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TRANSFORMATION OF MONEY INSTITUTIONS ON THE EXAMPLE OF NON-CASH TRANSACTIONS AND CBDC

Keywords: money transformation, money institution, cash transactions, non-cash transactions, CBDS

JEL Classification: E42, E58, O23, O31

1. Abstract

Purpose: in recent years, the unchanging institution of money has taken on a different dimension through the transformation of cash transactions into non-cash, very dynamic development of payment infrastructure, exemplified by system like BLIK, or even in global terms, intensive work of central banks on the construction of a new digital money system of central banks. These changes concern not only individual changes on local markets, a very good example of which is Poland as a leader in the digitization of banking systems, but also on global markets, on the example of digital money of central banks. Due to the rapid changes there is a need to examine the transformation of money institutions with a focus on non-cash transactions and Central Bank Digital Currencies (CBDC), exploring their implications for the financial system and broader economy, what is the aim of the chapter. The purpose of the chapter is to identify areas of changes within monetary institutions and to indicate their directions.

Research method: the study employs targeted literature reviews, secondary data analysis, and a comparative study of cash versus non-cash transactions in Poland, alongside an analysis of global CBDC implementation as a big picture of changing World. Secondary empirical data was used, including: public statistics, industry reports, reports, press publications, data

archives, databases, etc. It also includes an in-depth case study of the BLIK payment system in Poland.

Results: the findings indicate a significant shift towards non-cash transactions in Poland, accelerated by technological advancements and the COVID-19 pandemic. Additionally, the global landscape of CBDC development is diverse, with countries at varying stages of exploration and implementation, reflecting the growing importance of digital currencies in modern economies. It appears that the new race full of challenges has already started for the whole World and the transitions from subsequent development phases to implementation will soon be visible. It is still very interesting moment as the CBDC development is currently in its growing phase.

Research contribution: this research contributes to the understanding of the digital transformation of money, highlighting the growing gap between technological advancements and their practical implementation. It provides insights into the evolving financial landscape, particularly in the context of Poland's rapid adoption of non-cash transactions and the global progression of CBDCs with its variety of phases.

2. Introduction

For the first time in 10 years, the National Bank of Poland has not introduced, but withdrawn from circulation 274 million units of the 100-zloty banknote, thus changing its share from 56% to 52% in the structure of cash circulation. At the same time, we observe a dynamic increase in the value of transactions, for example through the BLIK system, from PLN 5 million to PLN 2.8 billion in a short time from 2015 to 2022. In addition, the ongoing race among central banks worldwide to effectively construct digital money systems justifies addressing the transformation of money institutions in an era of overlapping, multifaceted changes affecting the structure of both local and global currencies. It appears that the transformation of the monetary institution is unavoidable, and its dynamic nature underscores the rapid changes in this field. The article presents an analysis of the Polish money market, both cash and non-cash, and indicates the directions of creating money by central banks (CBDC) worldwide.

Establishing the general background, it is crucial to outline the main focus of this paper. The study contributes to the literature on the transformation of money in the digital age, exploring its profound implications for the financial system and society. Money institutions, encompassing organizations involved in managing, exchanging, or regulating money, play a pivotal

role in the economy by supporting activities ranging from personal savings to large-scale corporate financing. Recent research in the Scopus database reveals significant interest in how digitalization impacts money institutions, including central banks, commercial banks, investment banks, and various financial entities. Key areas of focus include digital transformation and monetary policy, sovereignty and global payment systems, interactions with states and the financial industry, the evolution of money theories, and societal influences.

Digital transformation, particularly the rise of digital currencies and cashless societies, reshapes our understanding of money. Studies highlight the impact of digital assets on monetary policy and financial system regulation, raising concerns about sovereignty and the role of money as a public good. The interaction between digital money and traditional financial systems necessitates a reevaluation of established monetary frameworks.

The research also examines non-cash transactions, which have gained prominence since 2021, reflecting their growing importance in academic and professional circles. Non-cash transactions encompass various payment methods facilitated by electronic means, contributing to more efficient and secure financial systems. The increasing body of research underscores the need for continued exploration of the implications for economic stability, financial inclusion, and global economic policies.

Establishing the niche, it is crucial to take the conclusion from literature review that is done in this paper. When examining the broader landscape of money transformation, it becomes evident that this topic is increasingly significant. Scientific interest in this area dates back to 1963 when the first scholarly document appeared in the Scopus database. Since then, interest has steadily grown. While only a few documents were available before 1993, there has been an explosion of interest in money transformation since 2023. Narrowing our focus, we observe that central bank digital currencies (CBDCs) have become a particularly prominent topic, with a substantial surge in interest starting around 2020. Additionally, the relatively young topic of non-cash transactions is gaining importance. These trends underscore the relevance of monetary transformation in academic and professional circles, where researchers explore various facets such as digital currencies, cashless societies, and the evolving role of financial institutions. The expanding body of research highlights the need for ongoing investigation and analysis, given the profound implications of money transformation for economic stability, financial inclusion, and global economic policies.

Occupying the niche, it should be noted that all three aspects of this topics seems to be growing in their importance, but at the same time there is still a significant gap between scientific, business and practical use and implementation. The dynamic of digitalization for the money transformation in business and practical implementation outpaces scientific advancements. Consequently, this paper aims to contribute by practically examining CBDCs and non-cash transactions, bridging part of the existing gap.

3. Literature review

The paper contributes to the literature on money transformation in the digital age, addressing critical implications for the financial system and society. According to the literature and practice a money institution generally refers to any organization involved in the management, exchange, or regulation of money and financial assets. These institutions play a crucial role in the functioning of the financial system and the broader economy. Money institutions are integral to the financial infrastructure, providing essential services that support economic activities, from personal savings and loans to large-scale corporate financing and international trade. Doing research by the Scopus base it is possible to find many areas that are consider by scientists with the connection to money institution nowadays. Exploring research within the Scopus database reveals several areas that scientists currently consider in connection with money institutions. The strong influence of digitalization is evident across various domains, including central banks, commercial banks, investment banks, credit unions, insurance companies, pension funds, hedge funds, mutual funds, microfinance institutions, payment service providers, and cryptocurrency exchanges. This research topic is intrinsically linked to the evolving concept of money institutions, driven by changes in the economic environment, particularly due to digital transformation.

Taking a broader view, it is worth calling the conclusions of several research that strongly emphasize the transformative aspects related to money. These can be categorized into five key streams: digital transformation and monetary policy, sovereignty and global payments systems, interactions with states and financial industry, evolution of the theory of value of money, postmoney and societal influence. In the aspect of digital transformation and monetary policy it is worth to call two works that confirms that the digitalization of money alters monetary policy transmission and may

impact the regulatory policy of the financial system, particularly with the introduction of digital assets (Zatti, Barresi, 2024; Zatti, 2022). Zatti also discusses sovereignty and global payment system and comments that the rise of cryptocurrencies and global payment systems based on stablecoins and digital currencies issued by central banks raises concerns about the effects on sovereignty and the concept of money as a public good and legal tender (Zatti, 2022). Zatti's research also highlights concerns arising from the rise of cryptocurrencies and global payment systems based on stablecoins and digital currencies issued by central banks. These developments challenge the traditional concept of money as a public good and legal tender, potentially affecting national sovereignty. Going further to the stream of research connected with interactions with states and financial industry it is worth to call Ortiz research about how the digitalization of money interacts with the central role of states and the financial industry in the issuance and distribution of money, prompting a reevaluation of how money interacts with non-monetary digital information and digital forms of social interaction. He concluded that, The expansion of digital technologies makes the global character of monetary interdependence, already established through the banking system, even more intense, as they involve increasing numbers of everyday uses of money by entities around the globe. And also, that the ongoing shift in institutional settings and technological possibilities concerning money issuance and circulation demands a transformation of normative perspectives involved in constructive critique and reform proposals of established monetary settings (Ortiz, 2024). Fantacci and Gobbi (2021), on the one hand, explore how digital monetary connections expand the power of actors like the US government beyond their territory, through the influence of networks like SWIFT. The proliferation of alternative networks to avoid this hegemony may transform some of these interdependences and create new ones. These new monies thus ask for new theorizations about the distinction between private and public and between local, national and global. This may reshape the controversies and legitimizing discourses that accompany today's global monetary inequalities, for instance in terms of income and assets. The global proliferation of projects to produce central bank digital currencies is a good example of this, since it foregrounds the role of public authorities in the design of money and hence in the way it is unequally distributed, something the four articles of the symposium highlight in different ways (Fantacci, Gobbi, 2021). When exploring the theory and evolution of value and money, it is essential to investigate the role of factors that

contribute to the development of modern socio-economic systems Guseva and Kulikova claim, that the evolution of the theory of value and money is influenced by factors such as financialization of the economy, information technology, and new forms of organization of production and social activities, necessitating the development of a modern theory of money (Guseva, Kulikova, 2021). The field of postmoney and its impact on society is currently undergoing significant development. The transformation of money into postmoney, influenced by technological advancements and societal changes, has implications for the inner nature of money and its perception as a value. Interesting conclusions were presented by Ivantchev in his research about the latest quantitative and qualitative transformations of money and its interaction with the market economy and societies in terms of their influence on the inner nature of money and its transformation from a simple tool to an aim per se, i.e. postmoney. In conclusions one may read that the objective and qualitative reasons offered by the PMT for the transformation of money into Postmoney, are related to the being of temporality, as well as to technologization and the sixth factor of production, scientific exponentiality and mental changes in the human being. The value function and prospect theory claim that the increase of money quantity and the status quo shift, lead to a diminishing sensitivity of money gains and losses. Scientific development and the possibility of “buying” more years of life (or even immortality in next 30 years), is changing the perception and psychological evaluation of humanstowards money (Ivantchev, 2018).

When considering the transformation of monetary institutions, it's crucial to explore four main research streams related to Central Bank Digital Currencies (CBDCs). These streams provide valuable insights into the implications and design considerations for CBDCs:

- the introduction of CBDC raises questions about the private sector's access to central bank reserves, as it involves the transformation of bank loans into deposits and ultimately into CBDC (Bibi, Canelli, 2023);
- digital platforms and non-bank institutions are transforming traditional banking operations, impacting the digitalization level and prospects for further implementation of financial transactions (Mikhaylov, Petrov, 2021);
- CBDCs are expected to revolutionize the financial ecosystem, enhancing financial inclusion and transaction efficiency, while posing social and technological challenges (Kasana, E., Singh, R., 2024);

- CBDCs offer secure digital payment solutions, ease online and offline transactions, and foster financial inclusion, especially in underbanked regions (Lekhi, P., 2024).

The second sub-topic of this paper are non-cash transactions. A non-cash transaction refers to any exchange of goods, services, or financial instruments that does not involve the physical exchange of currency. These transactions are facilitated through electronic means, providing a more efficient and secure method of payment compared to traditional cash transactions. Non-cash transactions encompass a wide range of payment methods and technologies, each playing a vital role in modern financial systems. Usually, the selected types of non-cash transactions are considered: credit and debit card payments, electronic funds transfer (EFTs), online banking and bill payments, mobile payments, cryptocurrency transactions, digital wallets and others.

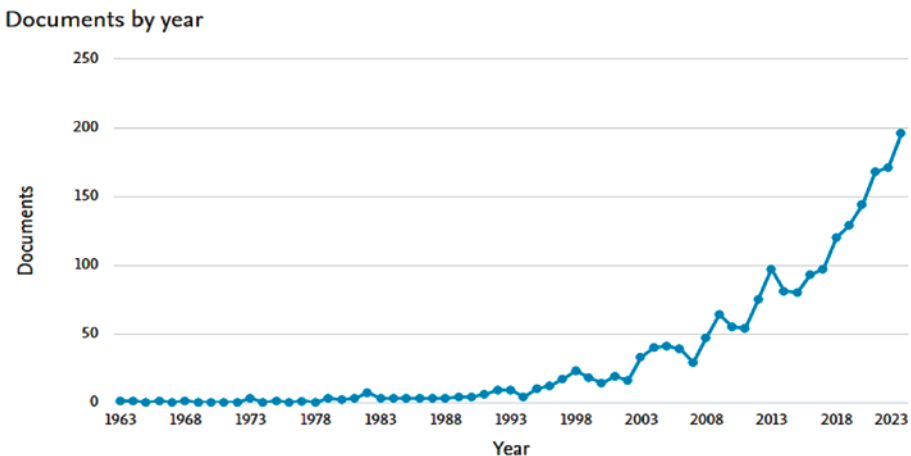
Based on research from the Scopus database, there are seven main research streams related to non-cash transactions: impact on economy, cultural dimensions and adoption, technological advancements, factors influencing adoption, security and fraud detection, cash preference, and M-money services. The sintetic summaries and conclusions for this main research streams are:

- non-cash transactions have a positive impact on society and government, reducing the cost of printing and circulating new money (Wahyuningtyas, Wasiaturrahma, 2020);
- there are various adoption rates of non-cash methods among countries, with correlations found between national cultural dimensions and the percentage of consumer payment transactions done using non-cash methods (Juntiwasarakij, Sunkpho, 2018);
- the rapid growth of non-cash transactions has been fueled by technological developments, leading to service innovations within the banking industry and the entry of new payment providers (Bajada, Trayler, 2015);
- Easiness, trust, and lifestyle have positive effects on the community's choice to use non-cash transactions, while risk has a negative effect (Yuliadi, Ariyani, 2021);
- The technological developments have increased the need for greater vigilance around security and fraud detection in non-cash transactions (Bajada, Trayler, 2015);

- In India, customers of public and private sector banks show a preference for cash transactions over non-cash transactions, while customers of foreign banks prefer non-cash transactions over cash transactions (Maiti, S. S., Hemachandra, N., Sharma, A., K., 2019);
- the study in Tanzania found that students and business operators frequently used m-money services for non-cash payments and savings deposits, with challenges related to transaction costs and network errors (Mpogole, H. et al., 2016).

The analysis of the Scopus base scientific documents with the filter: TITLE-ABS-KEY (transformation AND of AND money) shows that the topic starts to be extremely important. Scientifically, the topic of money transformation has been present since 1963 when the first scientific document appeared in the Scopus database. However, interest in this topic has grown significantly over time. Prior to 1993, only a few documents were available, but from 2003 onward, there has been an explosion of interest. Graph 1 illustrates this trend, showing a notable increase in research related to money transformation. Specifically, in 2023, there were 196 documents related to money transformation in the Scopus database.

Graph 1. Number of scientific documents in Scopus base for filter: TITLE-ABS-KEY (transformation AND of AND money)



Source: own study based on Scopus base: <https://www.scopus.com/term/analyzer.uri?sort=plf-f&src=s&sid=efda3cc39c10fa32154974a53d2473e7&sot=a&sdt=a&sl=38&s=TITLE-ABS-KEY%28transformation+of+money%29&origin=resultslist&count=10&analyzeResults=Analyze+results>.

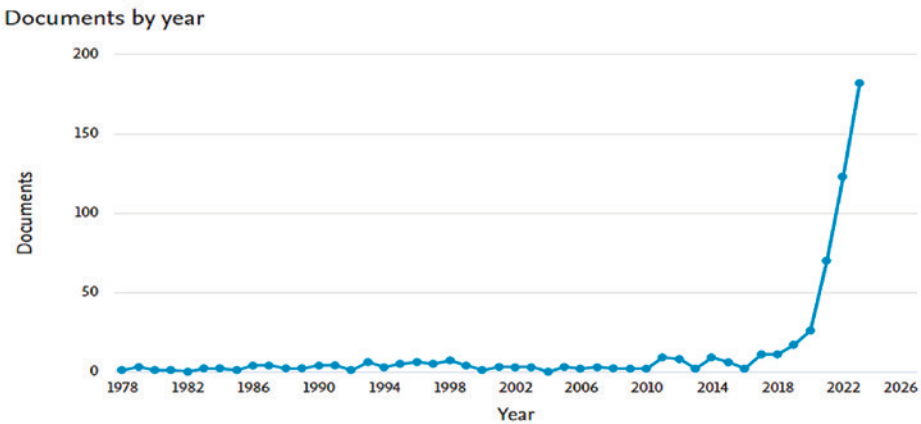
Those selected documents comes mainly from ten most active in the money transformation topic countries (percentages counted as a share in the group of those 10 countries): United States (30,93%), United Kingdom (17,62%), Russian Federation (11,23%), India (8,03%), China (6,54%), Germany (6,54%), France (5,53%), Australia (4,83%), Italy (4,61%), Canada (4,31%).

The most popular types of scientific documents about money transformation are: articles (55,7%), book chapters (17,4%), conference papers (13,6%), reviews (6,9%), books (4,6%).

The most productive authors for the money transformation are: Hsing Y. (5 documents in Scopus base), Moseley F., Hart K., Maurer B., Nelms T.C., Bellofiore R., Benigni R., Black I.S., Chen W., Chiadmi D..

Considering CBDC topic we may conclude that it is much more currenly appeared topic, but with huge increase of interest from 2020 year, what is presented in the Graph 2.

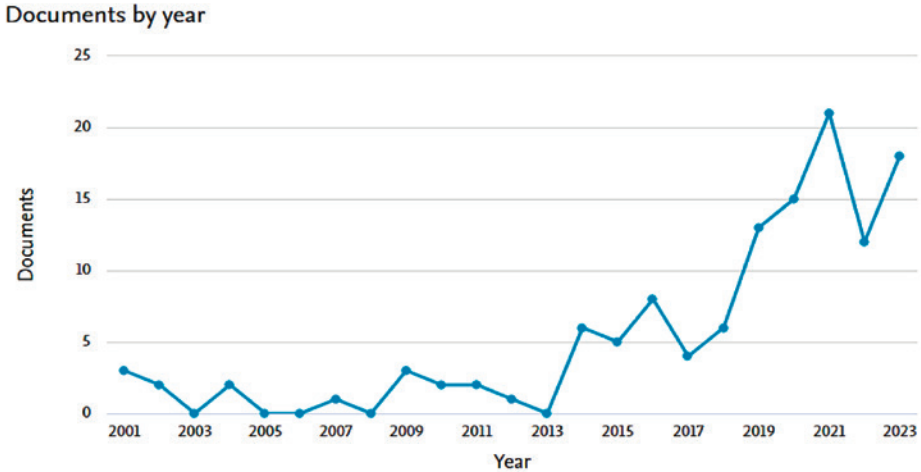
Graph 2. Number of scientific documents in Scopus base for filter: TITLE-ABS-KEY (cbdc)



Source: own study based on Scopus base: <https://www.scopus.com/term/analyzer.uri?sort=plf-f&src=s&sid=efda3cc39c10fa32154974a53d2473e7&sot=a&sdt=a&sl=19&s=TITLE-ABS-KEY%28CBDC%29&origin=resultslist&count=10&analyzeResults=Analyze+results>.

Employing the same analysis procedure for non-cash transactions, it may be concluded that it is the least developed research area in its early stages, although it holds significant growth potential. Graph 3 illustrates this trend.

Graph 3. Number of scientific documents in Scopus base for filter: TITLE-ABS-KEY (non-cash AND transaction)



Source: own study based on Scopus base: <https://www.scopus.com/term/analyzer.uri?sort=plf-f&src=s&sid=efda3cc39c10fa32154974a53d2473e7&sot=a&sdt=a&sl=35&s=TITLE-ABS-KEY%28non-cash+transaction%29&origin=resultslist&count=10&analyzeResults=Analyze+results>.

Non-cash transactions have been present in the scientific base of Scopus since 2001, but after 2013 there has been rapid growth in the number of documents related to this topic. This trend suggests that the topic is gaining critical importance in academic and professional circles, with researchers exploring various facets of monetary transformation, including digital currencies, cashless societies, and the evolving role of financial institutions. The increasing volume of research underscores the necessity for continued exploration and analysis, as the dynamics of money transformation have far-reaching implications for economic stability, financial inclusion, and global economic policies.

4. Methodology

This study adopts a multifaceted approach to scrutinize the theory and implementation of non-cash transaction in Poland and CBDC implementation worldwide as key drivers for money institution transformation. Initially, a comprehensive desk research, literature review, and comparative studies were conducted to establish a foundational understanding and delineate the specific parameters of inquiry within the subject matter. Subsequent-

ly, data and metadata were meticulously gathered to inform the subsequent analytical phases. Then, the methodology for this research is based on a comprehensive literature review and analysis of secondary empirical data. The study employs the following steps:

- literature review – a thorough review of existing literature was conducted using the Scopus database. This involved identifying key trends and developments in the areas of non-cash transactions and Central Bank Digital Currencies (CBDCs). The literature review focused on identifying the scope of research, key findings, and gaps in the current knowledge base;
- data collection – secondary data was gathered from various reliable sources, including public statistics, industry reports, academic publications, press articles, and database archives for non-cash transactions and CBDCs as well. This data provided a quantitative basis for analyzing the trends and patterns in the transformation of money institutions;
- comparative analysis – the research involved a comparative analysis of cash and non-cash transactions in Poland and CBDC level of implementation in the world. This included examining the share of these transactions over a period, with specific attention to the changes observed during the COVID-19 pandemic and the subsequent technological advancements in the fintech sector and also according to CBDC the crucial was to compare different activities and levels of implementation in the world;
- trend analysis – trends in the adoption of non-cash transactions and the development of CBDCs were analyzed. This included studying the rate of increase in non-cash transactions and the various electronic payment methods being adopted in Poland;
- empirical analysis – the collected data was analyzed to identify the impact of technological innovations, regulatory changes, and consumer behavior on the financial landscape in Poland and for CBDC worldwide. Specific metrics such as the share of cash vs. non-cash transactions and the growth rate of digital payment methods were evaluated and for CBDCs levels of implementations and alliances between countries;
- interpretation of findings – the results were interpreted to understand the implications of the transformation of money institutions

on economic stability, financial inclusion, and global economic policies. This interpretation was aimed at providing insights into the future directions of monetary systems both locally and globally.

Also, employing a case study methodology, an in-depth investigation was conducted on a specific exemplar to elucidate the practical application and implications of BLIK payment system. Following this quantitative methods were deployed, with a primary emphasis on statistical analysis utilizing time series data and descriptive statistics. These analytical tools were instrumental in discerning patterns, the dataset, facilitating the formulation of empirically grounded conclusions.

To enhance the clarity and comprehensibility of the findings, various visualization techniques, including charts, the map, tables were employed. These visual aids served to distill complex data and intricate relationships into accessible formats, thereby facilitating a more nuanced understanding of the research outcomes and facilitating informed decision-making processes.

5. Results

5.1. Non-cash transactions in Poland

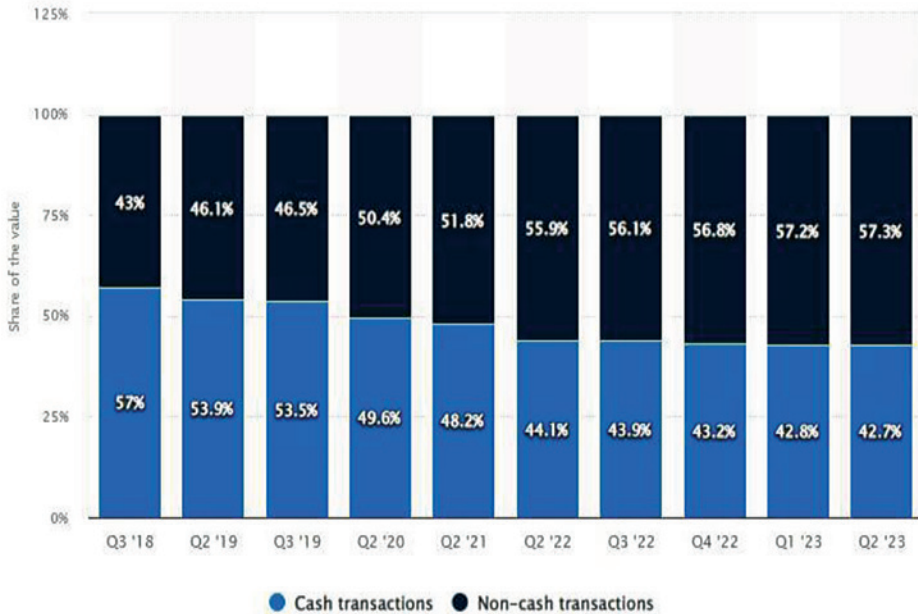
The financial landscape in Poland is undergoing significant changes driven by technological advancements, regulatory frameworks, and evolving consumer preferences. The coexistence and interplay between cash and non-cash transactions form a dynamic aspect of Poland's monetary system, reflecting broader global trends towards digitalization while maintaining traditional cash usage. Despite the rapid growth of digital payment systems, cash remains a critical component of Poland's financial infrastructure. Physical currency exchange including banknotes and coins, remains particularly prominent in everyday transactions and in regions with limited access to electronic payment systems. At the same time, the non-cash market in Poland is experiencing rapid growth, fueled by technological innovations, regulatory support, and the increasing adoption of digital financial services. This shift is marked by a rise in various electronic payment methods: credit and debit card payments, electronic funds transfers (EFTs), mobile payments or digital wallets and cryptocurrencies. This transformation is driven by regulatory support, technological advancements, and changing consumer behaviors, pointing towards

a future where digital and traditional payment methods coexist and complement each other, enhancing the overall efficiency and inclusivity of Poland's financial system. Notably, the adoption of non-cash payments accelerated during the pandemic, driven by both necessity and FinTech innovations. Technological advancements in the fintech sector are driving the development of new payment solutions, improving transaction efficiency, and enhancing security measures against fraud. The transformation in Polish market towards non-cash payments could be good characterized by the market statistics. In terms of adopting modern technologies for non-cash payments, Poland stands out as one of the most developed countries in Europe. Over the years, the proportion of cash payments relative to non-cash payments has consistently decreased. In the second quarter of 2023, the share of cash transactions amounted to 42.7 percent, a decrease of 1.4 percentage points compared to the previous year. More than 22.6 million Poles actively used online banking in 2023, and 21.7 million used mobile applications (Sas, A., Statista, 2024). The coronavirus (COVID-19) pandemic suddenly changed the payments market picture. During the lockdown, most transactions were cashless. The e-commerce market developed, making electronic payments even more popular.

A comparative analysis of cash and non-cash transactions on the Polish market clearly indicates the shift towards non-cash transactions. This analysis examines the shift in the value share of non-cash and cash transactions made with payment cards in Poland from the third quarter of 2018 to the second quarter of 2023. The data reveals a significant trend towards the increasing use of non-cash transactions over this period, what is seen on Chart 1.

Comparing Q3 2018 with cash transactions as 57% and non-cash transactions as 43% in the market with the Q2 2023 when the cash transactions constituted 42,7% and non-cash transactions 57,3% it may be concluded that this data shows a marked shift from cash to non-cash transactions over the five-year period. The turning point in favor of non-cash transactions in the Polish market occurred during Q2 2000. At that time, non-cash transactions captured 50.4% of the transaction market. Subsequently, their share gradually increased, reaching 57.3% by Q2 2023.

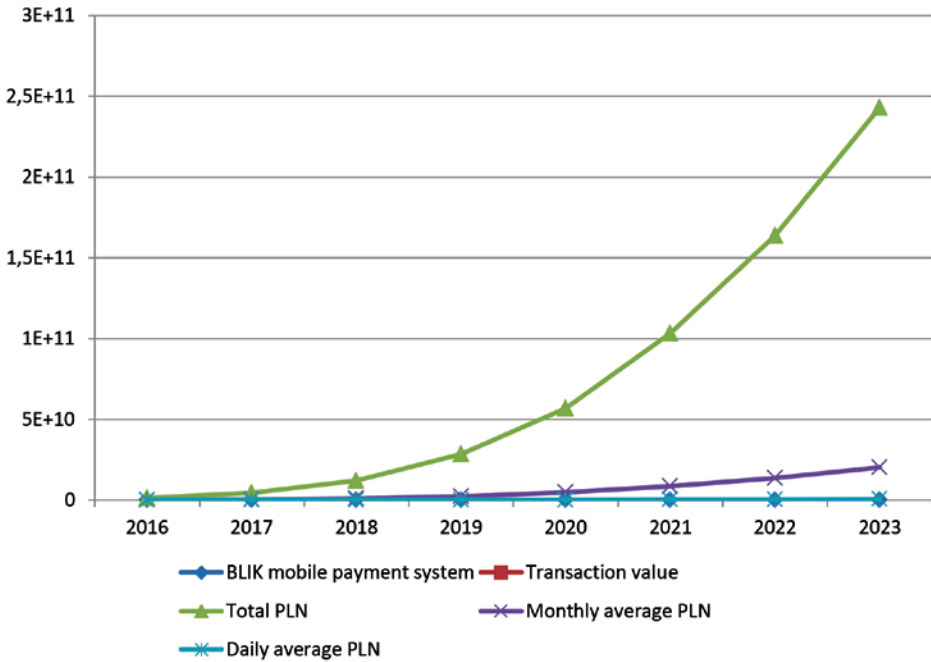
Graph 4. Share of the value of non-cash and cash transactions made with payment cards in Poland in the 3rd quarter of 2018 and 2nd quarter of 2023



Source: Sas, A., Statista, (2024), Digital payments in Poland – statistics & facts, Statista, <https://www.statista.com/topics/9396/digital-payments-in-poland/#topicOverview> [access: 15.05.2024].

A good example of transformation towards non-cash transactions in Poland is the BLIK system. Launched in 2015, the BLIK is a mobile payment platform that enables smartphone users to conduct cashless transactions both in physical stores and online, withdraw and deposit cash at ATMs, make transfers to a phone number and generate digital checks with unique codes for secure transactions. Mobile banking applications on Android or Harmony OS devices allow users to make contactless payments using BLIK at payment terminals that accept Mastercard cards. The system is managed and developed by Polski Standard Płatności (PSP). According to the National Bank of Poland, in 2019 the number of Blik transactions exceeded the number of transactions made with payment cards on the Polish Internet. This achievement underscores BLIK's effectiveness as a practical example of the shift toward non-cash payment methods.

Graph 5. Number and value of transactions in the BLIK system



Source: own study based on NBP reports, <https://nbp.pl/system-platniczy/dane-i-analizy/systemy-platnosci/dane-statystyczne/> [access: 15.05.2024].

To analyze the data provided for the BLIK mobile payment system from 2016 to 2023, we need to break it down into several key metrics. These metrics include the total transaction value, monthly average transaction value, daily average transaction value, average value of a single transaction, total number of transactions, monthly average number of transactions, and daily average number of transactions. By examining these metrics, we can identify trends and patterns in the usage and growth of the BLIK system. To the support this analysis we also consider the data presented in the table 1. When examining total transaction value (in PLN), it is visible that The total transaction value has seen a remarkable increase from PLN 1,534,959,097 in 2016 to PLN 243,132,089,388 in 2023. This substantial growth reflects a strong adoption and increasing usage of the BLIK system over the years. Going through monthly average transaction value (in PLN), it could be emphasized that The monthly average transaction value has also significantly increased from PLN 127,913,258 in 2016 to PLN 20,261,007,449 in 2023. This indicates a consistent rise in the volume of transactions processed

monthly. When it comes to total number of transactions (in pcs.) it could be concluded that The total number of transactions has grown exponentially from 8,237,472 in 2016 to 1,762,677,933 in 2023. This exponential growth in the total number of transactions, monthly average number of transactions, and daily average number of transactions showcases the system's popularity and user base. The monthly average number of transactions has increased from 686,456 in 2016 to 146,889,828 in 2023, reflecting the growing number of transactions processed on a monthly basis.

The data indicates a strong and continuous growth trend in the BLIK mobile payment system from 2016 to 2023. Key observations include:

- a significant increase in the total transaction value, monthly average transaction value, and daily average transaction value, reflecting broader adoption and more frequent use;
- stability in the average value of a single transaction, indicating consistent transaction sizes;
- exponential growth in the total number of transactions, monthly average number of transactions, and daily average number of transactions, showcasing the system's growing popularity and user base.

These trends suggest that BLIK has become an increasingly integral part of the financial ecosystem in Poland, with more users and higher transaction volumes year over year. The BLIK mobile payment system has profoundly impacted the landscape of non-cash transactions in Poland since its inception. The data from 2016 to 2023 illustrate a significant increase in both the volume and value of transactions conducted through BLIK, indicating its growing role in the country's financial ecosystem. BLIK's rise parallels broader global and regional trends towards digital and non-cash payments. Its integration with major Polish banks and the convenience it offers through mobile access have likely contributed to its success. By facilitating easy and secure transactions, BLIK has not only enhanced user convenience but also contributed to reducing the reliance on cash, promoting a shift towards a more digital economy. As BLIK continues to evolve, it is likely to further entrench itself as a cornerstone of Poland's digital economy, promoting financial inclusion and reducing the reliance on cash. Future research could focus on the long-term socio-economic impacts of this shift and the role of similar technologies in other regions and also is important and practical example of transformation towards non-cash transactions in Poland.

Table 1. Number and value of transactions in the BLIK system

| | BLIK mobile payment system | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|-----------|---------------------------------------|----------------|------------|-------------|-------------|-------------|--------------|--------------|--------------|
| 1. | Number of working days: | 366 | 365 | 365 | 365 | 366 | 365 | 365 | 365 |
| 2. | Transaction value | | | | | | | | |
| | Total | 1534959097 PLN | 4690726097 | 12139238942 | 28650673570 | 56876910418 | 103360922483 | 164012177044 | 243132089388 |
| | Monthly average | 127913258 PLN | 390893841 | 1011603245 | 2387556131 | 4739742535 | 8613410207 | 13667681420 | 20261007449 |
| | Daily average | 4193877 PLN | 12851304 | 33258189 | 78494996 | 155401395 | 283180610 | 449348430 | 666115313 |
| | Average value of a single transaction | 186 PLN | 142 | 134 | 132 | 134 | 135 | 133 | 138 |
| 3. | The number of transaction | | | | | | | | |
| | Total | 8237472 pc. | 33038639 | 90813859 | 217825794 | 424147074 | 763214721 | 1235645098 | 1762677933 |
| | Monthly average | 686456 pc. | 2753220 | 7567822 | 18152150 | 35345590 | 63601227 | 102970425 | 146889828 |
| | Daily average | 22507 pc. | 90517 | 248805 | 596783 | 1158872 | 2090999 | 3385329 | 4829255 |

Source: own study based on NBP reports, <https://nbp.pl/system-platniczy/dane-i-analizy/systemy-platnosci/dane-statystyczne/> [access: 15.05.2024].

5.2. CBDC directions in the World

Central Bank Digital Currencies (CBDCs) are digital forms of central bank money that are gaining attention globally as countries explore their potential benefits and challenges. CBDCs are designed to complement or replace physical cash, aiming to improve the efficiency, security, and inclusiveness of the financial system. The goals of Central Bank Digital Currencies (CBDCs) vary depending on the specific economic, social, and technological contexts of the countries considering or implementing them. However, according to literature there are several common objectives that central banks and governments aim to achieve with CBDCs: enhancing payment system efficiency, promoting financial inclusion, improving monetary and financial stability, enhancing security and reducing fraud, modernizing the payment system, reducing dependency on physical cash, facilitating cross-border payments, ensuring sovereignty in the Digital age and others. The overarching goal of CBDCs is to modernize the financial system, making it more efficient, inclusive, and secure while enhancing the central bank's ability to implement monetary policy and maintain financial stability. The specific objectives can vary based on each country's priorities and challenges, but the potential benefits of CBDCs make them a significant focus of research and development for central banks worldwide. Central Bank Digital Currencies (CBDCs) are still in the developmental and experimental stages for most countries, but several notable achievements have been made by early adopters and countries leading in this area.

It is worth to come to the two examples of successful pilot programs and launches done by China and Bahamas. As far as it goes to China, The Digital Currency Electronic Payment (DCEP), also known as the digital yuan, has been one of the most advanced CBDC projects. China's central bank, the People's Bank of China (PBOC), has conducted extensive pilot programs in major cities like Shenzhen, Suzhou, and Chengdu. These pilots have included various use cases, such as retail purchases, public transportation, and government services. The digital yuan has been successfully used by millions of users and thousands of merchants.

Considering the example of Bahamas, The Sand Dollar, launched by the Central Bank of The Bahamas in 2020, is one of the first fully operational retail CBDCs in the world. It aims to provide more inclusive financial services, particularly for the unbanked population, and improve resilience against natural disasters. The Sand Dollar is used for domestic transactions and

has integrated with several financial institutions in the Bahamas. It should be noted that countries are at different stages in thinking or realizing the policy of issuing the CBDC.

Examples of technological advancements are worth to be called in the cases of Sweden and Canada. In Sweden, the e-krona project by Sweden's Riksbank has made significant progress in its pilot phases. The project explores the technical and operational aspects of a CBDC, focusing on ensuring robustness, scalability, and security. It has provided valuable insights into the potential technical frameworks for CBDCs. In Canada, the Bank of Canada has conducted several experiments under its Project Jasper initiative, exploring the use of blockchain technology for interbank payments. These experiments have provided critical insights into the feasibility and benefits of distributed ledger technology (DLT) for CBDCs.

There are also cross-border collaborations in the matter of CBDC, like m-CBDC Bridge; a collaborative project involving the Hong Kong Monetary Authority, the Bank of Thailand, the People's Bank of China, and the Central Bank of the United Arab Emirates. This initiative explores the potential for CBDCs to facilitate cross-border payments, aiming to make them more efficient and less costly. The project is an example of how international cooperation can address the challenges of cross-border transactions. Another international project is called: Inthanon-LionRock, which is a joint initiative between the Bank of Thailand and the Hong Kong Monetary Authority that investigates the use of CBDCs for cross-border payments. The project has demonstrated the potential for CBDCs to enhance the efficiency and transparency of international payments.

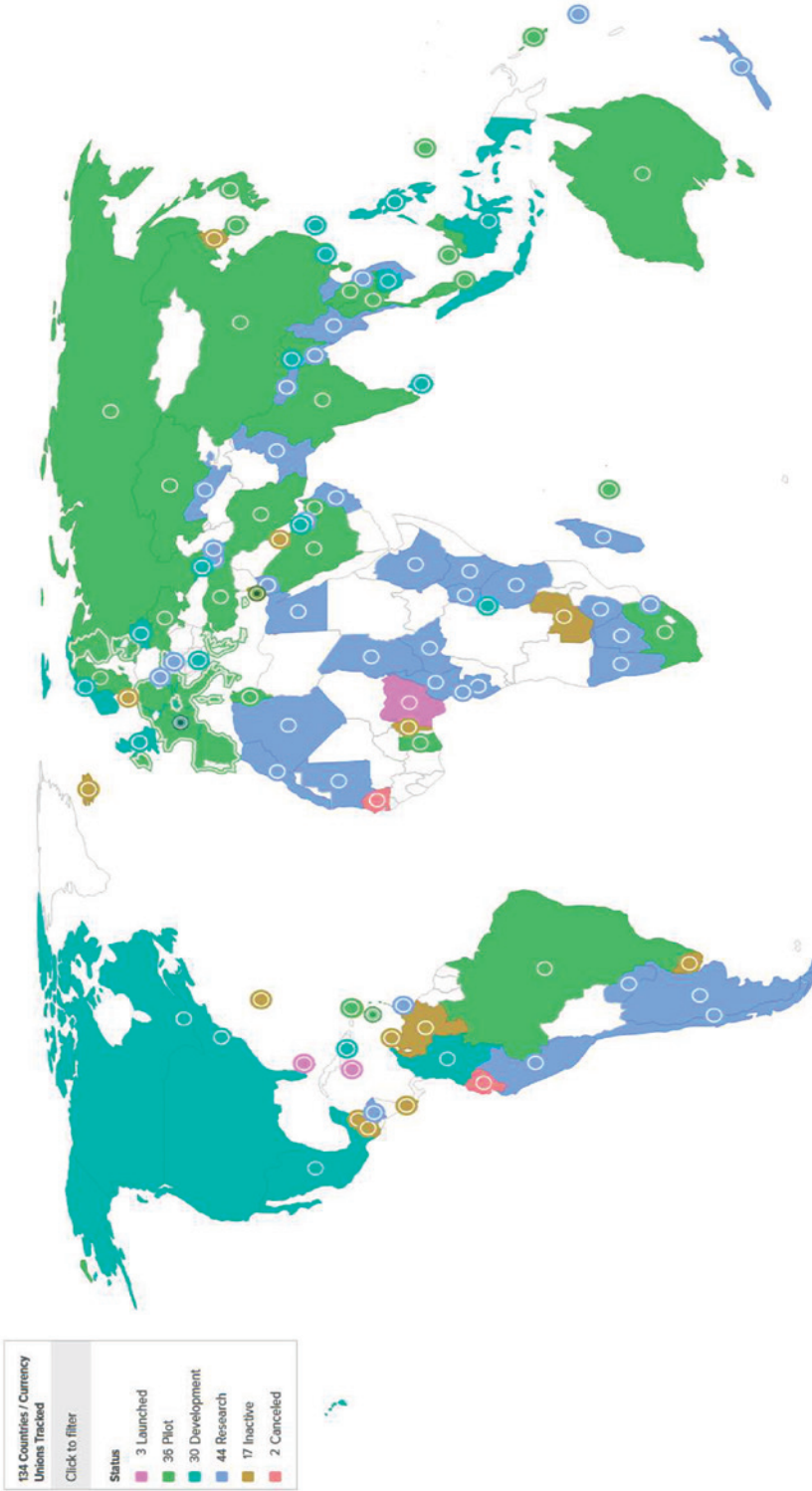
Defining the CBDC as virtual money backed and issued by a central bank, it is crucial to analyse how this transformation goes around the world and what is the level of implementation, development, research or maybe canceled CBDC as money and payments have become more digital. The world's central banks have realized that they need to provide a public option or let the future of money pass them by. The Graph-map 1 shows different stages and statuses of launching the CBDC. There are six different statuses: launched (3 countries), pilot (36 countries), development (30 countries), research (44 countries), inactive (17 countries), canceled (2 countries).

The analysis of the CBDC level launching in the world shows key findings:

- 134 countries & currency unions, representing 98% of global GDP, are exploring a CBDC. In May 2020 that number was only 35. Cur-

- rently, 68 countries are in the advanced phase of exploration, development, pilot, or launch;
- 19 of the Group of 20 (G20) countries are now in the advanced stages of CBDC development. Of those, eleven countries are already in the pilot stage. This includes Brazil, Japan, India, Australia, South Korea, South Africa, Russia, and Turkey;
 - 3 countries have fully launched a CBDC: the Bahamas, Jamaica and Nigeria. The Eastern Caribbean Currency Union – consisting of 8 countries – halted availability of DCash due to technical issues and is developing a new pilot;
 - there is a new high of 36 ongoing CBDC pilots, including the digital euro. The European Central Bank (ECB) is now in the preparation phase, conducting practical tests with some transactions being settled in a controlled environment. The digital euro is in a 2-year preparation stage, ending in 2025;
 - progress on retail CBDC has stalled in the US. There is a widening gap between the US and G7 banks, including the Bank of England and the Bank of Japan. CBDC has become an issue in the ongoing US presidential campaign, with several candidates speaking out against its development;
 - Brazil, Russia, India, China, and South Africa – the founding members of BRICS – are in the pilot phase of CBDC exploration. Several of the new members – Saudi Arabia, Iran and the UAE – are also exploring cross-border wholesale CBDCs. Since last year, BRICS has actively promoted developing an alternate payments system to the dollar;
 - since Russia's invasion of Ukraine and the resulting G7 sanctions response, wholesale CBDC developments have doubled. There are currently 13 cross-border wholesale CBDC projects, including mBridge, which connects China, Thailand, the UAE, and Hong Kong, and will enter a new phase, expanding to 11 more countries this year;
 - as the largest CBDC pilot in the world, China's digital yuan (e-CNY) reaches 260 million wallets across 25 cities. Since 2022, it has been used in a range of settings from transit and healthcare to buying crude oil. In 2024, the pilot is focused on optimizing overseas tourist use and expanding cross-border applications of e-CNY.

Graph-map 1. Status of CBDC launching in the World



Source: <https://www.atlanticcouncil.org/cbdctracker/> [access: 15.05.2024].

There are 18 CBDC projects lead in the world. Some of them are international and at different levels. Cross-border CBDC projects are: Project Jura, D-Cash, Project Cedar x/Ubin+, Project Aurum, Project Sela, Project Icebreaker, Project Agora, Venus Initiative, Project Rosalind, Project mBridge, Project Turbillion, Digital Euro, Project Mariana, Project Helvetia, Project Dunbar, Project Mandala, e-CNY.

The exploration and development of CBDCs represent a pivotal moment in the evolution and transformation of money and payment systems. CBDCs have the potential to significantly enhance the efficiency, security, and inclusiveness of the financial system while providing central banks with new tools for monetary policy and financial stability. The successful implementation of pilot programs in China, The Bahamas, Sweden, and Canada, as well as international collaboration projects, underscore the transformative potential of CBDCs. As central banks continue to explore and refine CBDC technologies, these digital currencies are poised to play a critical role in the future of global finance, addressing both existing challenges and emerging opportunities in the digital economy.

6. Summary and conclusions

The transformation of money institutions is a dynamic and rapidly evolving process driven by technological advancements, regulatory changes, and shifting consumer behaviours. The research indicates that Poland is at the forefront of this transformation, showcasing significant growth in non-cash transactions and the adoption of digital payment methods. The data reveals a clear trend towards digitalization, with non-cash transactions increasingly outpacing cash transactions, particularly during the COVID-19 pandemic.

The analysis highlights several key findings on money institution transformation:

- rapid growth of non-cash transactions. There has been a marked increase in the use of non-cash transactions in Poland, driven by innovations in the fintech sector and supportive regulatory frameworks. This trend is reflected in the significant rise in electronic payment methods such as credit and debit cards, mobile payments, and digital wallets;
- impact of COVID-19. The pandemic has accelerated the adoption of non-cash payments, with a notable shift towards digital transactions during the lockdown periods. This shift underscores the im-

portance of digital infrastructure in maintaining economic activity during times of crisis;

- technological advancements. The development of new payment solutions and robust fraud prevention measures have contributed to the efficiency and reliability of non-cash transactions. These advancements are essential for sustaining the growth and acceptance of digital payment methods.

The ongoing development of CBDCs also represents a significant shift in the monetary system, with the potential to enhance financial inclusion and transaction efficiency. However, it also poses challenges that need to be addressed, such as technological barriers and the need for robust regulatory frameworks.

In conclusion, the transformation of money institutions is an inevitable and ongoing process that will continue to reshape the financial landscape, what was presented on BLIK system and CBDC. The findings from this research provide valuable insights into the current trends and future directions of this transformation, highlighting the need for continued exploration and adaptation in the face of evolving economic and technological conditions. Additionally, this moment calls for practical efforts to establish legal frameworks that align with the rapidly changing financial environment and foster a new perspective on money.

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TRANSFORMACJA INSTYTUCJI PIENIĄDZA NA PRZYKŁADZIE TRANSAKCJI BEZGOTÓWKOWYCH I CBDC

Słowa kluczowe: transformacja pieniądza, instytucja pieniężna, transakcje gotówkowe, transakcje bezgotówkowe, CBDCS

Abstrakt

Cel: w ostatnich latach niezmienna instytucja pieniądza nabrała innego wymiaru ze względu na: transformację transakcji gotówkowych na bezgotówkowe, bardzo dynamiczny rozwój infrastruktury płatniczej np. BLIK, czy wręcz w ujęciu globalnym intensywną pracę banków centralnych nad budową nowego systemu pieniądza cyfrowego banków centralnych (CBDC). Zmiany te dotyczą nie tylko pojedynczych zmian na rynkach lokalnych, czego bardzo dobrym przykładem jest Polska jako lider w cyfryzacji systemów bankowych, ale także na rynkach globalnych, na przykładzie pieniądza cyfrowego banków centralnych. W związku z dynamicznymi zmianami istnieje potrzeba zbadania transformacji instytucji pieniężnych ze szczególnym uwzględnieniem transakcji bezgotówkowych i Walut Cyfrowych Banku Cen-

tralnego (CBDC), oraz zbadania ich konsekwencji dla systemu finansowego i szerzej rozumianej gospodarki. Celem rozdziału jest zatem, identyfikacja wybranych obszarów zmian w instytucjach monetarnych i wskazanie ich kierunków.

Metoda badawcza: w badaniu wykorzystano ukierunkowane przeglądy literatury, analizę danych wtórnych, badanie porównawcze transakcji gotówkowych i bezgotówkowych w Polsce, analizę globalnego wdrożenia CBDC jako znaczącego obrazu zmieniającego się świata. Wykorzystano wtórne dane empiryczne, takie jak: statystyki publiczne, raporty branżowe, raporty, publikacje prasowe, archiwa danych, bazy danych itp. Rozdział zawiera także pogłębione studium przypadku systemu płatności BLIK w Polsce.

Wnioski: ustalenia wskazują na znaczny zwrot w stronę transakcji bezgotówkowych w Polsce, przyspieszony postępem technologicznym i pandemią Covid-19. Ponadto globalny krajobraz rozwoju CBDC jest wyraźnie zróżnicowany, a kraje znajdują się w różnych fazach poszukiwań i wdrażania, co odzwierciedla rosnące znaczenie walut cyfrowych we współczesnych gospodarkach. Wydaje się, że dla całego Świata rozpoczął się nowy, pełen wyzwań wyścig i już niedługo widoczne będą przejścia z kolejnych faz rozwoju do faz wdrożenia. Jest to bardzo interesujący moment, ponieważ rozwój CBDC jest obecnie w fazie wzrostu.

Wkład badawczy: badanie to przyczynia się do zrozumienia cyfrowej transformacji pieniądza, podkreślając rosnącą lukę między postępem technologicznym a jego praktycznym wdrożeniem. Zapewnia wgląd w ewoluujący krajobraz finansowy, szczególnie w kontekście szybkiego przyjęcia w Polsce transakcji bezgotówkowych i globalnego rozwoju CBDC wraz z różnorodnością jej faz implementacji.