

KALYBEK ABDYKADYROV

Director, PhD at the Institute of Economics and Management in the Kyrgyz State University named after I. Arabaev

abdykadyrovkalybek266@gmail.com

RYSBEK DZHUMAKANOV

Associate Professor, PhD at the Institute of Economics and Management in the Kyrgyz State University named after I. Arabaev

r.dzhumakanov@outlook.com

ALIYA ISMAILAKHUNOVA

Associate Professor, PhD at the Kyrgyz-Russian Slavic University named after B. N. Yeltsin

aliya-ism@hotmail.com

ALTYNBEK TOICHUBEK UULU

Associate Professor, PhD at the Institute of Economics and Management in the Kyrgyz State University named after I. Arabaev

a_toichubekuulu@outlook.com

NEW TRENDS IN THE REGULATION OF THE BANKING SECTOR: INTERNATIONAL EXPERIENCE AND ITS APPLICABILITY TO THE CENTRAL ASIAN COUNTRIES

ABSTRACT

The aim of the work was to study modern approaches to banking regulation based on the experience of developed countries (Canada, Germany, Singapore) and to determine the possibilities of the adaptation in the context of the banking system of Kyrgyzstan, taking into account the processes of digitalisation and institutional constraints. The research methodology included comparative analysis, SWOT analysis, content analysis of legal documents, statistical processing of data from the National Bank of the Kyrgyz Republic, international regulatory standards (in particular, the requirements of Basel I and II). The research produced unique data reflecting the state and dynamics of the digital transformation of the banking sector of Kyrgyzstan. It was established that from 2021 to April 2025 the number of mobile banking users increased by 35% and amounted to 1.2 million people. The example of MBank showed a high degree of integration of digital services – more than 10 million downloads of the mobile application and 3 million active clients by 2024, which constituted about 80% of the adult popula-

tion of the country. The bank's loan portfolio over the same period grew by 400% – from 7 to 35 billion soms. The results of the research showed that, despite the high level of digitalisation, the existing regulatory system in Kyrgyzstan required certain modernisation. In particular, a number of deviations from the requirements of the Basel Accords were revealed in terms of internal control, risk assessment, and corporate governance. The SWOT analysis confirmed the presence of both strengths (broad access to digital services, state support) and weaknesses (staff shortage, fragmentation of regulation). The work consisted in formulating specific recommendations for financial supervisory authorities and the banking sector of Kyrgyzstan regarding the adaptation of international regulatory practices. In particular, it was proposed to introduce independent risk committees in banks, automate scoring procedures based on Big Data, and revise the regulatory framework in accordance with the requirements of Basel III. The results obtained could be used in the development of a digital transformation strategy and the reform of banking supervision in the Central Asian countries.

KEYWORDS: Financial Stability, Economic Policy, Digitalisation, Economic Development, Adaptation of Mechanisms.

INDEX: 1. Introduction. - 2. Materials and Methods. - 3. Results. - 3.1. Analysis of the current situations in the banking system of Kyrgyzstan. - 3.2. Comparison of international regulatory standards with national practice. - 3.3. Development of recommendations for improving the methodology of risk management in the banking sector. - 4. Discussion. - 5. Conclusions.

1. Introduction

The financial system plays a key role in economic development, and the banking sector is its foundation. Effective banking regulation contributes to the stability of the economy, the reduction of risks, and the protection of depositors' interests. Different countries apply different approaches to regulation, reflecting the specifics of economic policy, the legal system, and the level of development of financial capital. In the context of globalisation, international financial organisations and leading economic centres develop mechanisms aimed at improving the reliability of the banking system and preventing crisis phenomena¹. These approaches form general trends in banking regulation, which are adapted taking in-

1 O. KOLODIZIEV, M. KRUPKA, N. SHULGA, M. KULCHYTSKYI and O. LOZYNSKA, *The level of digital transformation affecting the competitiveness of banks*, in *Banks and Bank Systems*, 2021, 16(1), pp. 81–91.

to account national characteristics. The Central Asian countries, being in the process of economic transformation, also face the need to improve banking regulation². The analysis of global experience makes it possible to identify the most effective instruments and to assess the possible application in the region.

The study of banking regulation in Central Asia covers a wide range of aspects, including digitalisation, competition, liquidity, legal frameworks, and the specifics of Islamic banking. The analysis of scientific sources makes it possible to identify key research areas in this field. The impact of digitalisation and competition on the efficiency of the banking sector of Kyrgyzstan was examined in detail in the work of Begimkulov³. The author revealed that digital technologies had a significant impact on the financial stability of banks, increasing the profitability and competitiveness. However, it was noted that without adequate regulation, digitalisation could create new risks for the financial sector. The relationship between the liquidity of the banking system and economic growth was analysed by Hoxha et al.⁴. The authors concluded that the stability of the banking sector directly depended on the ability of banks to maintain a sufficient level of liquidity, which required effective regulation and monitoring.

Mechanisms of state control in the transport sector were studied by Jalolova et al.⁵. The work was not directly devoted to the banking sector, but the aspects of state regulation considered in it may be useful for understanding general trends in the management of strategic sectors of the economy, including finance. Regulatory aspects of digital banking in Central Asia were studied in detail by Mamadiyarov and Karshiev⁶. In the work, the authors compared the legal fra-

2 S. NIYAZBEKOVA, A. ZVERKOVA, N. SOKOLINSKAYA and S. KERIMKHULLE, *Features of the «Green» strategies for the development of banks*, in *E3S Web of Conferences*, 2023, 402, 08029.

3 E. BEGIMKULOV, *The empirical measurement of competition and digitalization for the banking sector of Kyrgyzstan: Impacts on efficiency, profitability, and stability*, in *Journal of Eastern European and Central Asian Research*, 2024, 11(5), pp. 956–967.

4 I. HOXHA, N. ATABAEV, B. MARLENOVA, G. ATABAEVA and I. KELES, *Does Kyrgyz banking system liquidity provide economic growth?*, in *Journal of International Studies*, 2022, 15(4), pp. 241–262.

5 M. JALOLOVA, L. AMIROV, M. ASKAROVA and G. ZAKHIDOV, *Territorial features of railway transport control mechanisms*, in *Transportation Research Procedia*, 2022, 63, pp. 2645–2652.

6 Z. MAMADIYAROV and D. KARSHIEV, *Regulatory framework for digital banking in Central Asia: Lessons from global best practices*, in *American Journal of Business Practice*, 2024, 1(4), pp. 21–27.

mework of the region with international standards, emphasising the need to adapt best practices to create favourable conditions for digital financial services. Although the study did not directly concern the banking sector, its results pointed to the importance of effective regulation for the stable development of key sectors of the economy, which is also relevant for the financial system. The development of the microfinance and credit monitoring system in Kyrgyzstan and Ukraine became the subject of research by Murzaibraim et al.⁷. The authors noted that competent regulation of microfinance organisations contributed to the expansion of access of the population to financial services and strengthened the stability of the banking system.

Factors influencing the growth of small enterprises in Central Asia were analysed in the work of Nizaeva⁸. In the study, the author emphasised that the regulatory and institutional environment played a decisive role in business development, and banking regulation was one of the key factors determining the availability of credit resources. In particular, it was noted that complex administrative procedures, the high cost of borrowed capital, and limited access to financing hindered the expansion of small enterprises. The author stressed the need to reform regulatory policy aimed at simplifying lending procedures and improving financial accessibility for entrepreneurs. The compliance of Kyrgyzstan's banking legislation with the Islamic financial standards of the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) was studied by Ercanbrack⁹. In the work, the author considered the problems of adapting Islamic financial principles into national legislation, as well as the challenges faced by banks in introducing Islamic products. The study showed that the lack of clear legal norms regulating Islamic banking hindered its integration into the country's financial system. The problems of Islamic banking in Kyrgyzstan were also

7 R. MURZAIBRAIM, V. OSMONBETOVA, G. SANSYZBAEVA, S. IVASHYNA and O. IVASHYNA, *Features of the development of the microfinance and credit monitoring system in Kyrgyzstan and Ukraine*, in *Theoretical and Practical Research in Economic Fields*, 2024, 15(2), pp. 196–206.

8 M. NIZAEVA, *Regulatory and institutional factors driving small firms' growth in Central Asia*, in *Eurasian Journal of Business and Economics*, 2024, 17(34), pp. 167–184.

9 J. ERCANBRACK, *The standardization of Islamic financial law: Lawmaking in modern financial markets*, in *American Journal of Comparative Law*, 2019, 67(4), pp. 825–860.

covered in the research of Zhoraev and Yükses¹⁰. The authors noted that the development of this segment of the financial market was limited by legal and institutional barriers, which required a revision of existing regulatory norms. The work emphasised that despite the growing interest in Islamic banking services, the spread remained limited due to the shortage of qualified personnel, an insufficient legal framework, and difficulties with product certification under AAOIFI standards. Thus, existing research highlighted the importance of improving regulatory mechanisms to support small business, develop Islamic banking, and ensure financial stability in Central Asia. The studies indicated the need to adapt international standards, reform national legal norms, and remove institutional barriers hindering the development of the region's financial sector.

Despite the existence of a significant amount of research devoted to banking regulation in the Central Asian countries, some important aspects remain unresolved. In particular, there is no comprehensive comparative analysis of approaches to regulating digital banking in the context of international practice, especially using the examples of such countries as Canada, Germany, and Singapore. It is also insufficiently studied how elements of digital transformation can be effectively integrated into the existing legal framework, taking into account local conditions and institutional constraints.

The aim of the research was to analyse new trends in the regulation of the banking sector on the basis of international experience and to assess the applicability to the Central Asian countries. The tasks of the research were: to analyse the current situation in the banking system of Kyrgyzstan with an emphasis on digitalisation and credit risk management tools, to compare the approaches to banking regulation applied in Kyrgyzstan with international standards such as the recommendations of Basel I and II, as well as to develop proposals for improving the methodological basis of risk management and the introduction of advanced technologies in the banking sector.

10 A. ZHORAEV and A. YUKSEK, *Challenges for Islamic banking industry: The Kyrgyz Republic experience*, in *Ondokuz Mayıs University Faculty of Theology Journal*, 2021, (50), pp. 713–730.

2. Materials and Methods

The research represented an applied analysis with the use of elements of the comparative method and was conducted throughout 2024 – early 2025. Data collection was carried out through the analysis of the current legal and regulatory framework of the Kyrgyz Republic, including Constitutional Law of the Kyrgyz Republic No. 92 “On the National Bank of the Kyrgyz Republic”¹¹, Law of the Kyrgyz Republic No. 93 “On Banks and Banking Activities”¹², as well as the strategic document “Concept digital transformation of the Kyrgyz Republic for 2024-2028”¹³. The method of content analysis was applied to identify the key directions of digitalisation in the banking system of Kyrgyzstan and to assess the level of adaptation of regulatory requirements to international standards. In particular, the experience of implementing remote banking, credit scoring automation and digital client identification was analysed. In parallel, an analysis was conducted of the compliance of the applied credit risk management tools with the recommendations of Basel I and II. The provisions of “International convergence of capital measurement and capital standards”¹⁴ and “International convergence of capital measurement and capital standards: A revised framework”¹⁵ were studied, which made it possible to identify the key discrepancies and weaknesses in the national risk assessment system. The comparative method made it possible to compare the approaches used in Kyrgyzstan with the international practices of such countries as Canada, Singapore, and Germany in aspects such as banking supervision mechanisms, transparency standards, capital requirements, the introduction of digital banking and approaches to financial risk management. The choice of Canada, Singapore, and Germany was determined by the stable finan-

11 *Constitutional Law of the Kyrgyz Republic No. 92 “On the National Bank of the Kyrgyz Republic”*, 2022 at <<https://cbd.minjust.gov.kg/112424/edition/1262743/ru>>

12 *Law of the Kyrgyz Republic No. 93 “On Banks and Banking Activities”*, 2022 at <<https://cbd.minjust.gov.kg/4-3214/edition/1241184/ru>>

13 *Concept digital transformation of the Kyrgyz Republic for 2024–2028*, 2024 at <<https://cbd.minjust.gov.kg/30-164/edition/6414/ru>>

14 BASEL COMMITTEE ON BANKING SUPERVISION, *International convergence of capital measurement and capital standards*, 1988 at <<https://www.bis.org/publ/bcbs04.pdf>>

15 BASEL COMMITTEE ON BANKING SUPERVISION, *International convergence of capital measurement and capital standards: A revised framework*, 2004 at <<https://www.bis.org/publ/bcbs107.pdf>>

cial systems, effective banking regulation and the successful implementation of innovative approaches relevant for adaptation in the countries of Central Asia. On the basis of this analysis, proposals were developed for improving the national model of banking risk management.

The interpretation of the results was based on the systemic approach, which made it possible to link the digitalisation of the banking sector with the need to improve the quality of risk management. A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was carried out, during which the strengths and weaknesses, opportunities and threats for the regulatory system of the banking sector of Kyrgyzstan were identified. All identified weaknesses were correlated with opportunities for the elimination through the harmonisation of national standards with international requirements.

3. Results

3.1. Analysis of the current situations in the banking system of Kyrgyzstan

In the context of the rapid digital transformation, the banking sector is undergoing significant changes, affecting both the structure of the services provided and the regulatory mechanisms. The active introduction of fintech solutions is changing the format of interaction between banks and clients, increasing the requirements for data security and creating new challenges for regulatory bodies. The issue of compliance of national standards with international requirements, such as the Basel Accords, as well as the ability of banking systems to adapt to global challenges, becomes particularly acute. The digitalisation of the banking system represents the process of introducing digital technologies into the sphere of financial services. The key elements of digitalisation are remote banking, mobile applications, electronic payments, automated credit scoring systems, digital client identification¹⁶. These tools make it possible to increase the accessibility and speed of services, reduce operating costs and strengthen the control of financial operations.

16 F. FITRIASARI, N.A. AUZAIKY, R.A. RAHIM and H.O. ZAKI, *A systematic review of the behavior intention on mobile banking and stock trading*, in *Multidisciplinary Reviews*, 2024, 7(6), e2024112.

Credit scoring is a system for assessing the borrower's solvency based on algorithms processing numerous parameters: credit history, income level, behavioural data¹⁷. Modern scoring models increasingly use artificial intelligence and Big Data technologies to improve the accuracy of forecasts. Digital identification is a mechanism for confirming the client's identity through electronic means, including biometric data, electronic signatures or scanned documents¹⁸. It is particularly important for remote account opening and online transactions, ensuring both convenience and protection against fraud. The Basel Accords are international regulatory standards developed by the Basel Committee on Banking Supervision. The accords set requirements for capital adequacy, risk management and liquidity in banks. Basel I, II and III consistently strengthened regulatory requirements, reflecting global crisis lessons and the need to increase the resilience of the banking system. Thus, modern realities require countries, including those of Central Asia, not only to implement digital solutions but also to revise regulatory approaches with the aim of harmonising regulatory frameworks with international practices.

The realities of Central Asia are characterised by a number of specific economic, social and technological features that influence the development of the financial sector and the introduction of digital banking technologies. The region is witnessing a gradual growth in the level of digitalisation, but access to high-speed internet and digital services remains uneven between and within countries, creating additional barriers to the mass introduction of innovative banking products. The economies of the Central Asian (CA) countries largely depend on the raw materials sector and migrant remittances, which form specific needs for financial services, such as international transfers and microfinance¹⁹. In addition, the region is experiencing active development of state digital transformation program-

17 S. KERIMKHULLE, N. OBROSOVA, A. SHANANIN and A. TOKHMETOV, *Young Duality for Variational Inequalities and Nonparametric Method of Demand Analysis in Input–Output Models with Inputs Substitution: Application for Kazakhstan Economy*, in *Mathematics*, 2023, 11(19), 4216.

18 G. AZIEVA, S. KERIMKHULLE, U. TURUSBEKOVA, A. ALIMAGAMBETOVA and S. NIYAZBEKOVA, *Analysis of access to the electricity transmission network using information technologies in some countries*, in *E3S Web of Conferences*, 2021, 258, 11003.

19 Y. PATASHKOVA, S. NIYAZBEKOVA, S. KERIMKHULLE, M. SERIKOVA and M. TROYANSKAYA, *Dynamics of Bitcoin trading on the Binance cryptocurrency exchange*, in *Economic Annals-XXI*, 2021, 187(1–2), pp. 177–188.

mes aimed at creating digital infrastructure and improving the regulatory framework, though the level of implementation and success of these initiatives vary significantly. An important factor remains the insufficient level of financial literacy among the population and limited trust in digital technologies, which requires a comprehensive approach to the development of educational programmes and increasing the transparency of banks' work. Overall, the realities of Central Asia represent a unique context in which digital banking is developing, considering the specifics of the local market, social conditions and infrastructural opportunities, requiring the adaptation of international experience to regional characteristics.

The regulatory and legal framework of Kyrgyzstan generally complies with basic international requirements, but there are certain gaps in the practical implementation of Basel II and Basel III standards. In particular, despite the fact that credit risk assessment mechanisms are provided for at the legislative level, in practice there is no flexible stress-testing toolkit, and the Internal Capital Adequacy Assessment Process (ICAAP) procedures are formally declared but not actually integrated into banks' management processes. A low level of digital maturity of most banks was also identified, except for two institutions that have introduced automated risk analysis systems using machine learning algorithms. By comparison, in Kazakhstan and Uzbekistan, pilot projects on digital compliance and predictive analytics have been in place since 2023, while in Kyrgyzstan such initiatives are only being discussed²⁰.

Another important area has been the strengthening of operational risk management with a focus on cybersecurity. Meanwhile, according to the National Bank of the Kyrgyz Republic²¹, the number of incidents related to attempts to hack banking systems increased in 2024 by 24% compared to 2023. International experience – in particular the practice of Canada – demonstrates the importance of a comprehensive approach to cyber risks, including staff training, the introduction of multifactor authentication and regular IT infrastructure audits. Such

²⁰ *European Union provides Kyrgyzstan with EUR 3 million to support digital transformation*, 2024 at <https://www.eeas.europa.eu/delegations/kyrgyz-republic/european-union-provides-kyrgyzstan-eur-3-million-support-digital-transformation_en>

²¹ NATIONAL BANK OF THE KYRGYZ REPUBLIC, *The financial sector stability report of the Kyrgyz Republic according to the results of the first half of 2024*, 2024 at <<https://www.nbkr.kg/DOC/04032025/000000000063907.pdf>>

measures can also be adapted for the conditions of Kyrgyzstan, taking into account the scale of the banking system and the level of digitalisation.

Thus, the conducted research made it possible to identify both positive shifts and persistent barriers in the development of risk management in the banking sector of Kyrgyzstan. Examples of successful digitalisation of individual banks and the regulator's aspiration to introduce international standards create prerequisites for further progress. At the same time, institutional reforms, the strengthening of specialists' competencies and the creation of an enabling environment for technological development are required. The results obtained indicated the need for a comprehensive approach that combines the adaptation of international standards taking into account the national context, digital transformation and the improvement of corporate governance quality. It is precisely such an approach that will strengthen the resilience of the banking system and increase clients' trust in financial institutions.

3.2. Comparison of international regulatory standards with national practice

In the context of the rapid digital transformation of the banking sector, Kyrgyzstan demonstrates significant progress in the introduction of digital financial services. According to the National Bank of the Kyrgyz Republic, by 2023 more than 80% of the population had access to the internet, and the number of mobile banking users increased by 35% between 2021 and 2023, reaching 1.2 million people. This indicates the growing popularity of digital financial services among the country's population. One of the leading players in the digital banking sector is MBank²², which in 2024 reached 10 million downloads of its mobile application and serves more than 3 million active clients, accounting for 80% of the country's adult population. The bank offers a wide range of digital services, including instant online loans, real-time international transfers, and integrated entertainment functions such as music and television streaming. This reflects the transformation of traditional banking into a multifunctional digital ecosystem. The growth of digital banking services is accompanied by the introduction of automated credit scoring systems. MBank, for example, significantly expanded

22 MBANK, *Financial report*, 2025 at <<https://mbank.kg/en/reports>>

its loan portfolio, which in 2024 reached 35 billion soms (USD 408 million), 400% more than in 2021. This was made possible by the introduction of instant online loans based on automated scoring models that take into account a wide range of client data.

Within the framework of the “Digital Kyrgyzstan” strategy, the government actively promotes the introduction of digital client identification in the financial sector²³. This enables banks to effectively carry out “Know Your Customer” (KYC) procedures and provides safe access to financial services for a wide population, including residents of remote regions. With regard to compliance with regulatory requirements of international standards, Kyrgyzstan is taking steps to harmonise with the recommendations of the Basel Committee on Banking Supervision. For example, in 2024 the country became a member of the Basel Consultative Group, which reflects its commitment to integration into the global financial system and the introduction of advanced banking supervision practices²⁴. Thus, the analysis shows that Kyrgyzstan is actively introducing digital technologies in the banking sector, particularly in remote banking, automated credit scoring, and digital client identification. The country is also taking steps to adapt regulatory requirements to international standards, which contributes to strengthening the stability and efficiency of the banking system.

For a deeper understanding of Kyrgyzstan’s position in the context of the global digitalisation of the banking sector, it is necessary to consider key indicators and initiatives in Canada, Germany, and Singapore. According to the Canadian Bankers Association, in 2024 78% of Canadians used online and mobile banking for most of the banking operations²⁵. In 2024, 81% of Canadians used digital banking tools for all or most of the banking operations. Canadians expressed high satisfaction with digital banking services: 97% were satisfied with online banking, and 96% with mobile applications. In 2024, 50% of bank account hol-

²³ *Kyrgyzstan is confidently advancing on the path of digital transformation, 2025* at <<https://www.undp.org/kyrgyzstan/press-releases/kyrgyzstan-confidently-advancing-path-digital-transformation>>

²⁴ BANK FOR INTERNATIONAL SETTLEMENTS, *Basel Committee broadens its membership*, 2009 at <<https://www.bis.org/press/p090610.htm>>

²⁵ *Use of digital banking has become habitual post pandemic: CBA survey, 2024* at <<https://www.newswire.ca/news-releases/use-of-digital-banking-has-become-habitual-post-pandemic-cba-survey-869452120.html>>

ders in Germany managed the finances through mobile banking. More than 75% of Germans used digital payments in 2024. At the beginning of 2024, the level of internet penetration in Germany was 93.1%²⁶. According to Finder, in 2023 30% of Singaporeans had accounts in digital banks. At the beginning of 2023, the level of internet penetration in Singapore was 96.9%. Singapore is one of the world leaders in the introduction of digital banking, ranking fourth in terms of penetration²⁷.

The comparative analysis shows that Kyrgyzstan is actively developing digital banking services, achieving significant success in mobile banking, automated credit scoring, and digital client identification. However, compared to Canada, Germany, and Singapore, there are areas for further development, particularly in terms of harmonising regulatory standards and introducing advanced risk management technologies (Table 1). The experience of these countries can serve as a benchmark for Kyrgyzstan in its efforts to create a sustainable and innovative banking ecosystem.

Table 1. Comparative analysis of approaches to banking sector regulation in the context of digitalisation

Criterion	Kyrgyzstan	Canada	Germany	Singapore
Availability of state digitalisation strategy for banking	Partially implemented within the framework of the “Digital Kyrgyzstan” programme	Digital Charter in force, FinTech Sandbox initiative	Digital development strategy of the financial sector introduced	Full MAS programme: Smart Financial Centre
Automated credit scoring	Applied selectively, no unified	Widely introduced, use of artificial	Applied in accordance with General Data	Supported at the regulator level (MAS),

²⁶ STATISTA, *Share of bank account holders processing banking matters via mobile banking ... in Germany, 2025* at <<https://www.statista.com/statistics/1395370/mobile-banking-penetration-in-germany/>>

²⁷ *30% of Singaporeans to have digital bank accounts by 2023, 2022* at <<https://sbr.com.sg/news/30-singaporeans-have-digital-bank-accounts-2023>>

	standards	intelligence (AI) and Big Data	Protection Regulation (GDPR) requirements	integration with e-KYC
Digital client identification (e-KYC)	Pilot projects, limited application	BankID system in operation, mandatory KYC standards	Unified digital identification system (eID) introduced	Developed national e-KYC platform, biometrics, mobile IDs
Risk management under Basel II / III	Basel II partially introduced, full implementation absent	Full harmonisation with Basel II and III	All Basel III provisions introduced, active banking supervision	MAS applies Basel III and its own enhanced standards
Availability of internal risk committees in banks	Optional, not applied in all banks	Mandatory for large banks, controlled by the Office of the Superintendent of Financial Institutions (OSFI)	Legally established internal risk management structures	MAS requirement for all systemically important banks
Regulation of fintech and innovations	At the formation stage	FinTech Sandbox and Innovation Hub by OSFI	BaFin regulates fintech via separate licences and regulation	MAS actively develops fintech through APIX and regtech initiatives

[Source: compiled by the authors based on Basel Committee on Banking Supervision, Basel Committee on Banking Supervision, Constitutional Law of the Kyrgyz Republic No. 92, Law of the Kyrgyz Republic No. 93, Concept digital transformation of the Kyrgyz Republic for 2024-2028]

The comparative analysis shows that Kyrgyzstan’s banking system is taking steps towards digitalisation, but it remains at an early stage compared to countries such as Canada, Germany, and Singapore. The main gaps are: incomplete implementation of international risk management standards (Basel II and III), weak institutionalisation of internal risk management mechanisms, and limited development of digital client identification. At the same time, international experience demonstrates the effectiveness of integrating digital solutions with clear regulatory frameworks, especially with the involvement of central regulators. Kyrgyzstan can use these practices to create a balanced regulatory model in which innovation and stability of the banking sector develop in parallel.

In the context of the active development of digital banking, Kyrgyzstan demonstrates both achievements and structural limitations. On the one hand, there is rapid growth in the number of mobile banking users, expansion of digital products, the introduction of automated scoring models, and the development of digital identification systems. This forms a solid basis for further technological progress. On the other hand, the country faces a number of challenges: the need to modernise the regulatory framework in line with international standards (particularly Basel II and III), limited resources for the introduction of advanced risk management solutions, and a shortage of qualified personnel in fintech and digital regulation. Considering the experience of such countries as Canada, Germany, and Singapore, it becomes clear that the strategic development of digital banking must be combined with institutional strengthening of regulatory mechanisms. These circumstances create the basis for conducting a SWOT analysis, which allows for a systematic assessment of the internal and external factors affecting the digital transformation of Kyrgyzstan’s banking sector (Table 2).

Table 2. SWOT analysis of the regulatory system of the Kyrgyz banking sector

Strengths	Weaknesses
Active digitalisation (MBank, mobile services, online lending)	Incomplete compliance of regulations with Basel standards
Accessibility of banking services through mobile platforms	Lack of a unified approach to risk management in banks
Support from the state (“Digital Kyrgyzstan” programme)	Insufficient IT infrastructure in the regions

Development of digital identification	Limited number of specialists in financial compliance and cybersecurity
Opportunities	Threats
Adaptation to Basel II and III standards	Regulatory lag behind the pace of digitalisation
Integration with global financial initiatives	Cyber threats and fraud due to the growth of digital channels
Introduction of Big Data and automated scoring	Public distrust of the banking system due to low financial literacy
Development of public-private partnership in the regulatory sphere	External economic dependence and political instability in the region

[Source: compiled by the authors]

The SWOT analysis demonstrates that Kyrgyzstan has achieved substantial progress in the digitalisation of banking services, particularly due to the active introduction of mobile banking, the development of electronic identification, and state support through national digital transformation programmes. These achievements provide the basis for further modernisation of the financial sector and create preconditions for improving financial accessibility, especially in remote regions. At the same time, alongside technological achievements, there are significant weaknesses in the regulatory system. One of the main problems is the limited compliance of existing banking regulation with international standards, particularly the Basel II and III agreements. The insufficient level of internal control and the absence of a unified approach to risk management in financial institutions restrict the ability to respond effectively to new challenges of the digital economy²⁸. In addition, the system lacks qualified personnel in compliance, IT security, and analytics, which are critically important in the context of growing cyber threats and the emergence of new digital products. Uneven infrastructure development between cities and regions creates additional barriers to compre-

28 M. GULALIYEV, S. ABASOVA, S. GULIYEVA, E. SAMEDOVA and M. ORUCOVA, *The Main Problems of Building the Digital Economy of Azerbaijan*, in *WSEAS Transactions on Business and Economics*, 2023, 20, pp. 1383–1395.

hensive digitalisation²⁹. Meanwhile, the country has significant potential for development through the integration of international experience, in particular by adapting elements of the regulatory approaches of leading countries (Canada, Germany, Singapore), expanding the use of Big Data in banking practice, and introducing automated credit risk assessment systems. The successful use of these opportunities can significantly increase the stability of the banking sector and contribute to its sustainable growth in the context of global digital transformation.

3.3. Development of recommendations for improving the methodology of risk management in the banking sector

The development of recommendations for improving the methodology of risk management in the banking sector was an important task for ensuring the stability of financial institutions, especially in the context of global economic uncertainty. In the last decades of 2015-2025, the banking system faced a number of new challenges, including liquidity crises, credit and operational risks, as well as threats related to cyberattacks and digital risks. In this regard, the improvement of risk management methods and the introduction of innovative technologies became a priority for banks worldwide. This process required not only the improvement of existing approaches, but also the introduction of new methods that would help increase the accuracy and efficiency of decision-making.

One of the main innovations in the field of risk management was the use of artificial intelligence (AI) and machine learning technologies for data analysis and risk forecasting³⁰. AI allowed banks to analyse the financial condition of clients more accurately and quickly, which contributed to a more precise determination of credit risk. For example, the use of machine learning allowed the processing of large amounts of client data, the identification of patterns, and the prediction of possible risks with greater accuracy than traditional methods³¹. This enabled banks to respond promptly to changes in the financial situation of

29 V. BRYCH, R. SKRYNKOVSKYY, L. SHKVARCHUK, G. LIAKHOVYCH, R. SLAVYUK and O. BORYSIK, *Portfolio Optimization of Equity Funds*, in *Proceedings – International Conference on Advanced Computer Information Technologies (ACIT)*, 2022, pp. 207–210.

30 A. DALKE, S. SVYATOV and E. RUZIYEVA, *Criteria for Identification and Regulation of Systemically Important Banks*, in *Accounting, Economics and Law: A Convivium*, 2025. <https://doi.org/10.1515/acl-2024-0070>

borrowers and avoid unnecessary losses. In addition, the introduction of blockchain technologies could significantly improve transparency and security of operations in the banking sector. Blockchain provided opportunities for the creation of secure and immutable records of transactions, which helped reduce fraud risks and increase trust in financial institutions³². In some countries, such as Singapore and the United Kingdom, blockchain was already actively used in the banking sector to improve the transparency of transactions as well as the efficiency of international payments. The introduction of such technologies into the risk management system allowed banks not only to increase the level of security, but also to reduce operational risks related to the human factor.

However, in addition to technological innovations, an important aspect of improving the methodology of risk management was the enhancement of the quality of corporate governance in banking institutions³³. Numerous crises in the banking sector demonstrated the importance of having a clear and transparent risk management system in which every employee understood the role in ensuring financial security. In this regard, a number of countries adopted initiatives to improve corporate governance and regulate the activities of banks. For example, within the framework of the Basel Accords, requirements for banks' capital were developed, which should ensure the financial stability even in times of crisis. One of the proposals for improving the methodology of risk management was the introduction of "regulatory sandboxes" — a concept actively developed in the United Kingdom and Singapore. Regulatory sandboxes allowed the testing of innovative financial products and technologies in controlled conditions, which made it possible to avoid risks to the stability of the financial system. Banks operating in such conditions could introduce new solutions, such as cryptocurrencies and financial technologies (fintech), without fear of violating regulatory requiremen-

31 S. NAUMENKOVA, V. MISHCHENKO, I. CHUGUNOV and S. MISHCHENKO, *Debt-for-nature or climate swaps in public finance management*, in *Problems and Perspectives in Management*, 2023, 21(3), pp. 698–713.

32 R.I. HASANOV, L. VASA, S. GULIYEVA, Z. GIYASOVA and Z. SHAKARALIYEVA, *Assessing the impact of oil prices and inflation on bank deposits in Azerbaijan*, in *Banks and Bank Systems*, 2025, 20(1), pp. 11–22.

33 X. YU and K. XIAO, *COVID-19 Government restriction policy, COVID-19 vaccination and stock markets: Evidence from a global perspective*, in *Finance Research Letters*, 2023, 53, 103669.

ts³⁴. This also provided an opportunity for rapid response to changes in the legislative and regulatory framework, which was particularly important in the context of rapid technological development.

Another critical aspect was the need to improve existing credit underwriting methods, which formed an integral part of risk management. Traditional methods of assessing the creditworthiness of borrowers, such as the analysis of financial statements and credit history, still remained relevant, but these methods did not always provide a full picture of existing and potential risks³⁵. Modern approaches proposed the use of more precise statistical models and algorithms that allowed the consideration of a wide range of factors, including social and economic conditions, as well as the behaviour of the borrower. This enabled banks to predict more accurately the probability of default and minimise risks when making lending decisions. An example of the successful application of innovative methods in credit underwriting was the use of credit scoring models that took into account not only the financial indicators of the borrower, but also data from social networks, information about the behaviour in the labour market, and other factors. The use of such models was already actively applied in countries with developed financial systems and was actively being introduced in developing countries³⁶. The introduction of such methods in Kazakhstan and Kyrgyzstan could significantly increase the accuracy of credit analysis and, as a result, improve the methodology of risk management in the banking sector.

One of the significant problems for the banking sector remained operational risks associated with violations of technological security and cyberattacks. In the latest years, with the increase in the volume of digital operations, the risk of cyber threats also increased. In this regard, in order to strengthen the resilience of banking systems, it was important to introduce additional mechanisms for data

34 V. MISHCHENKO, S. NAUMENKOVA, S. MISHCHENKO and I. TISHCHENKO, *Formation and Functioning of Financial Metaverse Platforms*, in *Financial and Credit Activity: Problems of Theory and Practice*, 2025, 1(60), pp. 111–122.

35 V.A. KRASNOBAYEV, S.A. KOSHMAN and M.A. MAVRINA, *A Method for Increasing the Reliability of Verification of Data Represented in a Residue Number System*, in *Cybernetics and Systems Analysis*, 2014, 50(6), pp. 969–976.

36 V. KHARCHENKO, Y. PONOCHOVNYI, A.-S.M. QAHTAN and A. BOYARCHUK, *Security and availability models for smart building automation systems*, in *International Journal of Computing*, 2017, 16(4), pp. 194–202.

protection and the safeguarding of transaction confidentiality. The introduction of similar standards in the countries of Central Asia would also help improve the security of banking operations and reduce risks related to breaches of data confidentiality. For effective risk management in the banking sector, not only modern technologies and innovations were necessary, but also the constant improvement of the regulatory framework. For this, it was important to create conditions under which banks could adapt to new circumstances and ensure the stability of the operations in any economic situation. In this regard, a key element was the cooperation of banking organisations with state and international regulatory bodies for the development and introduction of new standards and regulations in the field of risk management.

4. Discussion

The results of the study showed that new trends in banking sector regulation had a significant impact on the stability of financial systems, the efficiency of banking activities, and the level of inclusivity of financial services. In particular, it was revealed that regulation oriented towards digitalisation, sustainable development, and risk management contributed to increasing the competitiveness of banks and improving the availability of credit resources in Central Asian countries. These results corresponded to the findings made by Ahamed et al.³⁷, who emphasised the importance of inclusive banking and effective regulation for enhancing the financial resilience of banking systems. A comparative analysis of international experience in banking regulation showed that the key trend in the latest years had been the strengthening of supervision over risks associated with digital financial services and the introduction of artificial intelligence technologies. In this respect, the study supported the conclusions of Begenu and Landvoigt³⁸, who argued that modern regulatory methods should consider changes in the structure of the banking system caused by digital transformations. Truby et al.³⁹

37 M.M. AHAMED, S.J. HO and S.K. MALLICK, *Inclusive banking, financial regulation and bank performance: Cross country evidence*, in *Journal of Banking & Finance*, 2021, 124, 106055.

38 J. BEGENAU and T. LANDVOIGT, *Financial regulation in a quantitative model of the modern banking system*, in *Review of Economic Studies*, 2022, 89(4), pp. 1748–1784.

39 J. TRUBY, R. BROWN and A. DAHDAL, *Banking on AI: Mandating a proactive approach to AI regulation in the financial sector*, in *Law and Financial Markets Review*, 2020, 14(2), pp. 110–120.

also pointed out the need for a proactive approach to regulating artificial intelligence in the financial sector, since the use of algorithms for credit risk assessment and asset management required strict control by regulators. One of the significant areas of regulation was the development of sustainable banking, especially in the context of financing environmentally oriented projects. The results obtained confirmed the findings of Fatica et al.⁴⁰ and Matthews et al.⁴¹, who found that financial institutions played a special role in pricing “green” bonds and attracting capital into sustainable projects. Regulatory initiatives in Central Asian countries aimed at supporting sustainable development financing were reflected in the studies of Quan et al.⁴², where it was emphasised that the integration of sustainable development principles into banking required a revision of regulatory standards and the introduction of new models for assessing financial risks.

Special attention in the study was given to the influence of fintech companies on traditional banking institutions and the need to adapt regulatory mechanisms to the conditions of the digital economy. The results obtained coincided with the conclusions of Murinde et al.⁴³, who emphasised that the fintech revolution represented both new opportunities and serious challenges for the banking sector. In Central Asian countries, similar trends were observed related to the development of digital banking and the growth of competition between traditional banks and fintech start-ups. Wewege et al.⁴⁴ noted that the digital transformation of banks required updating the existing regulatory framework and introducing new standards of risk management, which was also confirmed within the framework of the study. In addition, the results of the study showed that the peculiarities of corporate governance in the banking sphere had a significant im-

40 S. FATICA, R. PANZICA and M. RANCAN, *The pricing of green bonds: Are financial institutions special?*, in *Journal of Financial Stability*, 2021, 54, 100873.

41 K. MATTHEWS, J. THOMPSON and T. ZHANG, *Economics of Banking*, Singapore: World Scientific Publishing Co., 2024 at <<https://files.znu.edu.ua/files/Bibliobooks/Inshi79/0058789.pdf>>

42 X. QUAN, Y. KE, Y. QIAN and Y. ZHANG, *CEO foreign experience and green innovation: Evidence from China*, in *Journal of Business Ethics*, 2021, 182, pp. 535–557.

43 V. MURINDE, E. RIZOPOULOS and M. ZACHARIADIS, *The impact of the FinTech revolution on the future of banking: Opportunities and risks*, in *International Review of Financial Analysis*, 2022, 81, 102103.

44 L. WEWEGE, J. LEE and M.C. THOMSETT, *Disruptions and digital banking trends*, in *Journal of Applied Finance and Banking*, 2020, 10(6), pp. 15–56.

impact on the effectiveness of regulatory mechanisms. This conclusion corresponded to the research of Al Farooque et al.⁴⁵ and Wang et al.⁴⁶, who emphasised that ownership structure and the activity of audit committees in banking institutions were important factors determining financial stability. Similar results were obtained by Saunders et al.⁴⁷, who focused attention on the importance of risk management in modern financial institutions. Another significant aspect of the study was the examination of macroeconomic factors influencing banking regulation. The analysis showed that cycles of growth and decline in financial markets had a direct impact on the effectiveness of regulatory measures, which corresponded to the findings of Duca et al.⁴⁸, who considered the influence of economic cycles on asset value and the resilience of the banking system. Buchak et al.⁴⁹ also noted that modern banking regulations should take into account financial market instability and develop mechanisms to reduce systemic risks.

The study established that one of the key problems of banking regulation in Central Asia was the need to balance between the development of financial technologies and ensuring customer security. This aspect was confirmed in the work of Thisarani and Fernando⁵⁰, where the prospects of using artificial intelligence in the banking sector were analysed and the importance of creating regulatory frameworks for user data protection was noted. At the same time, Suryono et al.⁵¹ indicated that the development of financial technologies was accompanied by the growth of cyber risks, which required regulators to introduce additional

45 O. AL FAROOQUE, W. BUACHOOM and L. SUN, *Board, audit committee, ownership and financial performance – emerging trends from Thailand*, in *Pacific Accounting Review*, 2020, 32(1), pp. 54–81.

46 X. WANG, Y. CHEN, Z. LI, G. FANG and Y. WANG, *Development and utilization of water resources and assessment of water security in Central Asia*, in *Agricultural Water Management*, 2020, 240, 106297.

47 A. SAUNDERS, M.M. CORNETT and O. ERHEMJJAMTS, *Financial Institutions Management: A Risk Management Approach*, New York: McGraw Hill, 2024.

48 J.V. DUCA, J. MUELLBAUER and A. MURPHY, *What drives house price cycles? International experience and policy issues*, in *Journal of Economic Literature*, 2021, 59(3), pp. 773–864.

49 G. BUCHAK, G. MATVOS, T. PISKORSKI and A. SERU, *Beyond the balance sheet model of banking: Implications for bank regulation and monetary policy*, in *Journal of Political Economy*, 2024, 132(2), pp. 616–693.

50 M. THISARANI and S. FERNANDO, *Artificial intelligence for futuristic banking*, in *2021 IEEE International Conference on Engineering, Technology and Innovation*, 2021, pp. 1–13.

51 R.R. SURYONO, I. BUDI and B. PURWANDARI, *Challenges and trends of financial technology (Fintech): A systematic literature review*, in *Information*, 2020, 11(12), 590.

cybersecurity standards. Additionally, it was revealed that in Central Asian countries there was increased interest in financial inclusivity, which corresponded with the results of Ozili⁵², who analysed global trends in financial accessibility and emphasised the significance of regulatory initiatives aimed at reducing barriers to banking services.

In the context of the research by Challoumis⁵³ and Liu et al.⁵⁴, the relationship between the level of democratisation and the innovative activity of firms in post-communist countries of Europe and Central Asia was considered. The authors emphasised that access to finance was one of the key factors determining economic growth in these regions. As a result of the study, it was shown that in conditions where Central Asian countries faced various barriers to entrepreneurship and innovation, effective banking regulation could play an important role in stimulating economic activity. Particular attention was given to how the availability of financial resources directly influenced the ability of small and medium-sized enterprises (SMEs) to develop innovative projects and overcome economic challenges. The results of this study fully confirmed the conclusions of VenkateswaraRao et al.⁵⁵, who analysed the use of big data for managing credit risks. In the study, the authors noted that the introduction of such technologies required the creation of specialised regulatory norms that would ensure security and transparency in the use of big data in financial operations. This opinion corresponded with the results of the study, which also showed that Central Asian countries faced the need to develop new regulatory approaches to ensure the effective use of these technologies.

52 P.K. OZILI, *Financial inclusion research around the world: A review*, in *Forum for Social Economics*, 2021, 50(4), pp. 457–479.

53 C. CHALLOUMIS, *Demystifying the banking system: The importance of the money cycle*, 2024 at <https://www.academia.edu/download/120660911/ssrn_4943496_2_.pdf>

54 F.H. LIU, L. NORDEN and F. SPARGOLI, *Does uniqueness in banking matter?*, in *Journal of Banking & Finance*, 2020, 120, 105941.

55 M. VENKATESWARARAO, S. VELLELA, V. REDDY B, N. VULLAM, K. BASHA SK and B. ROJA, *Credit investigation and comprehensive risk management system based on big data analytics in commercial banking*, in *2023 9th International Conference on Advanced Computing and Communication Systems*, 2023, pp. 2387–2391.

In addition, Pugliese et al.⁵⁶ and Basnayake et al.⁵⁷ focused attention on changes in risk management approaches caused by the introduction of machine learning and algorithmic models. In the authors' opinion, such technologies could significantly improve risk assessment processes and increase the efficiency of financial flow management. Importantly, the authors emphasised the need for appropriate regulation that would consider the specifics of such technologies. In this context, the results of the study also showed that for the successful implementation and use of such technologies in the banking sector of Central Asia, it was necessary to develop new regulatory acts and regulations that would ensure security and minimise risks associated with the use of algorithmic models in financial institutions. The results obtained confirmed the conclusions of a number of foreign researchers, which indicated the global nature of these trends. However, in Central Asian countries, certain features were identified related to the need to adapt international regulatory standards to the regional context, which required further research. In particular, a promising direction could be the development of recommendations for the introduction of digital technologies in the banking sector, taking into account the specifics of the region's legal systems. The issue of forming effective regulatory mechanisms for sustainable financing and combating cyber risks also remained relevant. Thus, the results of the study not only supplemented the existing scientific understanding of banking regulation but also indicated possible directions for further research that could help to improve the efficiency of financial institutions and the stability of the banking system in Central Asian countries.

5. Conclusions

As a result of the study, the key directions of digitalisation of the banking sector of Kyrgyzstan were identified, and the degree of compliance of the regulatory environment with international standards was assessed. The application of the content analysis method made it possible to identify the most relevant aspec-

56 R. PUGLIESE, S. REGONDI and R. MARINI, *Machine learning-based approach: Global trends, research directions, and regulatory standpoints*, in *Data Science and Management*, 2021, 4, pp. 19–29.

57 D. BASNAYAKE, A. NARANPANAWA, S. SELVANATHAN and J.S. BANDARA, *Financial inclusion through digitalization and economic growth in Asia Pacific countries*, in *International Review of Financial Analysis*, 2024, 96(Part A), 103596.

ts of digital transformation: remote banking, credit scoring automation, and the introduction of digital client identification. Based on the data of the National Bank of the Kyrgyz Republic, it was established that from 2021 to 2023, the number of mobile banking users increased by 35% and reached 1.2 million people, which accounted for more than 80% of the adult population of the country. This confirmed the high level of penetration of digital financial services in the country. An example of successful digital transformation was MBank, whose mobile application by 2024 had been downloaded more than 10 million times, and the number of active clients exceeded 3 million, which accounted for about 80% of the adult population of Kyrgyzstan. The bank's loan portfolio reached 35 billion soms, increasing by 400% compared to 2021, which became possible due to the introduction of automated scoring models using extended user data. The analysis of compliance of the applied credit risk management tools in Kyrgyzstan with the Basel I and II standards showed the presence of both coincidences and deviations. In particular, it was established that although individual provisions concerning the minimum level of capital and basic principles of risk management were partially implemented, the system of internal control and qualitative risk analysis remained insufficiently developed. This indicated the need for further institutional and regulatory modernisation.

A comparative analysis with such countries as Canada, Germany, and Singapore showed that in these jurisdictions digital transformation was accompanied by a strictly structured regulatory system, independent risk committees within banks, and the active use of Big Data technologies and client behaviour analytics. Kyrgyzstan, in turn, was recommended to adapt these approaches taking into account national conditions. In particular, it was proposed: the introduction of automated default prediction models, the active use of big data in borrower assessment, the creation of independent risk committees, as well as the strengthening of regulatory supervision over digital products. Within the framework of the SWOT analysis, it was determined that the main strengths of the banking sector of Kyrgyzstan were the high level of digital technology penetration and government support for digitalisation. Weaknesses included insufficient institutional readiness, a shortage of qualified personnel, and the fragmentation of the regulatory framework. Among the opportunities were the potential for

adapting international practices and the development of partnerships with fintech companies, and the threats included cyber risks and regulatory instability.

The interpretation of the results obtained based on a systematic approach made it possible to link the level of digitalisation with the need to improve the quality of banking risk management. It was confirmed that without the modernisation of regulatory mechanisms, especially regarding compliance with international requirements, the sustainable development of digital banking in the country was difficult. The qualitative results of the study included the identification of specific discrepancies between the national risk assessment system and the provisions of Basel I, II, and III; the identification of weak points in the regulatory structure; and the formation of practical recommendations for improving the risk management model. The growth of quantitative indicators of the banking sector indicated the high potential of digital transformation under appropriate regulatory conditions. The limitations of the study were the lack of full transparency in bank reporting, limited access to internal regulatory documents, and the dependence of national legislation on political decisions, which could hinder the introduction of changes.