19 crisis is directly affecting the nature of conducting business activities. The crisis directly imposes firms to undertake fast transformation measures and offer services in a more flexible manner. Furthermore, expanding the availability of services and providing access to more affordable and timely products and services will lead to financial inclusion and improved customer retention. In many countries, the regulatory and legal requirements impede the introduction of FinTech firms. To stimulate their entrance into the market, the updated regulatory frameworks should encourage financial institutions to innovate their business operations and successfully cope with the recent challenges. Regulatory frameworks should also be developed proportionally regarding the legislation of the size of the companies and be proportional to the supervision costs. Prior to the adoption of technological inventions, companies should take into account the regulatory barriers and comply with financial regulations. It should be also emphasized that facilitating research that yields a better understanding of consumer’s preferences and readiness to accept new technological solutions is necessary before introducing innovative technological solutions. This will enable companies to develop a suitable marketing strategy and lower the risk of potential resistance to change. Accordingly, proper management actions should be taken to support and ensure successful organizational change. In times of the CoVid-19 pandemic, banks are imposed to develop and launch new products and services which are expected to yield more revenues in a short period. The open innovation methods allow banks to increase the competitive edge and gain access to emerging markets at low costs. In the transformation process, banks should preconsider the administration of measures for control and cybersecurity within an open innovation ecosystem and secure sufficient R&D capability. The novelty of the subject is expected to foster focused scientific discussions and should be a matter of in-depth analysis and further examination.

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**Апстракт**

*Во денешно време, уметноста на иновациите и нивната експресивност играат суштинска улога во процесот на стекнување конкурентска предност и подобрување на финансиските перформанси на компаниите. Овој труд ги дискутира основните концепти, важноста и стимулирање на употребата на моделот на отворена иновација во современите економии. Покрај тоа, трудот се обидува да направи дистинкција помеѓу концептите на отворена и затворена иновација во организациите.* *Отворената иновација во банкарскиот сектор е тесно поврзана со концептот на отворено банкарство, кое им овозможува на трети страни да дизајнираат и имплементираат иновативни апликации или услуги со употреба на отворени API. Целта на овој труд е да истражат различни пристапи за развој на технолошки управувана стратегија која ги интегрира информациските технологии во рамките на деловните операции, сè со цел успешно задоволување на деловните барања и потреби на компанијата. Понатаму, се обидуваме да дадеме концизно објаснување на неодамнешните технолошки трендови кај финансиските институции во неколку земји, вклучително и во државите од Југоисточна Европа. Земајќи ја предвид зголемената потреба за имплементација на технолошки иновации во финансискиот сектор, овој труд ја нагласува важноста од подобрување на соработката и вклучување на надворешниот интелектуален капитал во рамки на организациите. Со цел успешно справување со динамичните барања на клиентите, финансиските институции треба да ги вклучат информациските технологии како дел од нивните централни деловни активности. Ова ќе резултира со зголемена продуктивност и ефикасност, навремена испорака на услугите, повеќеканална дистрибутивна мрежа, подобра конкурентност на пазарот и подобри вкупни финансиски перформанси.*

***Клучни зборови:*** *отворена иновација, FinTech, дигитална трансформација, финансиски институции.*

***JEL-класификација:*** *O32, O36, G2, N2.*