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NAVIGATING THE FINTECH LANDSCAPE: OPPORTUNITIES AND CHALLENGES IN ALBANIA

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Abstract

Fintech is used to describe new technology that seeks to improve and automate the delivery and use of financial services. Since the internet revolution, the financial technology sector has expanded rapidly. Although financial technology has entered the Albanian market for years, it seems that its adaptation and spread, still have many steps to take in order to encourage the necessary change, even if gradual, while continuously testing its effects on the market and economy. Fintech institutions are still in the early stages of development, primarily focused on payment functions and microloans. Generally, banks remain dominant in the structure of the Albanian financial market, and payment services are no exception. The role of fintech is important in competing with traditional banks, particularly among younger consumers who seek faster, less bureaucratic services. To enhance adoption, fintech should proactively promote consumer policies, combat informal practices, and reduce cash circulation. Fintech has the potential to drive financial inclusion, stimulate economic growth, and improve well-being by increasing transaction flows. A gradual introduction of fintech solutions, is very important in the Albanian financial market, supported by thorough analysis and adaptation to local markets, because while digital lending can positively impact economic growth, it requires careful implementation to avoid risks of misuse. Additionally, the rise of technology, particularly of *artificial intelligence and blockchain, offers new opportunities for innovation in fintech. The challenges include security risks and the need for collaboration on regulatory improvements. Overall, fintech can provide small and medium-sized enterprises with easier access to loans, fostering growth and market alignment. Increased financial activity through diverse services, will enhance the economy in Albania and promote more transparent financial practices.*

Keywords: Digital lending, financial inclusion, financial technology, innovation, regulation

INTRODUCTION

Technology can influence economic growth, by increasing productivity and expanding the market for goods and services. Based on this, technology as an advanced approach of the time, needs to be integrated into our daily lives. Embracing technology, especially financial technology, should become a popular topic for analysis, studies, policies, and consultations, through debates of various kinds. It is a necessity, because, before a new technology is integrated into the country's economy, discussions and dilemmas regarding the approach to its implementation must be thoroughly addressed, as well as identifying the sectors where it is crucial to be introduced more quickly (David et.al 2018). Fintech is necessary to promote the democratization of the financial system and at the same time, provide the opportunity through the wide access enabled by technology, to break the strong ties with the state, which in many cases is the largest user of banks and their services.

Fintech is used to describe new technology that seeks to improve and automate the delivery and use of financial services (Wang et.al, 2021). At its core, fintech is used to help companies, business owners and consumers, better manage their operations, processes, and financial decisions. Fintech consists of specialized software and algorithms utilized on computers and smartphones. The term "fintech" is a blend of "financial technology." When it first appeared in the 21st century, it referred primarily to the technology used in the backend systems of established financial institutions, like banks. However, between 2018 and 2022, the focus shifted towards consumer-oriented services. Today, fintech encompasses various sectors, including education, retail banking, fundraising for nonprofits, and investment management, among others. It also, covers the creation and use of cryptocurrencies like Bitcoin (Wamba at.al, 2020). Although this aspect of fintech often garners significant attention, the majority of financial value, remains in the traditional global banking sector, which has a market capitalization of trillions of dollars.

Since the internet revolution, the financial technology sector has expanded rapidly (Xu et.al, 2020). Financial services are among the most regulated industries globally, making regulation the primary concern for governments, as fintech companies gain traction. While banks and startups have developed valuable fintech applications focused on fundamental banking services, such as checking and savings accounts, money transfers, credit/debit cards, and loans, other areas of fintech related to personal finance, investing, and payments, have also gained significant popularity.

Regarding Albania, if technology becomes more prominent in the market, it is likely to give less wealthy individuals access to financial services, that they are unable to obtain from banks, which have a deeply entrenched approach to traditional services. There are still many businesses that do not understand what fintech is and what its benefits are for consumers, which makes it difficult for them to demand its use from banks, which have to adapt to the demands of clients and the emerging market. In terms of payments, market pressure should be directed at existing banks or new ones, encouraging them to leverage technology to simplify the process and reduce the costs of sending payments. This approach would benefit developing sectors, facilitate remittances from emigrants, and support trade-related transactions.

The purpose of this research, is to analyze the role of financial technology in driving economic growth and making financial systems more inclusive. By exploring how fintech facilitates access to financial services, enhances operational efficiency and stimulates innovation, the study aims to highlight its capacity, to revolutionize conventional banking practices, while driving economic growth, that benefits everyone. The research also tends to address the challenges of integrating fintech into developing economies, such as legal constraints, market awareness and sectoral readiness, with Albania in its focus, as a case study.

LITERATURE REVIEW

In recent years, there has been a surge in interest towards financial technology which is often referred to as fintech. The popularity of fintech, can be attributed to its ability to combine technology into the provision of financial services. This feature has changed the way business management and financial inclusion operates in a society (Jagtiani & Lemieux 2017). The present literature review, examines the latest evidence dealing with, how fintech is contributing to the development of the environmental sustainability, the penetration rate of the financial services, the performance of companies and the development of the digital financial services.

Many studies highlight the relative importance of fintech in environmental sustainability. In the case of China, Ren et al. (2023) used big data and web-crawler tech, to study digital finance's impact on green growth. It showed that inclusive digital finance, fosters green innovation. In the same way, Tang et al. (2023), showed that digital finance boosts green tech. It does this by reducing financial barriers, that would have stifled development. Han et al. (2023), provide strong evidence of digital finance's role in boosting green innovation in China.

At a worldwide level, Tao et al. (2022), explored how fintech can aid a low-carbon economy. The authors analyzed how financial systems can help to better fight climate change. Udeagha & Muchapondwa (2023) share this view also. They stressed the need for green finance and fintech for sustainability in the BRICS countries (Brazil, Russia, India, China, South Africa).

Fintech has also accelerated financial inclusion globally. Das & Chatterjee (2023), studied Information and Communication Technology and financial inclusion's impact on poverty in India. They found that digital finance can narrow the urban-rural gap. Yet, income inequality still persists. Likewise, Baker et al. (2023), studied how fintech adoption improved financial inclusion for Jordanian SMEs. The results were positive.

Almashhadani (2023), showed that digital finance makes banks more efficient. He examined the impact of fintech on foreign banks in the United Arab Emirates. The study showed that digital financial technologies, improved the performance of the aforementioned. It focused on their return on assets (ROA) and return on equity (ROE). It also explored the benefits of using new technologies in bank operations.

Digital finance affects also, corporate performance in different ways: Ren et al. (2023), admit that digital finance, improves ESG (Environmental, Social, and Governance) outcomes for Chinese companies. Further supporting this claim, Li et al. (2023,) emphasize digital finance's role in upgrading Chinese cities' industrial structure, encapsulating its economic impact.

Fintech is credited with boosting financial inclusion in India. An analysis of its role of Asif et al. (2023) study, highlights the explosive transformation within fintech, by outlining how the adoption of digital financial services, has caused an infinitude of improvement in financial performance for most middle-income groups across the country.

METHODOLOGY

The Fintech Landscape In Albania

Although financial technology has entered the Albanian market for years, it seems that its adaptation and spread still have many steps to take, in order to encourage the necessary change, even if gradual, while continuously testing its effects on the market and economy. Meanwhile, in Albania, fintech institutions are still in the early stages of development, primarily focused on payment functions and microloans (facilitating the process of obtaining them). Generally, banks remain dominant in the structure of the Albanian financial sector, and payment services are no exception. Currently, the role of non-bank financial institutions is significant mainly in providing counter payment services, meaning in cash. True fintech institutions are in their infancy, and according to their managers, they are primarily focused on educating customers. So far, the main focus of new fintech institutions, has been on creating electronic accounts/wallets, through which customers can perform a wide range of payments, centered around their applications.

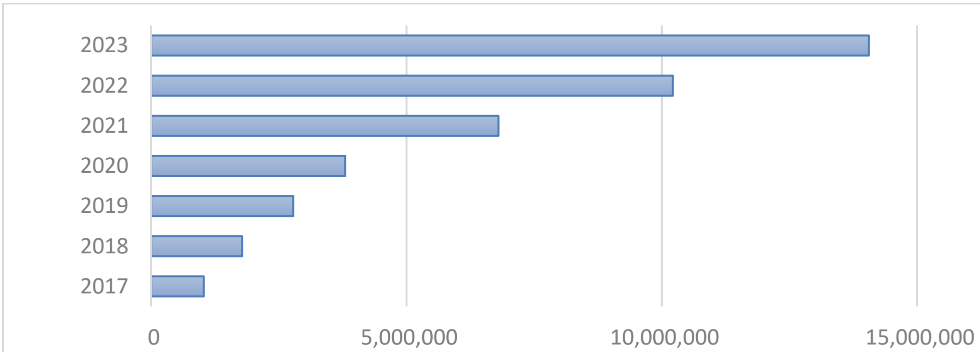
Payment services include, bill payments, utility payments, money transfers, online purchases, and transactions at points of sale, among others. The overall goal is, to create the so-called Super Apps, where customers can make purchases or payments for most of their everyday consumer needs. However, some electronic money institutions are blending the fintech concept with more traditional payment instruments, such as cards, to establish a connection with the banking sector's infrastructure and global payment system operators like Visa and Mastercard. In recent years, the consumer microfinance market has rapidly developed, leveraging technology to provide very fast service with minimal procedures. However, this comes with increased risk and higher costs for loans.

So far, fintech institutions are finding it challenging, to secure competitive advantages over the banking sector, which has a much larger market penetration and has been offering most of these services for years, through online banking applications and debit/credit cards. Some electronic money transactions remain tied to cash transactions, such as various payment methods that citizens use at physical electronic money counters in cash, which are then processed through the electronic payment terminals of these operators.

The total number of licensed electronic money institutions in Albania has reached ten. The largest bank in the country, National Commercial Bank, has also established an electronic money institution, which has recently been licensed by the Bank of Albania. While the banking market, has been undergoing a noticeable consolidation process in recent years, with the number of banks decreasing from 16 to 11, the fintech sector appears to be in a dynamic phase and is attracting new investors. This interest, is driven by the significant untapped potential of the Albanian market, particularly regarding financial inclusion and the expansion of public access to new information and communication technologies. The strong interest from new companies in credit and payment services, indicates that Albania, may also be moving toward a development era for fintech institutions, a trend that has been evident in more developed countries for years.

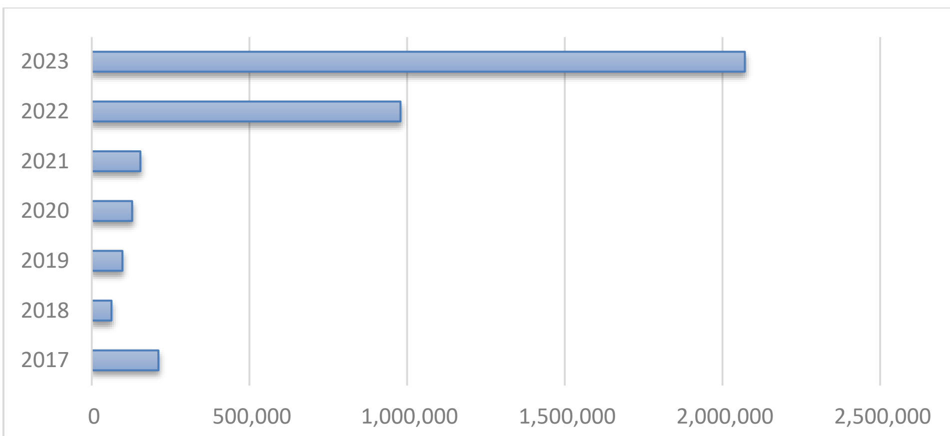
Electronic payments, are a form of payment similar to card payments, but the main difference is that these transactions are not conducted through bank cards and POS terminals; instead, they use the infrastructure of licensed electronic money institutions. Data from the Bank of Albania, indicate a significant increase in the number and value of electronic money transactions in recent years. Last year (2023), the number of electronic transactions reached 14 million, marking a 37,6% increase compared to the previous year.

Figure 1: Number of payments by electronic money (2017-2023)



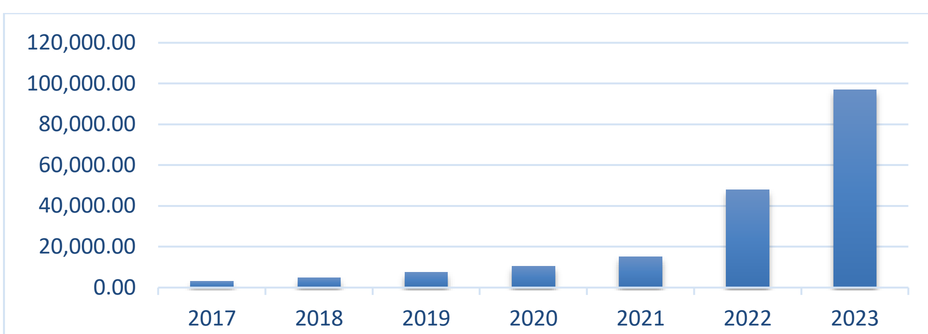
Source: Bank of Albania

Figure 2: Number of transactions with electronic money (2017-2023)



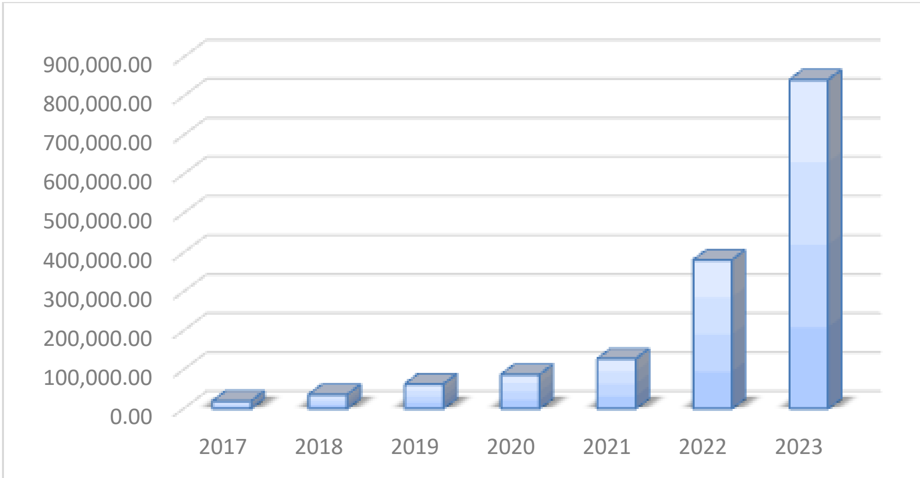
Source: Bank of Albania

Figure 3: Value of transactions with electronic money 2017-2023 (000,000 Albanian Lek)



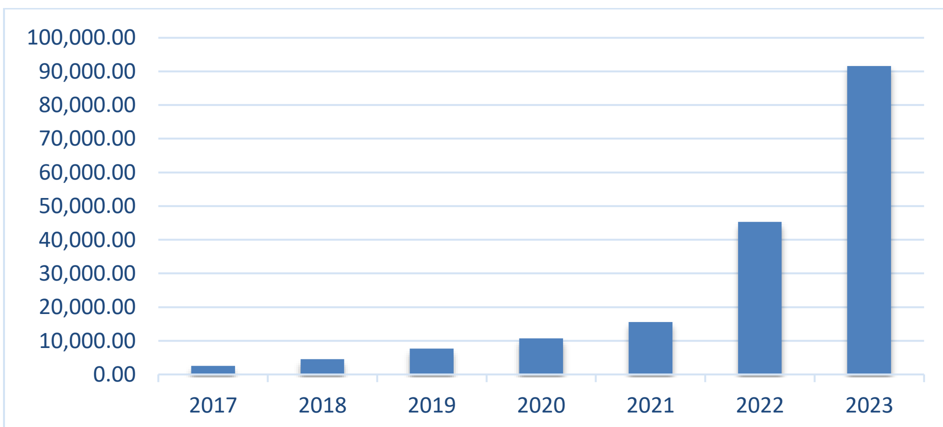
Source: Bank of Albania

Figure 4: Value of transactions with electronic money 2017-2023 (000 euro)



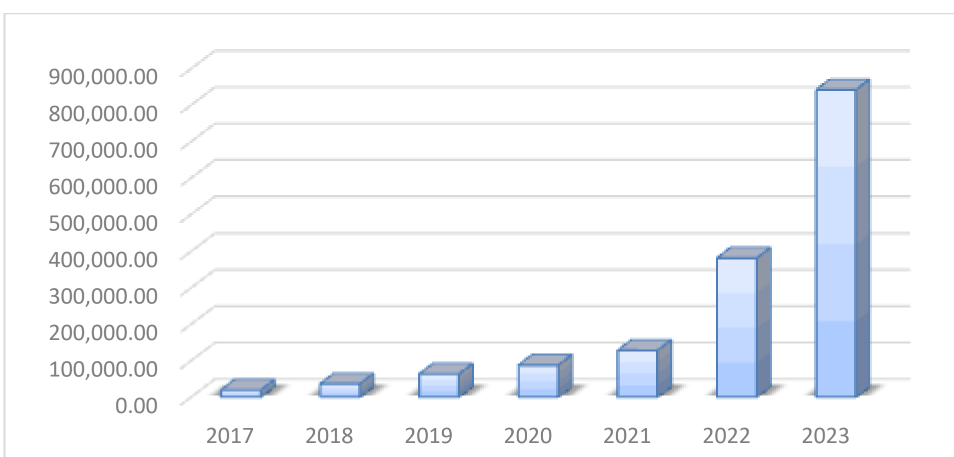
Source: Bank of Albania, authors' calculations

Figure 5: Value of payments with electronic money 2017-2023 (000,000 Albanian Lek)



Source: Bank of Albania

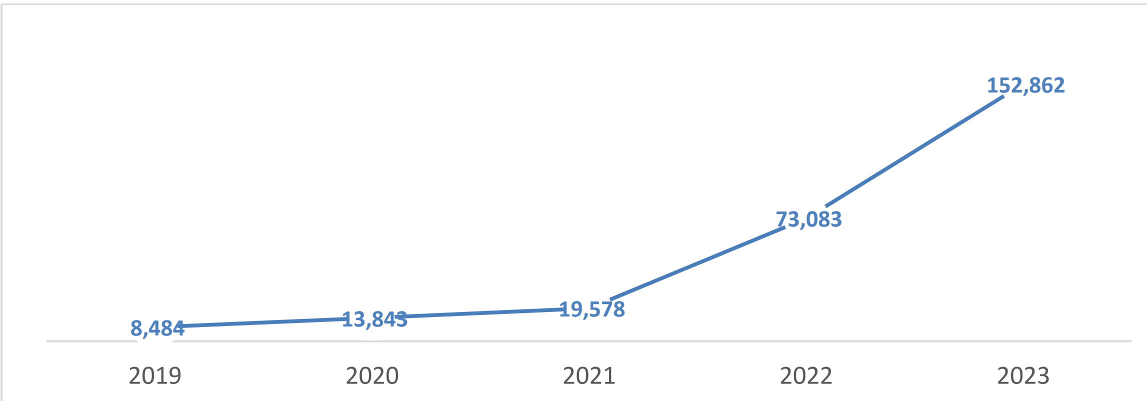
Figure 6: Value of payments with electronic money (000 euro)



Source: Bank of Albania

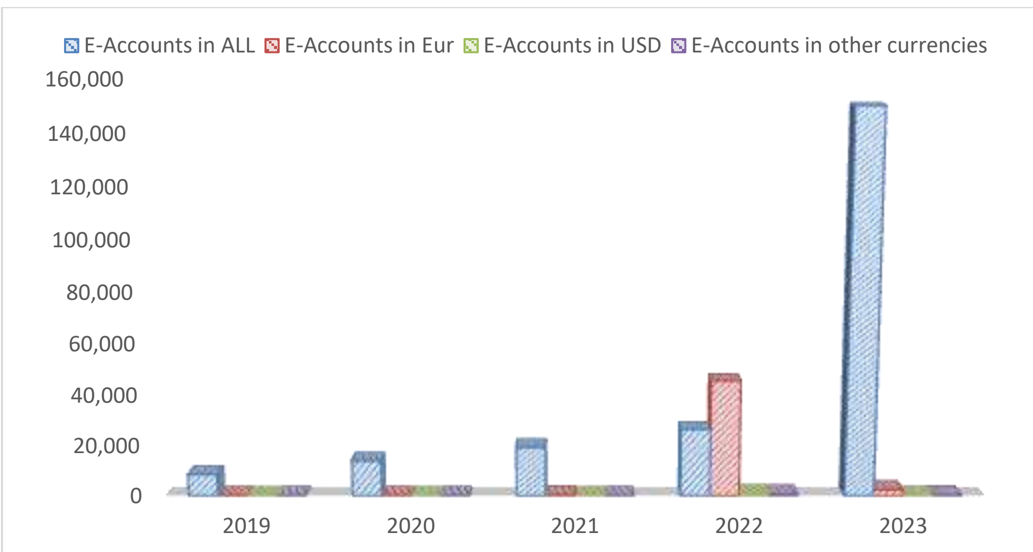
The growth is more prominent in transaction values. For the year 2023, the reported value of electronic cash transactions reached 96.8 billion Albanian lek (approximately 890 million euro), an increase of 102% compared to 2022. The growth is equally noticeable in the number of accounts. According to the Bank of Albania, by the end of the last year, the number of electronic cash accounts surpassed 152,000, an increase of 102% compared to the previous year. Meanwhile the increase of the number of electronic cash accounts for 2022 compared to 2021, has a fascinated value of 273%. The rise in the use of these payment methods, is also accompanied by a rapid expansion of the technological infrastructure the providers utilize. Predominant are the accounts in Albanian Lek (Albanian currency).

Figure 7: Number of e-money accounts (2019-2023)



Source: Bank of Albania

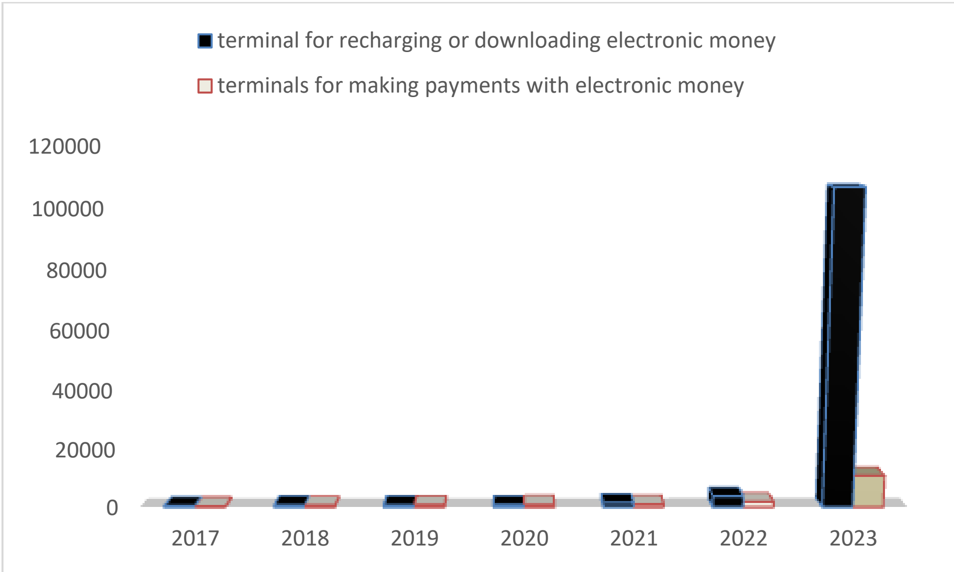
Figure 8: Number of e-money accounts in different currencies (2019-2023)



Source: Bank of Albania

According to the Bank of Albania, last year, the number of terminals for electronic cash use, reached 117,733 units, a fascinated 21 times increase from the previous year.

Figure 9: Number of e-money terminals (2017-2023)



Source: Bank of Albania

RESULTS AND COMMENTS

The figures presented, demonstrate the increasing importance of electronic cash institutions in the payment market in Albania. However, this growth should be interpreted cautiously and does not necessarily indicate the threshold of a boom, or flourishing of the fintech sector. Some electronic cash transactions remain tied to cash operations, such as various payment forms that citizens conduct through physical electronic cash counters, which are then executed via electronic cash terminals of these operators. Additionally, some of the new electronic cash institutions, link the opening of electronic cash accounts, with the disbursement of loans from their subsidiaries, that provide microloans for consumers in the country. For this reason, part of the growth reflected in the aforementioned figures, is related to ancillary factors and does not necessarily represent a direct breakthrough of fintech payment forms.

In 2020, Albania adopted a new law on "Payment Services". It has been aligned with the spirit of the EU's Second Payment Services Directive, aiming to create a more competitive environment in the payment services market and foster greater development of financial institutions, that offer electronic payments. One of the main innovations of the new law on "Payment Services", is the concept of Open Banking, which will allow users to utilize their bank account for payment services, offered by other financial institutions. The law came into effect in 2021, but in practice, it is still not fully enforceable, pending the complete implementation of the necessary subordinate acts. The provisions that are still not enforceable primarily relate to the concept of Open Banking. Banks will be required to provide access with the account holder's approval and only for payment transaction purposes. Based on this concept, two new services will be created: account information services and payment initiation services. Open Banking enables clients to perform payment services from their bank account through other financial institutions, rather than being limited to the bank where they hold their account. Practically, the new law requires every bank to offer the possibility of direct integration with non-bank financial entities, allowing for real-time linking of accounts, that the client may hold with both institutions.

Perhaps, the expectation was that Open Banking would mark a turning point in favor of these fintech institutions, but it should be noted that in most EU countries where Open Banking is a reality, banks have provided it to their clientele just as quickly and conveniently as fintech operators, making this element a technological solution that benefits them (Zachariadis & Ozcan 2017). A more significant impact could come from the introduction of "instant payment", as a new product in the market, led by the Bank of Albania. However, given the scale of the banking system and banks' investments in technology, it wouldn’t be surprising if banks integrate into this product just as quickly as fintech operators (Broomberg et.al, 2017).

The approach applied by the National Commercial Bank with its e-money platform, which ensures a diversity of platforms for customer service, could easily become the standard format for financial services in the country. In this scenario, banks offering traditional services alongside e-money services, would provide clients with the flexibility of fintech and a wide range of financial products they need in an increasingly digital world (Vives, 2019).

Currently, one of the most challenging difficulties in the field of electronic cash operations and fintech, is the acceptance of integration projects by banking entities. Even if accepted, the lengthy duration of integration projects, does not keep pace with the rapid developments in fintech institutions. In general, banks remain dominant in the structure of the Albanian financial sector, and payment services are no exception. Currently, the role of non-bank financial institutions is primarily significant in providing cash payment services at counters. Genuine fintech institutions are still in their early stages and are mainly focused on educating clients, according to their managers. Once open banking becomes functional, it will create greater competitive opportunities for fintech institutions. Users will be able to access payment services from fintech institutions using their existing bank accounts, without needing to create separate accounts and periodically fund them. However, the new law on payment services, does not grant non-bank institutions direct access to national payment systems. Such a limitation does not put fintech institutions on equal competitive footing with banks.

But, fintech institutions highlight that they have a cost advantage. Payments that banks enable for their merchants and clients, depend on the infrastructure of Visa and Mastercard, which incur high costs, including additional requirements that go beyond Albanian legislation. The fees charged by Visa and Mastercard are approximately 1.6-1.7% of the transaction value. Card payments also involve initial costs and ongoing maintenance for POS terminals. On the other hand, as fintech entities, not being necessarily tied to Visa or Mastercard, allows them to have lower costs. Fintech institutions operate through payments using QR codes. In addition to cost, this also gives them the advantage of speed. While a bank may take weeks to negotiate and implement an agreement with a merchant, they can offer their service to clients in just a few hours.

However, so far, the disadvantage that banks face regarding costs, is compensated by their broad customer base, greater use of bank cards, the payment infrastructure built over the years and their stronger investment capacity. Meanwhile, global payment technology is expected to increasingly shift from card payments to instant payments, moving from account to account. The Bank of Albania has made it a priority, to establish an instant payments infrastructure, which is anticipated to gradually replace the current card system, allowing for faster transactions at lower costs.

Despite a natural increase in cashless payments in recent years, cash transactions still dominate the Albanian economy. Experts attribute this to factors such as informality, low-income levels and the inadequate penetration of banking and financial services. Such an environment is challenging for the development of the fintech sector, but it also holds untapped potential and opportunities for fintech companies. As long as cash transactions are widely accepted and used, the level of electronic transactions will remain limited, experiencing only organic growth driven by necessity, rather than disruptive growth that shakes the existing pillars.

Given that not many Albanian clients use bank accounts or visit banks, electronic money institutions offer the same service integrated within the most widely used tool by Albanian clients: a simple and secure application, directly accessible from their mobile phones. Fintech institutions play a crucial role in enhancing financial inclusion and reducing cash usage. One of the advantages they promote is the ability to offer comprehensive remote services without the need for the client's physical presence, even during the initial identification phase and the physical signing of the account opening contract.

Some financial institutions in Albania (including banks, microfinance institutions, and electronic money institutions) are implementing remote identification and signing, through trusted service providers from EU countries. These operators offer businesses remote identification and signing services, without requiring the financial institution's client to physically visit a branch. Although this practice has begun to be adopted, there is still no fully clear and functional legal framework in the country for the remote identification and signing of contracts by individuals. The process involves uploading the identity document to the service provider's applications and entering the document's details. The applications then scan the client’s biometric data (such as their face) and verify whether it matches the identity document. Once the identity is confirmed, the client receives an authorization code, which also functions as the electronic signature for the contract with the financial institution. However, the new draft law on "Electronic Identification and Trusted Services," which was put out for public consultation at the end of last year, could jeopardize the progress made so far. Financial institutions argue that Albania is a small market, and significant operators from EU countries may not be interested in undergoing a special tax registration process and legal accreditation in our country.

Fintech institutions capable of withstanding the test of time and competition, particularly in light of developments in this field in European markets, will serve as complementary parts of the banking sector. They will provide fast and agile services in the lending sector, particularly consumer lending (but not exclusively), that has been significantly influenced by fintech solutions, and it is believed that there is room for further developments related to this model. Ultimately, everything will depend on the flexibility shown in response to customer needs, how banks will adapt to these developments and the demand from customers for these products.

The implementation of Open Banking will bring changes to the payment market, but these changes will be gradual, alongside public education and the development of products. Therefore, there is no doubt that fintech has the transformative potential to make financial systems more efficient and to expand financial inclusion to specific market segments, which will be positively perceived by the end customer.

CONCLUSION

On one hand, Albania still has a long way to go in terms of financial inclusion; recent estimates show that only 60% of the adult population has a bank account. On the other hand, the fintech model aims to compete with the services offered by banks, particularly targeting younger individuals who often perceive banks as more bureaucratic and slower to adopt contemporary solutions. To achieve a wider adoption, fintech institutions should take proactive steps, rather than observe how banks choose to offer these services. Instead, it is essential for them, to promote consumer policies and increase efforts to combat informal practices, reduce the use of dirty money, and minimize cash circulation. In fact, the greatest benefit of fintech, is its potential to enhance financial inclusion by accelerating the expansion of the financial system through increased transaction flows (Jagtiani & Lemieux 2017). This, in turn, boosts consumption and demand for more goods and services. As financial transactions inclusion increases, the country's economy will expand, leading to enhanced well-being for its citizens.

For Albania, with its still somewhat inelastic and underdeveloped market, this opening requires not only a continuous policy of adaptation to technology, but also a thorough examination of all aspects at both the business and individual /family levels. The aim should be to simplify financial processes and address the growing need to tackle the technical challenges arising from the introduction of new and complex systems. However, the introduction of financial technology should be gradual and well-tested within the market and the entire business environment, as well as the level of economic relationships. While digital lending is seen to have a significant positive effect on the economic growth of countries where this service is widespread, it seems that the strongest impact comes from the decentralization of lending through digitization (Meng et.al, 2021). This necessitates in-depth analyses and studies to measure the effect in a small economy that is still underdeveloped in terms of financial instruments. Additionally, there is an environment that creates opportunities for such instruments, but also carries risks of misuse by criminal or abusive companies and individuals in the market. Thus, from a technological perspective, beyond the growth of digital capital by banks, the rise of smartphones and the internet has made digital solutions more accessible to consumers, leading to an increase in demand for fintech services. Meanwhile, regulatory and legal changes need to be analyzed and opened for consultation, well before being approved. Advances in technology, such as Artificial Intelligence and blockchain, have opened up new opportunities for fintech innovation, driving further growth in the market (Buchanan, B. (2019), Hellwig & Huchzermeier (2019)).

One of the biggest challenges in the coming years will be the increased risk of system interference and security breaches. Once all the necessary elements for safe system interoperability are established, collaboration must be prioritized to adhere to regulations and further improve them. This should involve a gradual transition from theory to digital reality, rather than a virtual one (Bromberg et.al 2017).

The benefits for society, especially for small and medium-sized enterprises, do not end there. These businesses will have access to loans at lower costs (in terms of speed and ease), enabling them to expand their operations. This also makes it more straightforward to find potential investors, facilitating growth and development in the business sector. In one way or another, financial technology aligns market demand (businesses, individuals, families, government, foreigners) with market supply at a much higher level, as it is technology, that drives this entire process. On the other hand, if digital lending is quickly introduced into the market, it can have a significant positive effect on economic growth, influencing the rise of digital capital with considerable impact in the near future, even if its immediate effects may seem less significant (Asifl et.al, 2023).

The impact of technology, including all the instruments derived from its application, is positive and crucial due to the overwhelming potential that digital lending can hold overall. The higher the financial activity, the more the economy will improve. Offering more solutions and alternatives in payments and financial services, would enable a reduction in banking transaction costs, combat informality, and enhance the circulation of funds. This diversification would not only make financial services more accessible, but also encourages a shift towards more transparent and formal financial practices.

While this research highlights the potential of fintech in accelerating financial inclusion and consequently the economic growth, there is significant scope for further studies. In Albania's case, studies are needed to explore, how fintech can compete successfully with traditional banking services, especially in targeting younger individuals, who consider banks as bureaucratic and outdated. Moreover, the introduction of digital lending provides a favorable opportunity for economic development, but its effects in small economies with a moderate financial sector like Albania, requires careful and further evaluation.

A critical area for further research, is the growing threat of cybersecurity breaches and system interference, within the fintech sector. Exploring best practices to ensure secure system interoperability and strengthening consumer trust in digital solutions, is crucial for the long-term growth of fintech. Finally, while digital lending and other fintech solutions, have demonstrated a positive global correlation with economic growth, localized studies are crucial to evaluate their effectiveness within specific socio-economic contexts, such as Albania's developing economy.

REFERENCES

Almashhadani.M (2023), The Impact of Financial Technology on Banking Performance: A study on Foreign Banks in UAE. International Journal of Scientific and Management Research, 06(01) http://dx.doi.org/10.37502/IJSMR.2023.6101

Asifl.M, Khan.N, Tiwari.S, Wani.Sh, (2023). The Impact of Fintech and Digital Financial Services on Financial Inclusion in India, Journal of Risk and Financial Management, 16(2):122 https://doi.org/10.3390/jrfm16020122

Barroso.M, Laborda.J, (2022) Digital transformation and the emergence of the Fintech sector: Systematic literature review. Journal of digital business, Volume 2, Issue 2, https://doi.org/10.1016/j.digbus.2022.100028

Bromberg, L., Godwin, A., & Ramsay, I. (2017). Fintech sandboxes: Achieving a balance between regulation and innovation. Journal of Banking and Finance Law and Practice, 28(4), 314–336.

Caytas, J. (2016). Developing blockchain real-time clearing and settlement in the EU, US, and globally. Columbia Journal of European Law: Preliminary Reference (June 22, 2016). Retrieved from http://cjel.law.columbia.edu/preliminary-reference/2016/developing-blockchain-real-time-clearing-and-settlement-in-the-eu-u-s-and-globally-2

Buchanan, B. (2019). Artificial Intelligence in Finance. London: The Alan Touring Institute. http://doi.org/10.5281/zenodo.2612537

Das.S & Chatterjee.A, 2023. "Impacts of ICT and digital finance on poverty and income inequality: a sub-national study from India," Information Technology for Development, Taylor & Francis Journals, vol. 29(2-3), pages 378-405, July. DOI: 10.1080/02681102.2022.2151556

Hellwig, D., & Huchzermeier, A. (2019). An Industry Study of Blockchain Technology's Impact on Trade Finance. https://dx.doi.org/10.2139/ssrn.3453767

https://www.investopedia.com/terms/f/fintech.asp

https://www.monitor.al/misioni-fintech-shume-deshire-por-ende-pak-rezultate-2/

https://www.monitor.al/sektori-fintech-mund-te-kete-rol-komplementar-me-sektorin-bankar-2/

Jagtiani, J., & Lemieux, C. (2017). Fintech lending: Financial inclusion, risk pricing, and alternative information. FRB of Philadelphia Working Paper No. 17-17, Available at SSRN: https://ssrn.com/abstract=3005260

Meng.Sh, He.X, Tian.X, (2021). RETRACTED: Research on Fintech development issues based on embedded cloud computing and big data analysis. Journal of Microprocessors and Microsystems, Volume 83,103977. https://doi.org/10.1016/j.micpro.2021.103977

Razzaq.A & Yang.X (2023), Digital finance and green growth in China: Appraising inclusive digital finance using web crawler technology and big data. Journal of Technological Forecasting and Social Change, Volume 188, https://doi.org/10.1016/j.techfore.2022.122262

Ren.X, Zeng.G, and Zhao.Y, (2023), Digital finance and corporate ESG performance: Empirical evidence from listed companies in China. Pacific-Basin Finance Journal, Volume 79, https://doi.org/10.1016/j.pacfin.2023.102019

Ren.X, Zeng.G, Gozgor.G, (2023), How does digital finance affect industrial structure upgrading? Evidence from Chinese prefecture-level cities. Journal of Environmental Management, Volume 330, https://doi.org/10.1016/j.jenvman.2022.117125

Tang.D, Chen.W, Zhang.Q, Zhang.J, (2023), Impact of Digital Finance on Green Technology Innovation: The Mediating Effect of Financial Constraints, Journal of Sustainability, 15(4), 3393; https://doi.org/10.3390/su15043393

Tao.R, Su.Ch, Naqvi.B, Rizvi.S, (2022). The Impact of Fintech Development on a Transition Towards a Low-Carbon Economy: A Global Perspective. Journal of Technological Forecasting and Social Change, Volume 174, https://doi.org/10.1016/j.techfore.2021.121278

Udeagha.M & Muchapondwa.E, (2023). Green finance, fintech, and environmental sustainability: Fresh policy insights from the BRICS nations International Journal of Sustainable Development & World Ecology, 30(1) http://dx.doi.org/10.1080/13504509.2023.2183526

Vives, X. (2019). Competition and stability in modern banking: A post-crisis perspective. International Journal of Industrial Organization, Volume 64, Pages 55-69. https://doi.org/10.1016/j.ijindorg.2018.08.011

Wang, Y., Xiuping, S., & Zhang, Q. (2021). Can fintech improve the efficiency of commercial banks? An analysis based on big data. Journal of Research International Business and Finance, Volume 55, 101338. https://doi.org/10.1016/j.ribaf.2020.101338

Wamba, S., Kamdjoug, J., Bawack, R., & Keogh, J. (2020). Bitcoin, Blockchain and Fintech: a systematic review and case studies in the supply chain. Journal of Production Planning & Control, 31(2-3), 115–142. https://doi.org/10.1080/09537287.2019.1631460

Xu, M., David, J. M., & Kim, S. H. (2018). The fourth industrial revolution: Opportunities and challenges. International Journal of Financial Research, 9(2), 90–95. https://doi.org/10.5430/ijfr.v9n2p90

Zachariadis, M., & Ozcan, P. (2017). The API economy and digital transformation in financial services: The case of open banking. https://dx.doi.org/10.2139/ssrn.2975199

Zalan, T., & Toufaily, E. (2017). The promise of fintech in emerging markets: Not as disruptive. Contemporary Economics, Vol. 11, No. 4, pp. 415-430, Available at SSRN: https://ssrn.com/abstract=3200954

Zetzsche, D. A., Arner, D. W., Buckley, R. P., & Tang, B. (2020). Artificial intelligence in finance: Putting the human in the loop (p. 1). University of Hong Kong Faculty of Law Research Paper No. 2020/006, Available at SSRN: https://ssrn.com/abstract=3531711