

Preparation Financial Systems in the Digital World: Threat, Opportunities, and Challenges

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Abstract— This paper examines the impact of digitalization on financial systems, exploring the threats, opportunities, and challenges they present. The analysis delves into the evolution of the financial landscape and its implications for financial institutions, regulators, and consumers. The paper highlights the importance of understanding these changes and developing appropriate policies, strategies, and regulations to capitalize on the benefits of technological advancements while mitigating potential risks and challenges. Furthermore, the study underscores the need for financial institutions to adapt and stay competitive in the ever-changing financial landscape and for consumers to make informed decisions and navigate the complex world of finance.

Keywords—Financial systems, digitalization, financial technologies, fintech, opportunities, threats, challenges, regulation, financial stability

I. INTRODUCTION

Financial systems worldwide have undergone significant transformations in recent decades, driven by rapid advancements in digital technologies (Claessens & Kodres, 2014). Globalization has led to increased interconnectedness of financial markets, facilitating cross-border capital flows, and fostering greater cooperation among countries (Gopinath, Helpman, & Rogoff, 2014). Concurrently, adopting digital technologies, such as artificial intelligence, blockchain, and mobile applications, has revolutionized financial services by introducing new business models and innovative products (Arner, Barberis, & Buckley, 2016). Digitalization has reshaped the economic landscape, presenting opportunities and challenges for financial institutions, regulators, and consumers.

As financial systems continue to evolve in the digital world, stakeholders must comprehend the impact of these changes on various aspects of the financial sector (Lastra, 2015). This understanding is essential for formulating appropriate policies, strategies, and regulations to harness the benefits of technological advancements while mitigating potential risks and challenges (Carney, 2018). Furthermore, comprehending the implications of these trends is crucial for financial institutions to adapt and stay competitive in the ever-changing financial landscape and for consumers to make informed

decisions and navigate the complex world of finance (Demirguc-Kunt, Klapper, & Singer, 2017).

This paper aims to provide a comprehensive analysis of the threats, opportunities, and challenges associated with the digitalization of financial systems, focusing on their implications for financial institutions, regulators, and consumers. This analysis aims to contribute to understanding the changing dynamics of the financial sector and inform the development of effective policies and strategies for managing the risks and maximizing the benefits of these transformations.

The research hypothesis of this paper posits that digitalization of financial systems, while offering significant opportunities for innovation and financial inclusion, also present substantial challenges in terms of regulation, financial stability, and consumer protection. By examining the effects of these transformations on various aspects of the financial sector, this paper seeks to identify the key factors that influence the balance between the benefits and risks associated with the digital financial landscape.

This study employs a mixed-methods approach to investigate financial systems in the digital world. Quantitative analysis utilizes macroeconomic data from Eurostat for 2011-2022 with basic statistical methods, while qualitative analysis is based on selected case studies from the Polish market.

II. LITERATURE REVIEW

Digitalization of Financial Systems

The rapid advancements in digital technology have profoundly impacted financial systems worldwide. In the economic realm, financial globalization has led to an increasing interconnectedness of financial systems across countries (Fabozzi et al., 2019). Integrating digital technology into financial services has spurred innovation, transformed traditional business models, and reshaped customer expectations (Arner, Barberis & Buckley, 2016). As a result, the digitalization of financial systems has become a major driving force in the evolution of the global financial landscape. The impact of digitalization on the financial system generates several opportunities, challenges, and threats. They were outlined below.

2.1. Opportunities

The digitalization of financial systems has given rise to numerous opportunities that promise to revolutionize the industry in various ways. Digital payments and transactions

have accelerated the speed and reduced the costs associated with financial services, leading to increased efficiency for both businesses and consumers (Chakravorti & Chaturvedi, 2017). Automation in financial services has further improved operational efficiency, streamlining processes such as customer onboarding, risk management, and compliance (Arner, Barberis & Buckley, 2016). Decentralized finance enabled by blockchain technology, has emerged as a potential game-changer, eliminating intermediaries, and offering cost-effective alternatives to traditional financial services (OECD, 2022).

One prominent aspect of digitalization in financial systems is the widespread adoption of online banking and mobile payment platforms, particularly in developing countries with limited traditional banking infrastructure (Demirguc-Kunt, Klapper & Singer, 2017). These innovations have enabled consumers to access financial services more conveniently and efficiently, leading to a significant shift in the way individuals manage their finances (Chishti & Barberis, 2016). The rise of digital payment methods, such as mobile wallets and peer-to-peer payment apps, has further revolutionized the way transactions are conducted, reducing the reliance on cash and traditional payment systems (Zwitter, Gstrein & Yap, 2020) and enabling individuals and small businesses to obtain loans from a vast pool of investors (Serrano-Cinca, Gutiérrez-Nieto, & López-Palacios, 2015). Microfinancing initiatives have provided much-needed financial support to low-income populations, empowering them to engage in entrepreneurial activities and contribute to economic growth (Vanroose & D'Espallier, 2013).

Another transformative development in the digitalization of financial systems is the emergence of digital assets and cryptocurrencies. These novel forms of digital assets, like Bitcoin and Ethereum, have gained popularity as an alternative investment class and medium of exchange, challenging the traditional roles of central banks and monetary policy (Casey & Vigna, 2018; Narayanan et al., 2016). In addition, the underlying technology behind cryptocurrencies, known as a blockchain, has opened up new possibilities for decentralized finance (DeFi) platforms, which offer a range of financial services without intermediaries such as banks (Mougayar, 2016).

Artificial intelligence (AI) and machine learning (ML) have also begun to play a significant role in the digital transformation of financial systems. These advanced technologies are increasingly being applied in various aspects of finance, such as credit scoring, fraud detection, risk management, and trading algorithms (Yermack, 2017). Integrating AI and ML in financial services can significantly enhance decision-making processes, optimize resource allocation, and improve overall efficiency (Holzinger, 2017). Robo-advisors and AI-driven investment strategies have democratized access to financial advice and wealth management services, catering to a more diverse clientele (Waliszewski & Zięba-Szklarska, 2020). Crowdfunding and tokenization have transformed capital-raising activities, enabling entrepreneurs and innovators to raise funds from a global investor base (Belleflamme, Lambert & Schwienbacher, 2014).

2.2. Challenges

While the digitalization of financial systems offers numerous opportunities, they also present several challenges that need to be addressed by various stakeholders in the financial sector. As financial systems become increasingly global and digital, regulatory and compliance issues become more complex (Claessens & Kodres, 2014). National and international regulatory frameworks struggle to keep pace with rapidly evolving technologies, leading to gaps in oversight and potential legal ambiguities (Arner, Barberis & Buckley, 2016). Furthermore, the decentralized nature of some emerging technologies, such as blockchain, complicates regulatory efforts and raises concerns about jurisdictional boundaries (Zohar, 2015). Financial institutions face the challenge of complying with various regulatory standards across different jurisdictions, resulting in increased compliance costs and operational complexities (Zetzsche et al., 2017).

Digitalizing financial systems has increased the risk of cyberattacks and fraud. Cybercriminals exploit vulnerabilities in digital infrastructures and target sensitive financial data (Romanosky, 2016). The interconnected nature of global financial systems also magnifies the potential consequences of cyber incidents, as they can quickly spread across borders and disrupt multiple institutions simultaneously (Gai, Haldane & Kapadia, 2011). Financial institutions must invest heavily in cybersecurity measures to protect customers and maintain trust in the digital financial ecosystem (Böhme et al., 2015).

Integrating digital technologies connected with financial systems can introduce new sources of systemic risk as financial markets become more interconnected and interdependent (Allen & Gale, 2000). The rapid adoption of innovative financial products and services, such as cryptocurrencies and DeFi platforms, raises concerns about potential market volatility and the implications for financial stability (Bouri et al., 2017). Policymakers and regulators must monitor these developments closely and adapt their macroprudential frameworks to address emerging risks and maintain financial stability (Danielsson & Zigrand, 2008).

2.3. Threats

The digitalization of financial systems also brings about several threats that can pose significant risks to the financial sector, jeopardizing these systems' potential benefits and stability. While digital financial services have the potential to promote financial inclusion, there is a risk that the digital divide may exacerbate existing inequalities (Demirguc-Kunt, Klapper & Singer, 2017). Individuals who lack access to digital technologies or have limited digital literacy may be excluded from the benefits of digital finance, perpetuating financial exclusion, and exacerbating income inequality (Park & Mercado, 2015). Governments and financial institutions must ensure digital financial innovations do not inadvertently marginalize vulnerable populations (Mbiti, I., & Weil, 2016). The increasing reliance on digital platforms for financial transactions raises concerns about privacy and data security (Solove, 2013). The collection, storage, and sharing of sensitive financial information by digital financial services providers can expose users to the risk of data breaches and

identity theft (Romanosky, 2016). Moreover, using advanced data analytics and artificial intelligence in financial services raises ethical questions about the potential for discriminatory practices and biased decision-making (Barocas & Selbst, 2016).

The anonymity and cross-border nature of digital financial transactions can facilitate illicit activities such as money laundering, terrorist financing, and tax evasion (Zdanowicz, 2009). The emergence of decentralized digital currencies, such as Bitcoin, has further complicated efforts to combat these illegal activities, as they can bypass traditional financial systems and avoid regulatory oversight (Casey & Vigna, 2018). Policymakers and regulators must work together to develop effective strategies for combating the misuse of digital finance while preserving its benefits for legitimate users (Fanusie & Robinson, 2018).

III. METHODOLOGY

A combination of research methods has been employed to provide a comprehensive understanding of the topic. The quantitative aspect of the research is based on macroeconomic data obtained from the Eurostat database for the years 2011-2022. The data was used to analyze the trends and patterns in digital technology adoption within the financial sector. Simple statistical methods were applied, such as the correlation coefficient and the coefficient of determination (R-squared), to identify relationships between variables and to assess the strength of those relationships.

In addition to the quantitative analysis, a qualitative analysis

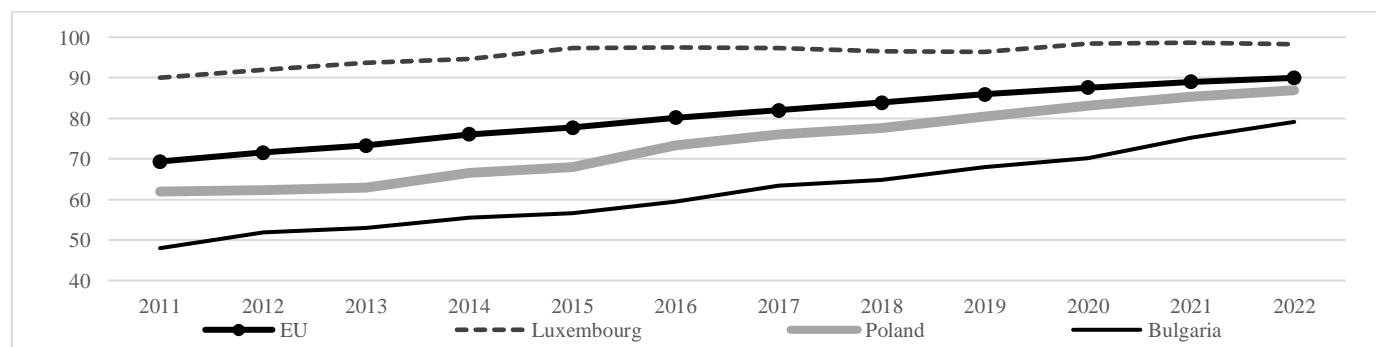
was conducted based on selected case studies from the Polish market. This approach aimed to provide a deeper understanding of the real-life implications of digital technology adoption in the financial sector. The case studies were selected to represent various aspects of the financial system, including both traditional financial institutions and emerging fintech companies. Through these case studies, the study sought to identify key challenges, opportunities, and threats that digitalization presents to the financial sector and to explore potential strategies for addressing them.

IV DIGITALIZATION IN THE EUROPEAN UNION – MACROECONOMIC DATA ANALYSES

As mentioned earlier, the digital inclusion of society (and the economy) is crucial for the financial market digitalization process. It is most important, especially among individuals, as companies and corporations are generally more digitally oriented than the average person. Besides, the individuals often are (or – at least – should be) the end users of digital financial services.

The data presented in Fig. 1 provides insight into the percentage of individuals who often use the Internet as a proportion of the total population in the European Union (EU) and three of its member countries – Luxembourg, Poland, and Bulgaria – from 2011 to 2022. Luxembourg consistently shows the highest level of individuals who use the Internet in the EU, Poland demonstrates an average level, and Bulgaria has the lowest level of people who use the Internet in the EU.

Figure 1. Internet use by individuals (in % of total society). The whole EU, Poland, the leading and the last ranked country



Source: own elaboration based on the Eurostat data: Individuals - internet use, online data code: ISOC_CI_IFP_IU (extracted on 03 Apr. 2023).

The EU as a whole has seen a steady increase in Internet usage, growing from 69.36% in 2011 to 89.99% in 2022. It reveals a positive trend in Internet adoption among the EU population.

Luxembourg, holding the highest level of Internet usage in the EU, consistently surpasses the EU average. From 2011 to 2022, Internet usage in Luxembourg increased from 90.03% to

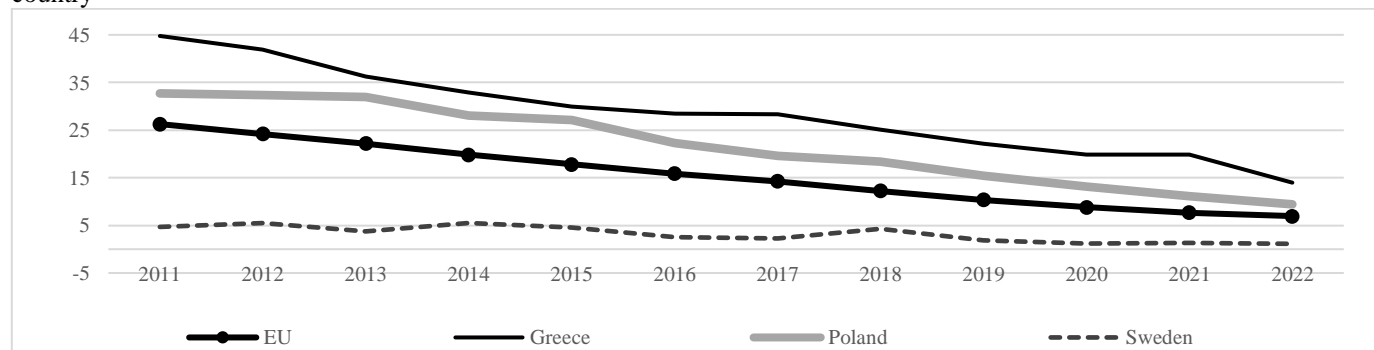
98.24%. It demonstrates a solid digital presence among Luxembourg's population.

Poland exhibits an average level of Internet usage compared to the EU average. In 2011, 61.95% of the Polish population used the Internet, which gradually rose to 86.94% by 2022. This growth indicates a steady increase in Internet adoption among the Polish population over the years.

Bulgaria has demonstrated the lowest level of individuals who use the Internet in the EU. It started at 47.98% of Internet users among the whole society in 2011 and reached 79.13% by 2022. Despite having the lowest level among the countries, Bulgaria has also experienced a considerable increase in Internet usage over the years, demonstrating improved digital connectivity.

To complement the data on digital exclusion in the EU, an analysis was made of the number of people who have not used Figure 2. Individuals who never used Internet (in % of total society). The whole EU, Poland, the leading and the last ranked country

the Internet. The data presented in Fig. 2 offers a comprehensive overview of the percentage of individuals who have never used the Internet within the total population of the European Union (EU) and three of its member countries – Greece, Poland, and Sweden – from 2011 to 2022. Greece demonstrates the largest percentage of the population that has never used the Internet, Poland exhibits an average level with improvement, and Sweden has the lowest level of people who have never used the Internet in the EU.



Source: own elaboration based on the Eurostat data: Individuals - internet use, online data code: ISOC_CI_IFP_IU (extracted on 03 Apr. 2023).

Across the EU, there has been a significant decline in the percentage of society that has never used the Internet. However, it dropped from 26.27% in 2011 to 6.96% only in 2022. This trend reflects the increasing digital connectivity and Internet accessibility among the EU population.

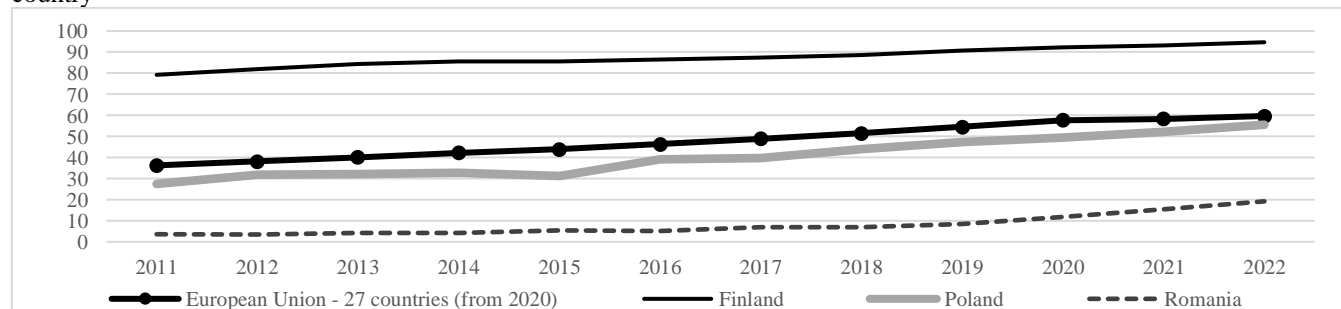
Greece, with the highest level of individuals who have never used the Internet in the EU, has experienced a substantial reduction in this percentage over the years. In 2011, 44.77% of the population had never used the Internet, but this figure decreased to 13.97% by 2022, indicating a marked improvement in Greece's digital inclusion.

Poland, exhibiting an average level of people who have never used the Internet, has shown steady progress. The percentage decreased from 32.71% in 2011 to 9.42% in 2022, highlighting Poland's efforts to increase digital access and literacy among its population.

Sweden, with the lowest level of individuals who have never used the Internet in the EU, has maintained an impressive record. In 2011, only 4.62% of the Swedish population had never used the Internet, and this figure further dropped to 1.13% in 2022. This data underscores Sweden's exceptional digital connectivity and Internet adoption among its citizens.

The next stage of the study was an evaluation of the number of the Internet banking users. The data presented in Fig. 3 provides a detailed analysis of the percentage of individuals who use Internet banking as a proportion of the total population in the European Union (EU) and three of its member countries – Finland, Poland, and Romania – from 2011 to 2022. Finland demonstrates the highest level of people who use Internet banking in the EU. Poland has exhibited improvement and is now approaching the EU level. Romania has the lowest level of percentage of the population that use Internet banking in the EU.

Figure 3. Individuals who use Internet banking (in % of total society). The whole EU, Poland, the leading and the last ranked country



Source: own elaboration based on the Eurostat data: Individuals - internet use, online data code: ISOC_CI_IFP_IU (extracted on 03 Apr. 2023).

In the EU, there has been consistent growth in the percentage of individual users of Internet banking, increasing from 36.25% in 2011 to 59.68% in 2022. This trend highlights the expanding adoption of digital banking services among the EU population.

Finland, boasting the highest level of citizens who use Internet banking in the EU, has consistently outperformed the EU average. Internet banking usage in Finland increased from 79.20% in 2011 to 94.68% in 2022, reflecting a strong preference for digital banking services among the Finnish population.

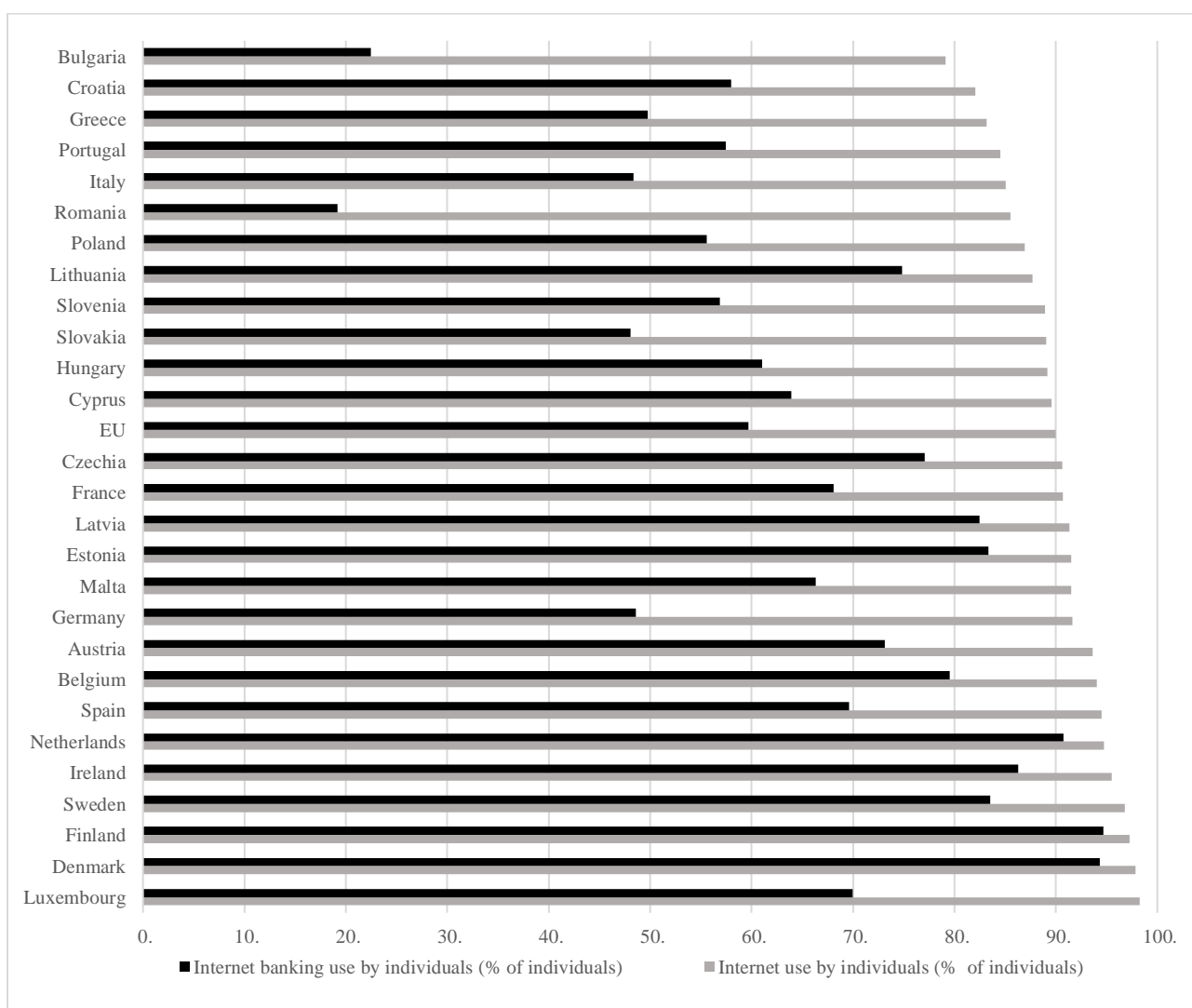
Poland, which has shown significant improvement in the adoption of Internet banking, has nearly reached the EU level. Starting at 27.46% in 2011, Poland's Internet banking usage increased to 55.55% of the total population in 2022,

demonstrating a growing trend toward digital banking services among Polish citizens.

Romania, with the lowest level of individuals who use Internet banking in the EU, has experienced a considerable increase in this index over the years. In 2011, only 3.51% of the Romanian population used Internet banking, but this figure grew to 19.19% by 2022. Despite having the lowest level among the three countries, Romania has shown noteworthy progress in adopting digital banking services.

To provide a more informative study, the Internet users population was compared with the size of the Internet banking users group. The data presented in Fig. 4 provides this comparison across all European Union member states in 2022.

Figure 4. Internet users vs. Internet banking users in the EU in 2022 (in % of total society)



Source: own elaboration based on the Eurostat data: Individuals - internet use, online data code: ISOC_CI_IFP_IU (extracted on 03 Apr. 2023)

In 2022, Luxembourg had the highest level of Internet usage among all EU countries, with 98.24% of individuals using the

Internet. The Scandinavian countries – Denmark (97.86%), Finland (97.26%), and Sweden (96.81%) – also exhibited

exceptionally high levels of Internet usage. These high percentages indicate a strong digital presence in the Scandinavian region.

The Eurozone countries, such as Ireland (95.49%), the Netherlands (94.74%), Spain (94.49%), Belgium (94.01%), Austria (93.61%), Germany (91.63%), Malta (91.54%), France (90.67%), and others, generally displayed robust Internet usage rates, although there were some variations between countries.

The newer EU member states, including countries from Central and Eastern Europe, showed a range of Internet usage percentages. Estonia (91.50%), Latvia (91.31%), and Lithuania (87.72%) had relatively high levels, while others like Poland (86.94%), Romania (85.50%), and Bulgaria (79.13%) exhibited lower levels of Internet usage. It is worth noting that these countries have experienced considerable growth in Internet adoption over recent years.

In the EU as a whole, the average Internet usage rate was 89.99%, indicating widespread adoption of digital technology and connectivity among the European population. However, there are still disparities in Internet usage among different regions and countries.

In 2022, Finland had the highest level of Internet banking usage among all EU countries, with 94.68% of individuals using Internet banking services, followed closely by Denmark (94.35%) and the Netherlands (90.72%). The Scandinavian countries – Finland, Denmark, and Sweden (83.50%) – exhibited high levels of Internet banking usage, indicating strong adoption of digital banking services in this region.

Eurozone countries, such as Ireland (86.29%), Belgium (79.51%), Spain (69.60%), France (68.09%), Malta (66.32%), and others, showed varying degrees of Internet banking usage, reflecting different levels of digital banking adoption within the monetary union.

Among the newer EU member states, Estonia (83.36%), Latvia (82.45%), and Lithuania (74.82%) demonstrated relatively high levels of Internet banking usage, while countries such as Poland (55.55%), Bulgaria (22.44%), and Romania (19.19%) exhibited much lower percentages. It suggests a digital divide in banking services among the new EU member states.

The EU average for Internet banking usage in 2022 was 59.68%, indicating that slightly more than half of the European population used Internet banking services. However, there were significant disparities in Internet banking usage across different regions and countries. In conclusion, the data highlights the general trend of increasing Internet banking usage across the EU while revealing the digital divide between different regions and member states regarding digital banking adoption.

Comparing information on Internet users vs. Internet banking users provides interesting information. The data demonstrates the relationship between the percentage of individuals using the Internet and Internet banking across European Union (EU) countries. The correlation coefficient for 2022 amounted to 0.78, which proves the strong linear relationship. The R-squared coefficient is equal to 0.61. It means that the number of individuals using the Internet describes the amount of Internet banking users in 61%. However, the proportion of

Internet banking users among Internet users varies significantly across the EU member states (standard deviation for this variable was 18.5% of the mean).

Scandinavian countries, such as Finland (97.35%), Denmark (96.41%), and Sweden (86.25%), exhibit a high percentage of Internet banking use among Internet users. The Netherlands also shows a high rate (95.76%). In contrast, countries like Bulgaria (28.36%), Romania (22.44%), and Slovakia (53.98%) have considerably lower percentages, indicating an underutilization of Internet banking services in these regions. The data suggests the potential for increasing the adoption of digital banking services in countries with lower ratios.

To sum up, the data analysis of Internet usage and Internet banking usage across the European Union (EU) in 2022 reveals disparities among regions and member states. Scandinavian countries and some Eurozone countries demonstrate high levels of Internet usage and adoption of digital banking services. However, a digital divide persists, with certain new EU member states exhibiting lower Internet and Internet banking usage levels. The data underscores the need to address this divide and promote digital inclusion across the EU.

The analysis of the data has shown that the population of online banking users is not solely derived from digital inclusion in individual EU countries. Cultural characteristics, trust in new technologies, and propensity to use them are also important.

IV. DIGITALIZATION – SOME EXAMPLES FROM THE POLISH FINANCIAL MARKET

This section presents selected examples of the use of digital technology by Polish financial institutions and fintech companies. Some of them are complementary to existing global solutions, others are unique services, widespread not only in Poland but in many other countries of Europe and the world.

5.1. mBank's Innovative Approach to Digital Banking
mBank, a subsidiary of Commerzbank, is one of Poland's leading digital banks. Since its inception in 2000, mBank has been at the forefront of digital innovation in the Polish banking sector. It was the first bank in Poland to launch a fully online banking platform, and it has continued to introduce innovative digital solutions to its customers.

Some of mBank's unique digital offerings include its award-winning mobile banking application, which provides users with a comprehensive suite of banking services, and its mKantor platform, which enables customers to make foreign currency transactions at competitive rates. By focusing on digitalization and delivering user-friendly, customer-centric solutions, mBank has distinguished itself as a pioneer in the Polish financial sector.

5.2. PKO Bank Polski's Expansion to the European Market
PKO Bank Polski is the largest bank in Poland, with a strong presence in both retail and corporate banking. In recent years, the bank has expanded its operations beyond Poland, capitalizing on the globalization of financial systems. By

leveraging its digital capabilities, PKO Bank Polski has been able to enter new markets such as Germany, the Czech Republic, and Slovakia.

In addition to expanding its geographical reach, PKO Bank Polski has also adopted various digital technologies to enhance its product and service offerings. For example, the bank has introduced a mobile application that allows customers to manage their accounts, make transactions, and access various financial services. PKO Bank Polski's success in the digital world demonstrates the potential for Polish financial institutions to compete internationally.

5.3. Alior Bank's Digital Transformation

Alior Bank, established in 2008, has quickly become one of Poland's leading financial institutions. Recognizing the potential of digital technologies, Alior Bank embarked on an ambitious digital transformation journey to enhance its customer experience and streamline internal processes. In 2016, the bank launched its "Digital Disruptor Strategy," which fosters innovation and expands its digital offerings.

Key initiatives of Alior's digital transformation include the development of a mobile banking application, implementing of artificial intelligence and machine learning solutions for credit risk assessment, and launching a virtual branch that allows customers to perform banking transactions remotely. Alior Bank's commitment to digitalization has helped it stay competitive and attract a growing customer base in the Polish market.

5.4. BLIK: A Unique Mobile Payment Solution in Poland

BLIK is a mobile payment system launched in 2015 by the Polish Payment Standard, a consortium of six major Polish banks: Alior Bank, Bank Millennium, Bank Zachodni WBK, ING Bank Śląski, mBank, and PKO Bank Polski. As a homegrown solution tailored to the needs of the Polish market, BLIK has quickly gained popularity among consumers and merchants alike, with millions of users and a growing number of participating retailers and service providers.

Key Features of BLIK include:

1. Ease of use.
2. Versatility.
3. Integration with bank mobile applications.
4. Security.

One of the defining features of the BLIK system is its ease of use. Users can make payments quickly and securely by entering a unique six-digit code generated on their smartphones at the point of sale or online checkout. The code is valid for a limited time, ensuring the security of the payment process.

BLIK's versatility enables it to support a wide range of transactions, including in-store and online purchases, bill payments, and cash withdrawals at ATMs. Furthermore, the system's compatibility with most major Polish banks makes it accessible to a large customer base.

The seamless integration of BLIK into the mobile banking applications of participating banks simplifies the user experience and facilitates the adoption of the system. This integration allows users to access the payment system without

needing to download a separate app, streamlining the transaction process.

BLIK employs robust security measures to protect users' financial information and prevent fraud. These measures include two-factor authentication, time-limited codes, and transaction monitoring. These features ensure that the system remains secure and trustworthy for its users.

BLIK's success in the Polish market demonstrates the potential for locally developed digital payment solutions to compete with international players like Apple Pay and Google Pay. By offering a convenient, secure, and user-friendly payment system, BLIK has played a significant role in driving the digitalization of financial services in Poland and fostering a cashless society.

5.5. Kontomatik – Empowering Polish Fintech with Open Banking Solutions

Kontomatik, founded in 2009 in Warsaw, Poland, is a leading fintech company specializing in open banking solutions. As one of the pioneers in the Polish fintech scene, Kontomatik has developed an innovative Banking API that enables third-party financial service providers to access customers' bank account data securely and efficiently, with the customer's consent. Kontomatik's solutions have been instrumental in promoting competition, innovation, and customer-centric services in the financial industry.

Key Features of Kontomatik include:

1. Banking API.
2. PSD2 compliance.
3. Global reach.
4. Collaboration with financial institutions.

The core offering of Kontomatik is its Banking API, which allows financial service providers to access customers' bank account information, such as transaction history, account balances, and personal details, securely and compliantly. This data can be used for various purposes, including account aggregation, credit scoring, and personal finance management. Kontomatik's solutions are fully compliant with the European Union's revised Payment Services Directive (PSD2), which mandates that banks open their infrastructure to third-party providers. This compliance ensures that fintech companies and other financial service providers can leverage Kontomatik's technology to offer innovative and customer-centric services.

Although Kontomatik originated in Poland, the company has expanded its services to multiple countries across Europe, Asia, and Latin America. This international presence demonstrates the scalability and adaptability of Kontomatik's open banking solutions.

Kontomatik actively collaborates with traditional financial institutions, fintech companies, and other industry stakeholders. By partnering with established banks, Kontomatik helps drive digital transformation in the financial sector and fosters a more innovative and competitive landscape.

Kontomatik is a shining example of a Polish fintech company that has significantly impacted the financial market, both domestically and internationally. By developing and implementing cutting-edge open banking solutions, Kontomatik has empowered financial service providers to

deliver more innovative, personalized, and customer-focused services, ultimately benefiting the entire financial ecosystem.

V. RECOMMENDATIONS AND CONCLUSION

In order to harness the potential of digitalization in the financial sector while addressing the associated threats and challenges, policymakers and financial institutions must adopt a multi-faceted approach. This section outlines several strategies and recommendations that can help to promote a more stable, inclusive, and secure digital financial ecosystem. Regulatory frameworks must be adapted to the evolving digital landscape to ensure that new financial technologies are subject to appropriate oversight and consumer protection measures (Arner, Barberis & Buckley, 2016). Policymakers should strive for a balance between fostering innovation and maintaining financial stability (Claessens & Kodres, 2014). International cooperation is essential in this regard, as many of the challenges posed by digital finance are cross-border in nature, necessitating collaboration among national regulators and standard-setting bodies (Carney, 2018).

Efforts should be made to improve financial literacy and digital skills among the general population, particularly in underserved communities, to ensure that individuals can fully participate in the digital financial system and make informed decisions about their financial well-being (Lusardi & Mitchell, 2014). Educational initiatives, public awareness campaigns, and targeted training programs can help to bridge the digital divide and promote greater financial inclusion (Mbiti, 2016).

Financial institutions and technology providers must prioritize privacy and data security in designing and implementing digital financial services (Solove, 2013). It can be achieved through robust encryption protocols, secure data storage practices, and comprehensive privacy policies informing users about how their data is collected, used, and shared (Romanosky, 2016). Additionally, regulators should establish clear guidelines and standards for data protection in the financial sector to mitigate the risks associated with privacy breaches and identity theft (Barocas & Selbst, 2016).

Policymakers, regulators, and financial institutions must collaborate to develop innovative solutions that can help to detect and prevent the misuse of digital finance for illicit activities (Zdanowicz, 2009). It may include leveraging advanced data analytics, machine learning algorithms, and blockchain technology to enhance transaction monitoring and facilitate information sharing among authorities (Casey & Vigna, 2018). By investing in cutting-edge tools and techniques, the financial sector can better safeguard against money laundering, terrorist financing, and other criminal activities while preserving the benefits of digital finance for legitimate users (Fanusie & Robinson, 2018).

In order to harness the benefits of the digital financial systems while mitigating the associated threats and challenges, a multi-faceted approach is required. Key strategies to address these challenges include:

1. Strengthening regulatory frameworks and cooperation.

Regulatory frameworks need to be adapted to the evolving digital landscape to ensure that new financial technologies are subject to appropriate oversight and consumer protection

measures. Policymakers should strive for a balance between fostering innovation and maintaining financial stability. International cooperation is essential in this regard, as many of the challenges posed by digital finance are cross-border in nature, necessitating collaboration among national regulators and standard-setting bodies.

2. Promoting financial literacy and digital skills.

Efforts should be made to improve financial literacy and digital skills among the general population, particularly in underserved communities, to ensure that individuals can fully participate in the digital financial system and make informed decisions about their financial well-being. Educational initiatives, public awareness campaigns, and targeted training programs can help to bridge the digital divide and promote greater financial inclusion.

3. Enhancing privacy and data security measures.

Financial institutions and technology providers must prioritize privacy and data security in the design and implementation of digital financial services. This can be achieved through robust encryption protocols, secure data storage practices, and comprehensive privacy policies that inform users about how their data is being collected, used, and shared. Additionally, regulators should establish clear guidelines and standards for data protection in the financial sector to mitigate the risks associated with privacy breaches and identity theft.

4. Developing innovative solutions to counter illicit activities.

Policymakers, regulators, and financial institutions must collaborate to develop innovative solutions that can help to detect and prevent the misuse of digital finance for illicit activities. This may include leveraging advanced data analytics, machine learning algorithms, and blockchain technology to enhance transaction monitoring and facilitate information sharing among authorities. By investing in cutting-edge tools and techniques, the financial sector can better safeguard against money laundering, terrorist financing, and other criminal activities while preserving the benefits of digital finance for legitimate users.

As the digital financial landscape evolves, financial institutions and regulatory authorities must prioritize cybersecurity and data protection. It can be achieved by developing and implementing robust security frameworks, regular audits, and risk assessments (Dunn & Balzacq, 2014). Additionally, a collaboration between the public and private sectors is crucial to sharing information on emerging cyber threats and best practices to combat them (Werbach, 2023).

Given the interconnected nature of the financial system, countries need to collaborate on the development of harmonized regulatory frameworks. It can help promote financial stability and ensure a level playing field for financial institutions operating across borders. International organizations, such as the Financial Stability Board and the International Monetary Fund, can play a vital role in facilitating cooperation and providing guidance on best practices for financial regulation (Claessens & Kodres, 2014). Financial education and digital literacy are crucial to empowering individuals and businesses to make informed decisions and safely navigate the digital financial landscape. Governments, financial institutions, and educational institutions should work together to create and promote

programs that foster financial literacy and digital skills, ensuring that all members of society can benefit from the opportunities offered by digital financial services (Lusardi & Mitchell, 2014).

While digital innovation can drive significant improvements in financial systems, balancing fostering innovation and managing risks is essential. Regulators should adopt a forward-looking and flexible approach, such as "regulatory sandboxes," to allow experimentation and learning in a controlled environment (Prahalad & Hart, 2002). Financial institutions should also adopt responsible innovation practices, focusing on transparency, consumer protection, and long-term sustainability.

In conclusion, the digital world has significantly impacted financial systems, presenting opportunities and challenges. Digitalizing financial services has fostered greater efficiency, financial inclusion, and innovation in the industry. However, these advancements have also introduced new risks and complexities, such as cybersecurity threats, regulatory challenges, and concerns about financial stability.

To fully harness the potential of digital financial systems, it is essential for stakeholders – including governments, financial institutions, and individuals – to work collaboratively in addressing the challenges identified in the research hypothesis. By adopting strategies such as strengthening cybersecurity measures, enhancing international cooperation, promoting financial education and digital literacy, and encouraging responsible innovation, it is possible to create a more resilient, inclusive, and sustainable financial ecosystem.

In light of the analysis presented in this paper, the research goal has been achieved by providing a comprehensive understanding of the threats, opportunities, and challenges associated with digitalization of financial systems. Examining their implications for financial institutions, regulators, and consumers contributes to developing effective policies and strategies for managing the risks and maximizing the benefits of these transformations.

Moreover, the research hypothesis has been verified by identifying key factors influencing the balance between the benefits and risks of the digital financial landscape. The findings of this study highlight the importance of collaborative efforts among stakeholders in addressing the challenges posed by digitalization in the financial sector.

As the digital landscape continues to evolve, it is crucial for all stakeholders to stay informed and adapt to the changes to seize the opportunities and address the challenges ahead. By embracing the transformation and fostering a collaborative approach, the financial system can better serve the diverse needs of individuals, businesses, and societies in the 21st century.

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