DOI: 10.47743/ejes-2022-0214

Regulatory barriers for fintech companies in Central and Eastern Europe

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Abstract

Fintech is the delivery of financial products and services to consumers using a combination of innovation and technology. Fintech offers new solutions that have the potential to replace traditional banking operations. The paper presents, as the first contribution of its kind, a summary of the legislation and innovation facilitators provided by Central and Eastern European (CEE) countries for fintech companies. The purpose of this paper is to identify the barriers and challenges created for fintech companies by the current legislation. Another goal is to see how the regulatory environment adapts to the challenges presented by these technology-based companies operating in the financial and banking sectors. Using a comparative analysis, the most progressive countries regarding the preparation of legislation and the facilities that they create for fintech companies are Estonia, Lithuania, and the Republic of Slovakia. The least developed countries in terms of legislation and facilities for fintech companies are Albania, Bosnia and Herzegovina, Kosovo, and Serbia. Regulators in some CEE countries have created Regulatory Sandboxes and Innovation Offices, but fintech companies face many challenges, such as a lack of regulations, the prohibition of fintech companies' activities, and the existence of two different regulators. The study also analyzes the results of the DiGiX index for the years 2018 and 2020.

Keywords: Central and Eastern Europe, Fintech companies, business law, regulatory innovations, financial institutions, BigTech

Introduction

The financial services sector all over the world is changing rapidly, being transformed by new emerging technologies, new participants in the market, and the ever-changing needs of users. Financial services that rely on technology are rapidly

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growing and are offered both by banks, and other financial institutions, as well as various "fintech" start-ups. The BCG FinTech Control Tower (2021) reports approximately 27,000 fintech companies operating across a variety of sectors by late 2021. That is 16% more than in 2018.Yet another report from KPMG (2021) reports 105.3 billion dollars in global fintech investments in 2020. These figures all show a great evolution (or revolution) happening right before our eyes.

Consumers benefit from developments in the fintech sector because they get better service, more flexibility, and more access to finance at lower rates. These advantages must, however, be carefully evaluated against the new hazards posed by new activities like data and cyber risk. Recently, there has been a growing trend of research focusing on fintech and its implications for regulation, activities, trends, profitability, and flexibility in various industries around the world, particularly in developed countries where technology is more advanced and, importantly, more affordable. There is limited research, though, about the fintech impact and development in the CEE countries. Deloitte (2016) studied the fintech companies in CEE and found that innovations in the banking sector provide the greatest share of fintech solutions in all CEE countries; innovation in insurance is still far behind the banks, and the asset management sector is somewhat conservative. According to their report, most financial institutions use systems provided by traditional vendors. One report by the World Bank and the Cambridge Centre for Alternative Finance and Fintech Innovation for the Western Balkan countries in 2019 was based on semi-structured interviews with 13 regulatory authorities in the Western Balkans, individuals working in senior positions in the financial sector, and policy sectors. This report claims that due to strong mobile and internet penetration and a skilled IT workforce, despite the high increase in the usage of cards and digital payments, there is still untapped potential for other fintech services in the Western Balkans; regulatory frameworks are not explicitly adapted to the fintech sector; and there is moderate to high market concentration in the financial sector, which limits the levels of competition and innovation (World Bank, 2020). Due to the limited number of existing studies, the goal of this paper is to outline the difficulties that the law as it stands presents to fintech companies. Another objective is to investigate how the regulatory system is responding to the difficulties faced by these companies. The last one is to investigate which countries are more progressive in the context of legislation.

The current study contributes in several ways. First, this is one of the unique studies that investigates barriers to the fintech sector in the CEE region. Second, through it, it calls on the regulatory authorities to make changes, or even draft relevant legislation for the operation of these companies and financial technology in general. Third, the study fills a gap in the literature regarding this region, and especially the Balkan countries. Fourth, it is the first paper in this field that opens the door for many other papers in this sector for CEE countries, combining current challenges and future prospects to attract the attention of policymakers, regulators, and governments. Also, this study makes a special contribution by highlighting the spread of fintech in the CEE countries. Countries that include the CEE region are Albania, Bosnia & Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, and Slovenia.

The rest of the paper is organized as follows: Section 1 gives a literature overview with a special focus on fintech and the CEE region. Section 2 includes the methods that were used for this study. Section 3 includes fintech-focused regulatory initiatives and policies in international and national regulations in CEE countries. Section 4 identifies the main challenges for fintech companies in CEE countries and summarises the results. In the last section, we included conclusions and recommendations.

1. Literature review

Fintech services may be offered by banks and other financial institutions, but also by companies that focus on offering financial-like services using internet platforms. Innovative, low-cost players have become the latest trend in the banking market, presenting an alternative to traditional banking. They enforce a business mode of retail banking based on an internet platform (Hes and Jílková, 2016). Fintech is becoming a broad term to refer to various technologies used in the financial and banking sectors. Schueffel (2016, p. 32), defines fintech as "a new financial industry that applies technology to improve financial activities." However, there are various classifications for financial technologies. Advances in technology provide new options for companies and individuals to conduct financial transactions.

The growth of financial technology, sometimes known as "fintech", is a subject of great interest among the general public and policymakers (Perkins, 2020). As reported by Arner *et al*. (2015), the term's origins may be traced back to the early 1990s, when Citigroup launched the "Financial Services Technology Consortium" to facilitate technological cooperation. Fintech as a phrase arose in 1972 when Abraham Leo Bettinger said, "FinTech can be defined as a contraction that combines bank experience and expertise with information technology" (Rabbani *et al*., 2020, p. 65).

In their article, Gomber *et al*. (2018) studied the term "Fintech Revolution." They categorize fintech into four categories: (1) operations management in financial services and the developments that are taking place; (2) technology innovations such as blockchain technologies, cryptocurrencies, and cross-border payment services; (3) innovations that have influenced loan and deposit services, such as peer-to-peer lending (P2PL), etc.; and (4) issues related to investments, financial markets, trading, risk management, etc. Another comprehensive study focusing on a literature review of articles about fintech published in journals from 2010 to 2019 was done by Lu *et al*. (2020). Based on their observations, three different streams of research will gain attention in the future: (a) the transformation of financial services' industrial structure and organization as a result of new technologies; (b) the rise of alternative finance and new forms of financial intermediation; and (c) fintech judicial and financial regulation.

Due to its huge reliance on algorithms, artificial intelligence tools, and coding languages, fintech is facing extreme challenges through its use in illicit activities such as terrorism, human trafficking, cybercrimes, and data insecurity. According to Adrian and Mancini-Griffoli (2019), fintech has the potential to cause financial instability, financial misconduct, and a risk to monetary policy, as well as raise new competition standards. Fintech's growth is experiencing several challenges due to its inherent nature, regulatory concerns, and its explicit use in terrorism and war crimes. Because of these concerns, fintech development is seen as a major impediment to financial stability and a greater source of exploiting social values, resulting in inequalities and discrimination. The primary entry barriers for the fintech industry are market concentration forces, economies of scale and scope, restrictions on consumer financial data access, and regulations imposed on the industry (Clements, 2022).

Nguyen *et al*. (2020) mention that there are five challenges for fintech development: (1) legal corridor; (2) infrastructure; (3) fintech companies; (4) customers; and (5) human resources. Furthermore, some regions are affected by major challenges such as a lack of trust, too-tight laws, or obsolete rules, which cause infrastructure and regulatory gaps, and pose serious barriers in terms of a lack of trust, which limits digital transformation and financial access. Fintech firms are heavily involved in algorithmic configurations and the use of artificial intelligence, creating serious accountability and transparency oversights for ordinary people (CTED, 2018). Trust is always a key component of fintech services, as with all other online services (Vatanasombut *et al*., 2008). Fintech is a type of innovation that has both advantages and disadvantages. As demonstrated by various theoretical studies, fintech has the ability to boost efficiency and lower costs for entities, improve access to and delivery of financial services, improve the consumer experience, and generate markets for new and innovative financial services products. However, there are risks associated with fintech, such as money laundering, cyber-security, consumer protection, and data privacy (Chance, 2018). One of the major challenges for fintech in some regions, such as the MENA region, is that many adults do not have a bank account (Anwar and Salama, 2021). Data security continues to be a concern for the MENA region's technological firms because every startup must ensure effective cyber-security measures, resulting in low entrepreneurship groups and another challenge of gender disparity, resulting in low female participation in entrepreneurial activities (O'Sullivan *et al*., 2011).

One study by Shala and Berisha (2021) focusing on fintech in the banking industry in CEE countries showed that the CEE countries' banks should find opportunities to partner with fintech companies, start-ups, and other industry players while keeping in mind all of the financial and regulatory implications in order to stay ahead of the competition.

An interesting case study comes from Romania, where the authors studied the connection between fintech and the non-banking capital market in this country. They imply that fintech solutions can be divided into two main categories: 1) solutions dedicated to the operations of the financial services providers, and 2) solutions dedicated to the interactions of the financial services providers with their clients. They also find that at the Bucharest Stock Exchange, the implementation of fintech has come mainly through the requirements of the market operator and the regulatory framework set by the Romanian Financial Supervisory Authority (Micu and Micu, 2016).

Rodriguez and Ortun (2020) argue that we are already witnessing the change from fintech to bigtech, which needs an evolving regulatory response. According to them, policymakers responded first to the fintech phenomenon with a fractional approach, defined and implemented mainly at the national level, that sought to ensure adequate control of new risks while promoting innovation-enhancing competition. With BigTech's entry, they instead argue that it is likely to significantly change the structure of the financial industry and, therefore, the magnitude and nature of risks. Hence, they insist that policymakers' mindsets should evolve towards a more comprehensive response to ensure the financial sector remains safe, stable and open to competition. Cornelli *et al*. (2020) studied the connection between fintech and bigtech, and they demonstrated that fintech and bigtech are more developed where the ease of doing business is greater, investor protection disclosure and the efficiency of the judicial system are more advanced, the bank's credit-to-deposit ratio is lower, and where bond and equity markets are more developed. In a recent study by Boikova *et al*. (2021), which focused on 28 countries in the European Union for 2017–2019, they demonstrate that one of the most significant factors that affect competitiveness and economic growth is digitalization, which is one form of the fintech revolution.

The financial services industry is still dealing with a slew of new security concerns, ranging from data breaches to large-scale theft and fraud (McQuinn *et al*., 2016). Rapid growth and the fintech revolution may be limited by a number of difficulties. Fintech companies, whether incumbents or newcomers, face a complex and uncertain regulatory environment, laws created for old business models, and limitations on where they can keep and send data. Furthermore, differences in national financial legislation make cross-border solutions more complex. Finally, the financial sector has security concerns that could result in fraud, theft, or network outages (McQuinn *et al*., 2016). In view of the fact that each country has its own set of financial regulations, financial institutions conducting business across borders must navigate a complicated patchwork of standards to deliver their services to global markets. Fortunately, there are already many international efforts to standardize regulations. involved in establishing rules for fintech companies. For example, Basel III discourages loan securitization and requires that banks modify their risk models. The Financial Stability Board (FSB) has undertaken various initiatives on the regulatory aspect of fintech companies (McQuinn *et al*., 2016).

Fintech has gotten a lot of attention from politicians, regulatory agencies, governments, and financial analysts because of its contentious status. Growth in the fintech industry is more difficult due to regulatory limitations. The majority of financial institutions are governed by the central banks of a particular area, and suitable risk management practices are used to account for the factors of credit default and liquidity. Because financial technology operates primarily in a decentralized manner without the need for intermediaries, the heavy reliance on encryption technology has led to unsettling consequences for the entire financial system, financial institutions, and its related constituents. Regulation can also act as a roadblock in this case. Fintech firms must test, set up, and create apps that combine many, typically heterogeneous technologies as they develop their technical platforms. A crucial step in the development process is testing in actual operational settings and live simulations, but to accomplish these goals requires clever partnerships and a supportive regulatory framework (Zetzsche *et al*., 2017). The development of fintech talent involves multiparty collaboration and ongoing support from local authorities, financial institutions, businesses, and academic institutions. Collaboration between educational institutions and policymakers is also needed to develop the fintech industry (Wu and Kao, 2022).

Romānova *et al*. (2018) analyze the regulatory environment by studying the perspectives of European Fintech companies after the issue of Directive 2 “Payment Services.” In their analysis, they look at the advantages and threats that this Directive will bring to the Fintech industry in the near future, as well as the prospects for collaboration between financial services and financial technology companies. They found that the directive “Payment Services” is intended to foster competitiveness, innovation, and development, and that competitiveness is mostly related to low prices and customer satisfaction. However, it is also important to have high-quality products and services, as well as transaction speed, security, and privacy.

Bossu and Rossi (2021) argue that fintech presents unique opportunities for central banks but also poses major challenges. Central banks have always been on the cutting edge of financial technology and innovation. But they now face new and unprecedented challenges, including distributed ledger technology, new data analytics such as artificial intelligence (AI) and machine learning, cloud computing, increased mobile access, and internet speed and bandwidth.

From these studies, we can conclude that there is a lack of research regarding the impact of a variety of approaches to innovation in finance at fintech companies, especially for the Balkan countries. At the same time that these fintech industries have expanded, concerns about fintech have also increased. Regulators and regulatory frameworks have faced significant hurdles as a result of the development of fintech. The expansion and innovation of the fintech sector are said to be seriously hampered by these strict rules. After all, a large number of countries have chosen to open regulatory sandboxes for their fintech industries (Treleaven, 2015). Authorities around the world have adopted a variety of approaches to innovation in finance, which are grouped into several categories: Baseline scenario: no regulation, extending regulations conceived for traditional financial services, a "Test and Learn" approach (with three innovative regulatory initiatives: Innovation Offices, Regulatory Sandboxes, and SupTech), and a bespoke regulatory framework (World Bank, 2020).

Also, we have another group of approaches: Innovation Offices, Regulatory Sandboxes, and RegTech (Zhang *et al*., 2019). According to the World Bank (2020), the policy responses seen across fintech companies can be broadly grouped into three categories: (i) applying the existing regulatory framework to new innovations; (ii) adjusting the existing regulatory framework to accommodate new entrants and re-engineering existing processes to allow for the adoption of new technologies; and (iii) creating a new regulatory framework to include (or prohibit) fintech activities. The World Bank (2020) also categorizes regulatory approaches into these groups: (a) "Wait and See", (b) "Test and Learn", (c) Innovation Facilitators, and lastly (d) Regulatory Laws and Reforms. They can be applied either in combination or solely, and they are not mutually exclusive.

Baseline scenario: no regulation. In some countries, it is not common practice to have any regulations for fintech companies. This approach is also known as "wait and see." According to the traditional point of view, certain events should only be controlled when they are sufficiently widespread or constitute a serious risk to the financial system. A "wait-and-see" approach, on the other hand, can prevent the emergence of an industry. For example, legislation may stipulate that only banks are permitted to lend, suffocating peer-to-peer lending. For example, the Central Bank of the Republic of Kosovo considers P2P lending to be a prohibited activity. In some circumstances, industry participants create rules to promote confidence and defend the industry's reputation. For instance, Estonia, which built a self-regulatory system for crowdfunding, is a successful example of such an effort (World Bank, 2020).

"Test-and-Learn". This involves creating a personal framework for each individual business case that allows them to operate in a direct environment (World Bank, 2020).

Innovation Facilitators. An innovation facilitator is a contact centre or structured environment to promote innovation and experimentation. According to the World Bank (2020), innovation facilitators are one of three types: innovation hubs (also referred to as "innovation offices"), regulatory sandboxes, and regulatory accelerators (also referred to as "Regtech labs").

Innovation Offices or Innovation Hubs. An Innovation Office or Innovation Hub is a contact centre or structured environment to promote innovation and experimentation. The fundamental goal of innovation offices is to improve engagement and collaboration between regulators and industry participants. These offices are a good channel through which a regulator is able to acquire data on various fintech models. Regulators will be better able to develop future regulatory improvements as a result of this data collection (World Bank, 2020). In most cases, it is a point of contact to help fintech companies in many ways. Companies can get support, advice, and direction from an innovation hub or innovation office to help them negotiate the regulatory, supervisory, policy, or legal environment. Given their role in fostering regulatory-innovative collaboration, innovation offices are frequently the initial stage in the regulatory path of innovation. Opening innovative offices will reduce regulatory uncertainty, which could stimulate fintech start-ups, increase awareness of technology-enabled financial innovation, and help regulators respond appropriately (Zhang *et al*., 2019).

Regulatory Sandboxes. Regulatory sandboxes allow some fintech solutions to emerge with a less restrictive regulatory burden before formal licensing, allowing market players to give feedback and regulators to better analyse risks (World Bank, 2020). They are formal programs that test financial services and business models with the current client. Sandboxes can help regulators gain a better understanding of fintech companies and develop evidence-based regulations that promote them (Zhang *et al*., 2019). Regulatory sandboxes require a more structured approach that typically includes controlled testing in a live environment to promote innovation and guide interactions with enterprises while allowing regulators to have good oversight of emerging financial products (World Bank, 2020).

SupTech (also known as Regulatory Accelerators or Regtech labs). The term "SupTech" refers to technology that supports supervisors. Unlike previous initiatives, which served regulatory purposes, SupTech solutions represent an oversight tool (World Bank, 2020). The Basel Committee on Banking Supervision has defined SupTech variously as: "the use of new technologies for internal supervisory purposes" (BCBS, 2017, p. 38) and "the use of technologically enabled innovation by supervisory authorities" (BCBS, 2017, p. 74 or p. 42). According to a World Bank report: "RegTech is a tool to help regulators make oversight and the enforcement of compliance more effective and efficient, using the technologies applied by FinTech companies" (Berg *et al*., 2020).

Bespoke Regulatory Framework. A framework like this requires the creation and implementation of a set of regulatory standards that are tailored to the needs, capacities, and risks of a particular fintech sector or business model. The main challenge, however, is the risk of a regulatory failure if this approach is adopted too early, as policymakers' risk not having enough information. Also, fintech business models are constantly evolving, which can result in regulatory circumvention, and there is a risk of sector over-regulation in which new businesses cannot bear the high compliance costs (World Bank, 2020).

Regulatory Laws and Reforms. It refers to the enactment of new laws or licenses, both overarching and product-specific, in response to innovative companies or business models (World Bank, 2020).

According to the review of literature, there are few, if any, studies focused specifically on Balkan countries for fintech companies and their regulatory challenges. As a result of the lack of analysis and research in this aspect, there is a big gap in highlighting the barriers and challenges that these companies face. Therefore, through this research, we try to close this gap.

2. Methodology

The methodology is based on a comparative analysis of the relevant regulations, challenges, and risks for fintech companies in CEE countries. We used it to identify, challenges that fintech companies face from actual legislation as well as to ascertain which countries are more forward-thinking in this regard.

According to Lor (2010), one of the most prominent subjects in comparative methodology is the question of how many examples should be researched (where cases refer mostly to countries). As a result, comparative studies are done for a single country, many-country (large-N) comparisons, and few-country (small-N) comparisons. Also, Landman (2008) classifies comparative studies into three categories: many countries, several countries, and single-country studies. According to Lor (2010), the first stage is to select countries that have the same characteristics, such as democratically governed countries, Islamic countries, or developing countries.

Comparative analysis plays an important role as the research method can be found in nearly all disciplines and applied to the study of nearly any topic (Azarian, 2011). The comparative methodology in our study has gone through these steps:

- The countries that will be included in our sample have been identified. Several factors have been taken into account in the selection of countries: European countries that are members of the European Union and Balkan countries, in order to see the differences between them;
- Following the selection of the sample, we determined who the regulators that deal with fintech companies are and what initiatives they have undertaken to help them (sandboxes or innovative offices);
- We gathered data about legislation for fintech companies, digital platforms, and other issues of importance for data security and digitalization in general;
- The following step is to analyze and evaluate the data. Separately, for each of them, it is marked with a YES for the existence of legislation or a NO for its absence;
- In the next step, the DiFiX index is analyzed, and its results are compared with ours;

- The last and most important step is the interpretation of the data, through which it is possible to determine which countries have made progress in this regard and which have not.

First, we have identified, from a theoretical point of view, what is important to help a fintech company start its operation in the market. Then, we analyzed initiatives and policies in each CEE country and researched the existence of auxiliary offices (innovation offices and regulatory sandboxes) for fintech companies. In the next step, we identified the lack of legislation for certain areas directly or indirectly related to fintech companies, and it was recognized what the main challenges based on this data were for these companies and fintech indirectly. The last step was the analysis of the DiGiX Index, which also analyzes the field of legislation. We compared results from our analyses with this index and concluded which countries have made legislative advances and which have fallen behind.
In our study, we posed the following research questions:

- What is the current state of CEE country legislation regarding fintech companies?
- What concrete steps have CEE countries taken to support fintech companies?
- What challenges do these companies face in these countries?

This paper uses relevant sources such as the websites of the central banks and other regulators, materials presented in the innovation and fintech offices, and other relevant institutions in the respective countries (the list of websites is at the end of the paper). Specifically, an analysis of the relevant literature and databases, such as the World Bank (WB), central banks, and websites regarding the relevant regulators in Europe. We used a specific database from the World Bank (Global Fintech-Enabling Regulations Database), which has a lot of information on fintech regulation. Also, we used the DiGiX index, an index provided by BBVA Research. After the identification of the regulation, the identification of legal barriers for each country in the field of financial technology was made.

The study includes the following countries: Albania, Bulgaria, Bosnia and Herzegovina, the Czech Republic, Croatia, Estonia, Hungary, Kosovo, Lithuania, Latvia, Montenegro, Northern Macedonia, Poland, Romania, Serbia, Slovenia, and Slovakia.

3. National regulations in CEE countries for Fintech companies

There are many challenges facing the development and adoption of fintech companies' services. Today, among other things, fintech companies face a complex regulatory environment that is designed for older business models and is not easily adaptable to new changes. While many fintech companies operate globally, they are subject to limitations on where they can store and transmit data, as well as legislation aimed at protecting domestic businesses.

Regulations can impact innovation in a variety of ways, both positively and negatively. Regulations in the economic sphere can keep product marketplaces open or competitive to a certain extent, which creates the ideal environment for research and innovation. Regulations in the social realm can impose technological requirements on enterprises and serve as focusing tools for their research efforts.
To encourage responsible fintech innovation, regulators from all over the world are experimenting with sandbox-inspired programs. This includes several sandboxes created especially for testing financial inclusion solutions. The sandbox has numerous advantages for all parties involved. For instance, they inform regulators about long-term policy-making through learning and experimentation, promote communication and engagement with market participants, cut time to market by simplifying the authorization process, collect comments on regulatory requirements and risks, promote the introduction of new and potentially safer products, and increase access to financial products and services. Regulatory sandboxes can help innovators understand the expectations of playing on a restricted field while also reducing the time, cost, and risk of launching a new product into the regulated financial industry (Zhang *et al*., 2019). Regulatory Accelerators are more focused on allowing innovators or fintech businesses to form partnerships with government agencies to develop shared technology to answer pre-defined use cases (World Bank, 2020). Table 1 summarizes regulatory initiatives as well as the benefits and risks they can bring.

Table 1. Regulatory Innovations

Initiatives	Key definitions	Benefits
Innovation offices	Fintech start-ups frequently use innovation offices as their initial step. **By opening these offices, innovators can increase their understanding of financial innovation and promote proper regulatory response**	Savings for both innovators and consumers; improved consumer protection; more informed policymaking; increased competition.
Regulatory sandboxes	They're official programs that put financial services and business concepts to the test with current clients, with specific safeguards and monitoring in place. Regulatory sandboxes are more formal than innovation offices and offer a live testing environment for financial services and business models under a specific framework for supervision and regulation.	Directly promoting financial inclusion; assisting in the development of financial inclusion regulatory enablers

RegTech (regulatory technology)	RegTech (regulatory technology) is concerned with how to monitor and enforce regulatory compliance.	Supervising institutions, monitoring the market, protecting customers, and assisting with rulemaking.

Source: Zhang *et al*., (2019) pp. 7-9; pp. 22-30; World Bank (2020) p. 19

As a first step on the journey toward regulatory innovation, certain jurisdictions have established innovation offices. Although they may go by different names, take different shapes, or serve different purposes, innovation offices all interact with financial services firms that want to offer novel goods and services and clarify regulatory issues for them. While there are innovation offices in many different countries throughout the world, the majority are in advanced economies.
To facilitate the access of fintech companies to domestic markets and their penetration beyond the borders of their countries, European financial institutions have begun to develop relevant strategies. Table 2 presents some of these initiatives.

Table 2. Initiatives and strategies by European financial institutions

Fintech regulatory in EU		
Digital Finance Strategy for the EU	The digital finance plan lays forth broad guidelines for how Europe might assist and regulate the digital transformation of finance in the next few years. The strategy outlines four main objectives: reducing fragmentation in the Digital Single Market; adapting the EU regulatory framework to support digital innovation; promoting data-driven finance, and addressing the challenges and risks associated with digital transformation, including improving the financial system's digital operational resilience.	By 2021
EC and European Forum for Innovation Facilitators (EFIF) framework for launching x-border testing	The EFIF was established following the January 2019 Joint ESA report on regulatory sandboxes and innovation hubs, which identified a need for action to promote greater coordination and cooperation between innovation facilitators to support the scaling up of fintech across the single market.	By 2021

Source: Authors' representation based on data from European Commission[1]; and European Forum for Innovation Facilitators [2]

[1] European Commission, Digital finance package, retrieved from: https://ec.europa.eu/info/publications/200924-digital-finance-proposals_en
[2] Procedural Framework for Innovation Facilitator Cross-Border Testing, retrieved from https://www.eiopa.europa.eu/document-library/publication/efif-procedural-framework-innovation-facilitator-cross-border-testing

The European Commission adopted a digital finance package on September 24, 2020, which includes a digital finance strategy and legislative proposals on crypto-assets and digital resilience, for a competitive EU financial sector that gives consumers access to innovative financial products while ensuring consumer protection and financial stability. This decision was made after extensive public consultations and outreach on digital finance. The package supports the EU's goal of a recovery that embraces the shift to digital technology. Digital financial services can make Europe a player on the global digital stage and modernize the European economy across all sectors.

Also, the framework for launching x-border testing had as an objective: to facilitate the scaling up of innovative products and solutions across Member States; to simplify communication between Member States in cases where a firm is interested in involving multiple national competent authorities (NCAs) from different Member States in its testing activities or outcomes; and to improve information accessibility and transparency regarding cross-border regulatory sandbox testing. This is because the sharing of testing-related information on a cross-border basis between NCAs is considered an important step to reduce the limitations and challenges observed regarding the scaling of financial innovations across the EU.[3]

The policies for fintech companies have also been presented to us by the innovation offices. These offices facilitate early cooperation between authorities and innovators as well as assist in addressing regulatory issues for companies. As an example, Estonia opened an office that provides assistance on applicable legal frameworks and a connection to licensing functions (Berg *et al.,* 2020). As mentioned by Berg *et al*. (2020), there are at least some regulatory boxes located in the CEE region (Hungary, Lithuania, Poland, and Serbia).

The Bulgarian Ministry of Finance announced intentions to establish a regulatory sandbox in February 2020, which would allow international companies to test their products and services in a secure regulatory environment. In this way, public institutions will gain insight into the regulatory framework that is essential to encourage growth in this industry (Financial Fintech Report, 2020). The Ministry of Finance set up a regulatory box (Sofia RegTech Sandbox) and participated in its management.[4]

Croatia has established an Innovation Hub[5]. The regulatory Innovation Hub's purpose is to provide informal support, advice, and guidelines to innovative projects. This can help fintech companies understand their position within the regulatory

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[3] Digital finance package (retrieved from: https://finance.ec.europa.eu/publications/digital-finance-package_en).

[4] Ministry of Finance, Republic of Bulgaria (retrieved from: https://www.minfin.bg/en/news/10967).

[5] Croatian Financial Services Supervisory Agency (retrieved from: https://www.hanfa.hr/fintech1/).

framework and identify regulatory, supervisory, and legal issues that are important to them.

Many EU countries, including the Czech Republic, have made moves to control digital assets. A law passed in the country in January 2017 reduces the anonymity of transactions. Customers of digital asset exchanges and other exchange services must currently be verified. This is done in order to combat money laundering and the financing of illegal activities by maintaining transaction anonymity. The Czech National Bank (CNB) has decided to establish a new specialized communication channel to receive inquiries from fintech companies and all other financial market participants. The new channel is simply called the "fintech contact point."

Finantsinspektsioon is the financial supervision and crisis resolution authority (Finantsinspektsioon) in Estonia. Its policy encourages financial companies to adopt new technological solutions that can handle risk controls, and it explains the possibilities and approaches of Finantsinspektsioon in applying innovative risk controls. The Finantsinspektsioon Innovation Hub is an initiative through which Finantsinspektsioon can communicate with companies applying innovation in the financial sector, learn about financial supervisory positions and guidelines on how to use them.[6]

Hungary has a flourishing fintech scene with around 120 players, most of them early-stage companies. In 2018, the Hungarian National Bank (MNB), launched its Innovation Hub to guide innovators in developing new products and its Regulatory Sandbox to support the market entry of fintech solutions.[7] In 2019, two central authorities – a government organization and the central bank – published their fintech strategies, while the Banking Association released a list of areas where further regulatory support could help enhance digitalization (RBI, 2019).

The Financial and Capital Market Commission (FCMC) in Latvia created an innovation hub and a regulatory sandbox. One of the strategic directions of the FCMC is to support fintech companies and promote innovation in the financial system.[8]

In Lithuania, the regulatory sandbox, which operates under the supervision of the Bank of Lithuania, allows new and existing financial market participants to test financial innovations in a live environment.[9] Also, the Bank of Lithuania has just implemented an electronic system for managing complaints and resolving disputes.

[6]The Finantsinspektsioon Innovation Hub (retrieved from: https://www.fi.ee/en/finantsin spektsioon/innovation-hub).
[7]Services of the MNB innohub (retrieved from: https://www.mnb.hu/en/innovation-hub/regulatory-sandbox).
[8]Latvijas Banka (retrieved from: https://www.fktk.lv/en/licensing/innovation-and-fintech /innovation-sandbox/).
[9]Bank of Lithuania (retrieved from: https://www.lb.lt/en/mission-vision-valuesretrieved from: https://www.lb.lt/en/fintech-and-innovation).

Innovation offices were formally established in North Macedonia[10] (June, 2019) and Montenegro[11]. Also, in Montenegro, the regulatory sandbox was established by the Securities Commission of Montenegro. The Securities and Exchange Commission adopted detailed rules governing the objectives, criteria, and application process for the scheme. This sandbox has a twofold purpose. First, by creating opportunities for potential companies to enter the market. Second, existing fintech companies should have the opportunity to test financial innovation within a controlled regulatory environment, particularly where the applicable regulation is ineffective or confusing (World Bank, 2020).

The Polish Financial Supervision Authority has created a Special Task Force for Financial Innovation in Poland (Fintech) in response to the dynamic development of new technologies in the financial services market. The objective of the Task Force is to identify legal, regulatory, and supervisory barriers to the development of financial innovations in Poland and to propose solutions and actions that could eliminate or limit the identified barriers. Also, in Poland, they have launched the Innovation Hub Program and Regulatory Sandbox.[12]

In Romania, the Financial Supervisory Authority (ASF) introduced the FinTech Hub. The FinTech Hub has established an institutional framework for communication with fintech companies, thereby promoting the development of contemporary financial technology while maintaining client confidence and sufficient levels of protection.[13]

The central bank of the Slovak Republic (NBS) has established the Innovation Hub. In this way, NBS supports the development of modern technologies in the financial market.[14] The Fintech Innovation Hub of Banka Slovenia is a dedicated, single point of contact for the exchange of information on innovative business models and clarification of regulatory requirements. It is aimed at companies that want to provide solutions based on financial technologies (fintech) and want to know what regulatory criteria fintech companies will have to fulfil if they do so in Slovenia or the European Economic Area.[15]

However, in other countries, one or two units/departments have typically served as de facto central points of contact because of the regulator's increased need to deal with industry-specific problems; for example, the Supervision Department within the Bank of Albania. In Serbia, the Department within the Serbian Securities

[10] Central Banking of North Macedonia (retrieved from: https://www.centralbanking .com/fintech).
[11] The Central Bank of Montenegro (retrieved from: https://fintechhub.cbcg.me).
[12] The Innovation Hub Program (retrieved from: https://fintech.gov.pl).
[13] AFS Romania (retrieved from: https://asfromania.ro).
[14] The NBS Bank (retrieved from: https://www.nbs.sk/en/financial-market-supervision1/ fintech#ih).
[15] Banka Slovenije's Fintech Innovation Hub (retrieved from: https://www.bsi.si/en/about-us/banka-slovenijes-fintech-innovation-hub).

Commission and the Payment System Department at the National Bank of Serbia, etc. (World Bank, 2020). Table 3 presents some fintech initiatives and policies in Central and Eastern European countries.

Table 3. Fintech-initiatives and policies in CEE countries

Country	Fintech -initiatives and policies
Albania	The Albanian government's "Digital Agenda for Albania 2015-2020" focused on improving ICT infrastructure and proposed measures to align national legislation with EU laws (such as PSD2). Several reforms to the payments system laws A proposed law on virtual assets The Albanian ICT Association
Bosnia and Herzegovina	Proposed measures to align national legislation with EU laws (such as PSD2)
Bulgaria	EU Regulatory Sandbox Bulgarian Fintech Association
Croatia	Regulatory Sandbox in the EU; The Croatian Financial Services Supervisory Agency (HANFA) and the Capital Markets, Insurance and Savings Authority have jointly signed a memorandum of understanding for collaboration on FinTech issues with the Israel Security Authority. Croatian Blockchain and Cryptocurrency Association
Czech Republic	EU Regulatory Sandbox Other FinTech-friendly policies and measures: Memorandum with Blockchain Republic
Estonia	The supervisory policy of the Financial Supervision Authority is to promote an innovative financial sector;
Hungary	Regulatory Sandbox, Innovation Office, EU Regulatory Sandbox
Kosovo	The government of Kosovo provides grants to stimulate innovation and the start-up community in the country and promotes a business-friendly environment through the Innovation Office (announced).
Montenegro	Government programs to improve financing for ICT SMEs, as well as proposed measures to align national legislation with EU laws (such as PSD2)
Poland	Regulatory Sandbox, Innovation Office, EU Regulatory Sandbox Other FinTech-friendly policies/ measures: Special Task Force for Financial Innovation
Republic of North Macedonia	The launch of an innovation gateway by the central bank to communicate with the FinTech sector; Proposed measures to align national legislation with EU laws (such as PSD2) Alternative Financial Services Association of North Macedonia

Romania	Innovation office, EU Regulatory Sandbox
Serbia	Regulatory Sandbox Other key strengths: Several start-ups and scale-ups from Eastern Europe have migrated here to take advantage of the beneficial climate and good ICT infrastructure. The government has implemented a range of measures to promote the ICT sector, including proposed measures to align national legislation with EU laws (such as PSD2). ICT Network
Slovak Republic	Special contact for FinTech questions, EU Regulatory Sandbox The Ministry of the Interior has created an API designed to facilitate the automation of know-your-customer processes.
Slovenia	EU Regulatory Sandbox

Source: Berg, *et al*. (2020) pp. 54-64; SeeNews "Financial Fintech Report 2020" (p. 36); The Joint Committee[16]

In Serbia, the Annual Financial Stability Report (NBS, 2017) of the financial system, mentions regulatory sandboxes, but the Central Bank of Serbia does not have any information about the opening of an innovation office or regulatory sandbox. There are other websites that confirm the opening of a fintech regulatory office. [17] Also, on the official website of the Central Bank of Kosovo, there is no information on the opening of an innovative office or regulatory sandbox.

Table 4 shows the types of initiatives as well as the respective institutions under which they operate in CEE countries.

Table 4. Type of Initiative and their operators in CEE countries

Jurisdiction	**Operator**	**Type of Initiative**
Europe	European Central Bank	RegTech
EU	European Banking Authority and European Commission	Regulatory Sandbox
Hungary	Central Bank of Hungary	Innovation Hub/Office
	Magyar Külkereskedelmi Bank	Innovation Office
	Central Bank of Hungary	Regulatory Sandbox
Lithuania	Bank of Lithuania	Innovation Office
	Bank of Lithuania	Regulatory Sandbox
	Bank of Lithuania	RegTech
Poland	Polish Financial Supervision Authority	Regulatory Sandbox
	Polish Financial Supervision Authority	Innovation Office

[16]The Joint Committee (retrieved https://www.eba.europa.eu/financial-innovation-and-fintech/european-forum-for-innovation-facilitators).
[17]Serbia Creates Opportunities (retrieved from: https://innovations.serbiacreates.rs/#).

Bulgaria	Financial Supervision Commission (FSC)	Innovation Hub/Office
Croatia	Croatian Financial Services Supervisory Agency	Innovation Hub/Office
Estonia	Estonian Financial Services Authority Finantsinspektsioon (EFSA)	Innovation Office
Czech Republic	Czech National Bank;	FinTech contact point
Latvia	Financial and Capital Market Commission	Sandbox
	Financial and Capital Market	Innovation Office
Romania	The Financial and Capital Market Commission	InsureTech Innovation Hub
	The Financial and Capital Market Commission	Innovation Office
North Macedonia	National Bank of North Macedonia	NM's innovation office
Montenegro	The Securities Commission of Montenegro	Regulatory Sandbox
	Central Bank of Montenegro	The CBCG FinTech Hub - Regulatory Innovation Centre
Slovakia	National Bank of Slovenia	Innovation Hub/ Office
Slovenia	Banka Slovenije	Innovation Hub/ Office

Note: The Central Bank of Kosovo, Albania does not provide information that they have drafted legislation for fintech firms. Also, the Central Bank of Serbia and the Securities Commission website do not have such information, although the World Bank reports indicate that there is a sandbox regulatory in Serbia.
Source: Zhang, *et al*., (2019); pp. 44-54; World Bank, (2020) p. 36; The Joint Committee; World Bank (2020) pp. 46-48

4. Analysis of results and discussions

From the World Bank, we also have a new database related to fintech companies. This database consists of nearly 200 countries around the world. Among other things, this database covers country-specific treatments of regulations such as digital banking, crypto assets and marketplace lending. Among other things, this database covers country-specific treatments of regulations such as digital banking, crypto assets, and marketplace lending. Based on this data and information gleaned from the World Bank report, central bank websites, innovative office websites, and the Regulatory Sandbox, we identified the barriers facing fintech companies.
Most of the region's central banks or relevant CEE financial institutions have opened an innovative office, a regulatory sandbox, or both. EU member states have

legislation that fully complies with EU legislation. Kosovo, Albania, and Bosnia & Herzegovina have no legislation at all for fintech companies.
Only five CEE countries (Estonia, Hungary, the Czech Republic, Lithuania, and the Slovak Republic) have legalized and regulated digital platforms such as P2P lending and crowdfunding. In some of these countries, these products are not regulated by law, but neither have they been banned: Albania, Bulgaria, Croatia, Latvia, Montenegro, Poland, Romania, and Slovenia.

When designing policies for the fintech industry, regulators should keep in mind that regulations enable the balance between innovation and regulation while at the same time achieving regulatory goals. Of course, the set of laws governing fintech companies can create duplicate requirements from multiple regulators. As a result, governments should aim to coordinate and integrate these operations in order to reduce the burden on fintech companies in areas where there is significant overlap. Macedonia and Serbia have two different regulators, so their approach to crowdfunding is different. In North Macedonia, equity crowdfunding is permitted by the Central Bank of North Macedonia, whereas the Securities Regulator considers it to be unclear. The Securities Commission in Serbia has no reservations about equity crowdfunding, whereas the National Bank of Serbia has reservations about its legality. Of all the Balkan countries, only North Macedonia explicitly allows P2PL activity.

Regulators must be careful not to go too far in punishing companies that work hard to bring new items to market. This policy would limit fintech innovation because innovators would be less confident in trying to create the next fintech application and would instead focus on compliance rather than uniqueness if they were afraid of being punished for making a mistake. In Kosovo, peer-to-peer lending and crowdfunding are considered prohibited activities, the same is true for peer-to-peer lending in Bosnia and Herzegovina.

Governments need to ensure that the fintech products they adopt have a high level of security. According to a report by the World Bank, the countries that have taken steps to regulate or clarify the legal status of crypto-assets are the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia (Berg *et al*., 2020). Also, all countries have regulated money laundering, cyber risk, electronic payment, and data protection with relevant laws (Table 5).

In some countries, policymakers take some principles into account when drafting regulations for the fintech industry. National governments should encourage the adaptation of fintech companies by promoting technology adaptation in the financial services industry. Another way national governments can support the advancement of fintech companies is by funding research and development (R&D) for fintech applications. Additionally, they should prioritize cyber security and the implementation of instant payment processing systems.

In Table 5, we have also placed the index called "DiGiX." DiGiX is a BBVA Research index that aims to measure the state of digitalization in various countries around the world in order to compare degrees of digitalization across countries and identify areas that require action. This index includes 19 indicators, grouped into three groups: supply conditions (infrastructure and costs), demand conditions (user, government, and enterprise adoption), and institutional environment (regulation). According to this indicator from CEE countries, Estonia, Lithuania, and Slovenia are ranked in the best positions for the years 2018 and 2020 (Table 5).

Table 5 presents information on related fintech companies and other aspects of financial law, with an affirmation (Yes) or denial (No) of their presence in CEE countries.

In order to make progress in terms of legal regulation and facilitation of entering the market, fintech companies from the Balkan countries also need to adapt to EU legislation. However, they are not all EU members, so local governments should work together to harmonize their policies so that there is no unnecessary burden on these companies. International harmonization-based collaboration and coordination are crucial for the effective regulation and control of fintech applications, eliminating systemic threats to financial stability and allowing fintech companies to grow.

Table 5. Summary of products, regulations for fintech companies and incentives

Country	Anti-Money Laundering	CBDC*	CDD*	Crypto Currency	Cyber Security	Equity Crowdfunding	P2PL	Data Protec.	Digital ID	Electronic Money	Electronic Payment	Open Banking	Invitation Facilities	FinTech-regulation	DiGiX	
															‘18 Rank	‘20 Rank
ALB	YES	NO	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	NO	NO	59	59
BIH	YES	NO	YES	NO	YES	NO	NO**	YES	YES	NO	YES	NO	NO	NO	NA.	NA.
BGR	YES	NO	YES	NO	YES	NO	NO	YES	YES	NO	YES	YES	YES	YES	41	40
CZE	YES	NO	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	69	70
HRV	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	30	37
EST	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	21	11
HUN	YES	NO	YES	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	55	65
KSV	YES	NO	YES	NO	YES	NO**	NO**	YES	YES	YES	YES	NO	NO	NO	NA.	NA.
LVA	YES	NO	YES	NO	YES	NO	NO	YES	YES	YES	YES	YES	YES	YES	39	46
LTU	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	33	34
MKD	YES	NO	YES	NO	YES	YES-NO	YES	YES	NO	NO	YES	NO	YES	YES	84	73
MNE	YES	NO	YES	NO	YES	NO	NO	YES	NO	NO	YES	NO	YES	YES	53	58
POL	YES	NO	YES	NO	YES	NO	NO	YES	YES	YES	YES	YES	YES	YES	50	39
ROU	YES	NO	YES	NO	YES	NO	NO	YES	YES	NO	YES	YES	YES	YES	49	43
SRB	YES	NO	YES	NO	YES	YES-NO	NO	YES	YES	NO	YES	NO	NO	YES	58	57
SVK	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	45	55
SVN	YES	NO	YES	NO	YES	NO	NO	YES	YES	YES	YES	YES	YES	YES	29	33

Note: *CDD-Law on the prevention of money laundering and financing of terrorist; CBDC-Central Bank Digital Currency; P2PL-Peer to Peer Lending. **Prohibited activity.

Source: Authors’ representation based on World Bank; Central Bank of Montenegro; Bank Slovenije (https://www.bsi.si/en/); The NBS Bank; Croatia Financial Services; Central Bank of the Republic of Kosovo

From all the CEE countries, the most successful countries in completing legislation for fintech companies and their products are Estonia, Lithuania, and the Republic of Slovakia.

The DiGiX index also ranks the country of Estonia as the most successful country in 2018 and 2020. The least developed countries in terms of legislation and facilities for fintech companies are Albania, Bosnia and Herzegovina, Kosovo, and Serbia.

In other Balkan countries, significant progress has been made in North Macedonia and Montenegro. Fintech companies face challenges such as a lack of regulations, the complexities of balancing key regulatory objectives between financial stability and consumer protection, prohibiting fintech companies' activities, and the existence of two different regulators, thus creating double standards and sometimes unclear guidance for fintech companies.

Regulators should carefully assess whether coordination and cooperation agreements are required, both locally and globally, to aid regulation creation and implementation, and, ultimately, to accomplish policy goals.

Cross-border cooperation between the authorities can facilitate the penetration of foreign fintech companies, which would help more widely with the exchange of knowledge, influencing regional and international market developments. Regulators should be careful about enforcing unnecessary prescriptive rules. They should start with more general provisions, including those supported by guidelines, and adopt more normative regulations only when necessary.

As in any other field, supervision is essential. In order to achieve the goals of regulatory policies, it is necessary to effectively monitor any regulatory measures implemented and monitor the developments of fintech companies and the risks they may pose to consumers. Of course, the end of the road is not just the issuance of relevant regulations. A number of additional measures will be needed to accompany the regulatory measures. For example, additional measures will be needed to enhance the digital and financial education of consumers so they can understand the benefits and risks of the product and their rights and responsibilities.

Conclusions

For any regulator in the CEE countries, it will be important to adapt regulatory approaches to the country's context and balance the need for consumer protection with the impact that results from development and innovation. The goal of this research was twofold. First, to investigate the regulatory challenges that fintech firms face in their respective countries. Second, to analyse the legislation for fintech companies in CEE countries in order to show which countries have shown the most progress in this regard.

Fintech companies in CEE countries face many challenges, such as a lack of regulations, the complexities of balancing key regulatory objectives between financial stability and consumer protection, prohibitions on fintech activities (Bosnia and Herzegovina and Kosovo), and the existence of two different regulators (Northern Macedonia and Serbia), thus creating double standards and sometimes unclear guidance for fintech companies. Of all the CEE countries, the most successful countries in completing legislation for fintech companies and their products are Estonia, Lithuania, and the Republic of Slovakia. In terms of facilitation and legislation for fintech companies, Albania, Bosnia and Herzegovina, Kosovo, and Serbia have seen stagnation.

Policymakers must first conduct a thorough examination of the market, consumer demands, and the current regulatory framework. The consultation will be most effective if both the consumer and the industry are involved. Consumer expectations and experiences regarding fintech products, as well as financial products in general, should be considered by regulators in the context of their requirements and circumstances. Information for these can be gathered in a variety of ways, such as through experts, customer focus groups, industry participants, other industry participants, etc.

Without a doubt, there are certain limitations to this research. Fintech companies are difficult to research because of their innovation, modest size, and diversity. In addition, many of the countries in the sample have little national data. There is also no official website in any of the countries that lists the names of fintech companies, their sizes, and other relevant data. Of course, in future studies, it would be interesting to analyse, in addition to other factors, the impact of various regulatory barriers on fintech companies. Since businesses in the Balkans mainly use banks as their financiers, future studies into digital platforms and the opportunities and potential risks that they may bring would be of interest to them.

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