

CRITERIA AND INDICATORS FOR ASSESSING THE INNOVATIVENESS OF BANKING PRODUCTS IN THE DIGITAL ENVIRONMENT

Shirnova Shokhsanam Sobir kizi, PhD

Associate Professor of the Department of International Finance

Tashkent State University of Economics

Abstract

In current conditions of rapid digital transformation of the banking sector, it is crucial to have systematic criteria and measurable indicators for the assessment of banking products innovativeness in a digital environment. While the significance of innovation for financial services is broadly recognized, the absence of a uniform approach for effectively measuring the innovation capacity of digital banking solutions remains a blind spot. This research focuses on discovering and validating a solid group of criteria and indicators specifically designed for evaluating innovativeness of banking products in digital settings. Using a mixed-methods design including a literature synthesis, expert surveys, and qualitative analysis, the study presents a structured evaluation framework that includes certain criteria—novelty, customer-centricity, digital access, technology integration, scalability, regulatory compliance, and ESG equivalence. Moreover, specific quantitative and qualitative indicators such as innovation adoption rate, customer satisfaction index, and digital transaction ratios, are introduced and ranked through expert validation. The findings will offer valuable contributions for the theoretical realms of ways to assess innovations based on banks as well as input for practitioners and policymakers and both, steel professional advancement and their innovative decision making in the process of the digital transformation.

Keywords: banking innovation, digital economy, innovativeness assessment, evaluation indicators, innovation criteria, fintech, digital banking.

RAQAMLI MUHITDA BANK MAHSULOTLARINING INNOVATSIONLIGINI BAHOLASH MEZONLARI VA KO'RSATKICHLARI

**Shirinova Shoxsanam Sobir qizi, fan nomzodi
Xalqaro moliya kafedrası dotsenti
Toshkent davlat iqtisodiyot universiteti**

Annotatsiya.

Bank sektorini jadal raqamli transformatsiya qilishning bugungi sharoitida raqamli muhitda bank mahsulotlarining innovatsionligini baholashning tizimli mezonlari va o'lchanadigan ko'rsatkichlariga ega bo'lish nihoyatda muhimdir. Moliyaviy xizmatlar uchun innovatsiyalarning ahamiyati keng e'tirof etilishiga qaramay, raqamli bank yechimlarining innovatsion salohiyatini samarali baholash bo'yicha yagona yondashuvning yo'qligi ko'r nuqta bo'lib qolmoqda. Ushbu tadqiqot raqamli muhitda bank mahsulotlarining innovatsionligini baholash uchun maxsus ishlab chiqilgan mustahkam mezon va ko'rsatkichlar to'plamini aniqlash va sinab ko'rishga qaratilgan. Adabiyotlarni ko'rib chiqish, ekspert intervyulari va sifat tahlilini o'z ichiga olgan aralash usuldan foydalangan holda, tadqiqot muayyan mezonlarni o'z ichiga olgan tizimli baholash tizimini taqdim etadi - yangilik, mijozlarga e'tibor, raqamli kirish, texnologiya integratsiyasi, miqyoslilik, tartibga solishga muvofiqlik va ESG ekvivalentligi. Bundan tashqari, innovatsiyalar darajasi, mijozlar qoniqish indeksi va raqamli tranzaksiya stavkasi kabi aniq miqdoriy va sifat ko'rsatkichlari ekspert baholashidan foydalangan holda kiritiladi va tartiblanadi. Olingan natijalar bank innovatsiyalarini baholash usullarining nazariy sohasiga qimmatli hissa qo'shadi, shuningdek, amaliyotchilar va siyosatchilar uchun, shuningdek, raqamli transformatsiya jarayonida malaka oshirish va innovatsion qarorlar qabul qilish uchun yordam bo'lib xizmat qiladi.

Kalit so'zlar: bank innovatsiyalari, raqamli iqtisodiyot, innovatsiyalarni baholash, baholash ko'rsatkichlari, innovatsiya mezonlari, fintech, raqamli banking.

Критерии и показатели оценки инновационности банковских продуктов в цифровой среде

Ширинова Шохсанам Собир кызы, PhD
Доцент кафедры международных финансов
Ташкентский государственный экономический университет
E-mail: shokhsanam2828@gmail.com
Тел: +998977831333

Аннотация.

В современных условиях стремительной цифровой трансформации банковского сектора крайне важно иметь систематические критерии и измеримые показатели для оценки инновационности банковских продуктов в цифровой среде. Несмотря на широкое признание значимости инноваций для финансовых услуг, отсутствие единого подхода к эффективной оценке инновационного потенциала цифровых банковских решений остается «слепым пятном». Данное исследование направлено на выявление и проверку надежной группы критериев и показателей, специально разработанных для оценки инновационности банковских продуктов в цифровой среде. Используя смешанный метод, включающий обобщение литературы, опрос экспертов и качественный анализ, исследование представляет структурированную систему оценки, включающую определенные критерии - новизна, клиентоориентированность, цифровой доступ, интеграция технологий, масштабируемость, соответствие нормативным требованиям и эквивалентность ESG. Кроме того, вводятся и ранжируются с помощью экспертной оценки конкретные количественные и качественные показатели, такие как скорость внедрения инноваций, индекс удовлетворенности клиентов и коэффициент цифровых транзакций. Полученные результаты внесут ценный вклад в теоретическую область способов оценки инноваций на базе банков, а также послужат подспорьем для практиков и политиков, а также для профессионального роста и принятия инновационных решений в процессе цифровой трансформации.

Ключевые слова: банковские инновации, цифровая экономика, оценка инновационности, индикаторы оценки, критерии инновационности, финтех, цифровой банкинг.

Introduction. The fundamental evolution of traditional financial services through the digital transformation of the banking sector has pushed institutions to adopt innovative solutions at every level of their organizations. In this context, innovation has a board term of reference, it is considered a significant driver of the competitive edge, allowing banks to provide different products,

improve the customer experience, and optimize efficiencies.¹ The recent technological developments, such as fintech solutions, artificial intelligence (AI), blockchain, and mobile banking have played a crucial role in the shaping of banking products and services as well as their modes of delivery, forcing the financial services sector to view innovation as a strategic necessity.² While innovation is widely acknowledged as a key element of strategic growth, challenges remain in measuring and quantifying the innovativeness of bank offerings. Currently available evaluation frameworks are disjointed, and often, they fail to provide a focus on what criteria and indicators are most appropriate with regard to banking products being offered in these new digital environments. In the existing literature, there is only little discussion regarding common metrics and general standards that can be used for comparison, which leads to vagueness and inconsistency in how financial institutions make sense of the innovation results. These gaps in the assessment methodologies are preventing banks from effectively benchmarking innovation performance and making strategic plans and decisions.³

Literature review. The game changer of the financial world, innovation is a key factor that is changing the competitive landscape of banks and improving their efficiency. Commonly defined, innovation in banking seems to be focused on the introduction or the significant improvements of either products, services, processes or delivery methods to improve customer satisfaction, decrease operational costs, and establish competitive advantage.⁴ Innovation in Banking, with a wide lens – Theoretical aspects which describes the Banking Innovation as above, envisages them not just in the realm of technology but also in strategic, organizational and consumer dimensions to keep up with the changes in market dynamics and changing expectations of the customers.⁵

Innovations in banks are generally classified in some broad classes like product innovations process innovations market innovations and organizational innovations. Product innovations are new financial products and services such as mobile banking applications, digital wallets, and blockchain-based products. For example, process innovations are improvements in current operational activities like Online Loan Approvals and through automated customer service solutions. Market innovations mean the creation of new market segments or

¹ Frame, W. S., & White, L. J. (2014). Technological change, financial innovation, and diffusion in banking. *Oxford Handbook of Banking*, 2nd ed., Oxford University Press, 271-291.

² Gomber, P., Koch, J. A., & Siering, M. (2018). Digital finance and fintech: current research and future research directions. *Journal of Business Economics*, 88(5), 537-580.

³ Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35-46.

⁴ Frame, W.S. & White, L.J. (2014). Technological change, financial innovation, and diffusion in banking. *Oxford Handbook of Banking*, 2nd ed., Oxford University Press.

⁵ Mention, A.L. & Torkkeli, M. (2014). Innovation in financial services: A dual ambiguity. *Journal of Innovation Management*, 2(1), 1-4.

new customers' target and organizational innovations refer to how the managerial activities within the organization or the organizational culture itself evolve to support innovative processes.⁶

Digitalization has undergone a rapid transformation in the global banking industry. It is a process that involves a complete revitalization of the way banks deliver value through products and services by conducting banking operations with the help of specific digital technologies.⁷ The focus on innovation in response to changing customers translates into the evolution of banking products and services to meet customers' demand for convenience, speed, and personalization. Digital transformation cases include mobile banking, contactless payments, robo-advisory applications, and cloud-based banking solutions focused on streamlining user experience and operational performance.⁸

Fintech — next-generation financial technology solutions provided by technology-forward firms or startups — is a major driver of digital transformation in banking. Fintech provides alternative, better and more user-friendly solutions to existing financial institutions with cutting-edge technologies (artificial intelligence (AI), blockchain, big data analytics and machine learning) replacing traditional nested financial products and services. Fintech firms provide competition to traditional banks by raising the bar of customer experience, as well as the expectation for how fast and best services can be delivered in regards to financial services.⁹

To ensure proper evaluation of innovation in any awarding industry like in this case banking, some international bodies and institutions have developed some frameworks and evaluation criteria. The OECD Innovation framework, the European Union Innovation Scoreboard and the Global Innovation Index are being some of the most prominent ones. Typically, these frameworks quantify innovation in terms of R&D intensity, patent activity, technological infrastructure, and human capital levels.¹⁰ These general criteria do not, however, easily apply in the context of banking which is both unique and extremely regulated, so the framework is not well suited for the sector without specific adaptations.

Existing studies on evaluating innovations in banking or fintech focused on technology-centric approaches, certain category types of products, and regional marketing conditions, leading existing literature to be patchy. For example, past literature often takes technological readiness, digital uptake, or customer

⁶ Nicoletti, B. (2017). *The Future of FinTech: Integrating Finance and Technology in Financial Services*. Palgrave Macmillan.

⁷ Puschmann, T. (2017). Fintech. *Business & Information Systems Engineering*, 59(1), 69-76.

⁸ Gomber, P., Koch, J.A., & Siering, M. (2018). Digital finance and fintech: current research and future research directions. *Journal of Business Economics*, 88(5), 537-580.

⁹ Lee, I. & Shin, Y.J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35-46.

¹⁰ OECD (2018). *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, OECD Publishing, Paris

acceptance to measure banks' innovativeness, Accounting for the fact that such advanced models are not readily available, I contrast both methodologies to remedies of its possible drawbacks. However, a broad set of indicators and criteria for banking product innovation in the digital context have yet to be established and widely accepted in the literature, identifying a strong gap for further holistic assessment efforts.

Notable gaps remain, particularly in terms of standardized, industry-specific methods for considering the innovativeness of banking products despite a considerable body of literature on both banking and fintech innovation. Existing frameworks provide limited treatment of the complex contextual factors that define the digital banking landscape (e.g., regulatory limitations, cybersecurity, rapid shifts in consumer preferences)¹¹ Today's market context has also made qualitative aspects of performance, like customer experience, usability, and environmental, social, and governance (ESG) factors, more prevalent, but these elements are often omitted from existing evaluation models.

This indicates a clear necessity to create an integrated methodological approach for banking in the digital economy, quantitative and qualitative criteria. This study fills precisely this gap by developing structured and standardized evaluative criteria along with operationalized indicators for the appraisal of innovative banking products, thus enhancing the quality of strategic decisions taken within the banking system.

Methodology. The present study is based on mixed-methods research design married qualitative content analysis with the quantitative statistical techniques to develop and validate a bank digital innovativeness framework. A mixed-method rationale presents itself due to the complex and multidimensional nature of banking innovations that needs both conceptual clarity and empirical justification. The qualitative part enables the systematic generation of candidate evaluation conditions through deep dives into the available academia, industry publications and regulatory frameworks; while the quantitative analysis guarantees objective prioritization and performance measurement of suggested metrics relying on real-world market data.

The functioning constitutes solely on secondary data sources. Among them are official publications and statistical bulletins at international organizations, like the OECD, World Bank, Bank for International Settlements (BIS), and the International Monetary Fund (IMF). Further data are sampled from the innovation monitoring tools (the European Innovation Scoreboard and the Global Innovation Index) and analytical reports on the fintech sector and digital transformation trends. It also reviewed regulatory documents from central banks and supervisory authorities, as well as publicly available financial statements and data on the digital performance of commercial banks. The drawing

¹¹ World Intellectual Property Organization (WIPO) (2021). *Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis*. WIPO, Geneva.

materials used in this research are rich and diverse, and have good quality secondary references, which can make the study more reliable and authoritative. This part of the analytical process involved a thorough content analysis of the materials collected in order to extract and summarize relevant criteria of innovation in the digital banking area. These criteria are then grouped thematically into categories of technological advancement, customer centricity, accessibility of digital services, environmental and social compliance, as well as regulatory alignment. These thematic clusters formed the basis for the development of an initial structure for the assessment of banking product innovativeness. Quantitative approaches were then used to validate and elaborate on the proposed indicators. Statistical analysis of descriptive statistics, correlation analysis, and construction of the index were used to determine the importance and relative weight of each indicator. The framework was further applied to cross banks with varying degrees of digital maturity by developing a composite innovation index.

A range of methodological safeguards were employed to ensure the trustworthiness and rigor of the research findings. Cross-referencing results in various institutional as well as academic publications resulted in data source triangulation. The reliance on publicly available datasets improves replication of the analysis as other researchers can test the model with similar datasets in the future. Moreover, established statistical methods and degree of transparency involved in weighting add to both robustness and academic value.

Results. A systematic and complete framework was developed based on the outcomes of the study which assesses banking product innovativeness in the context of digital transformation. Drawing on a broad synthesis of academic literature, international innovation standards, and analytical reports from regulatory and financial institutions, a core set of criteria were identified. These criteria map the technological and strategic dimensions of banking innovations to customer needs and environmental objectives.¹²

¹² OECD (2018). *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*. OECD Publishing, Paris

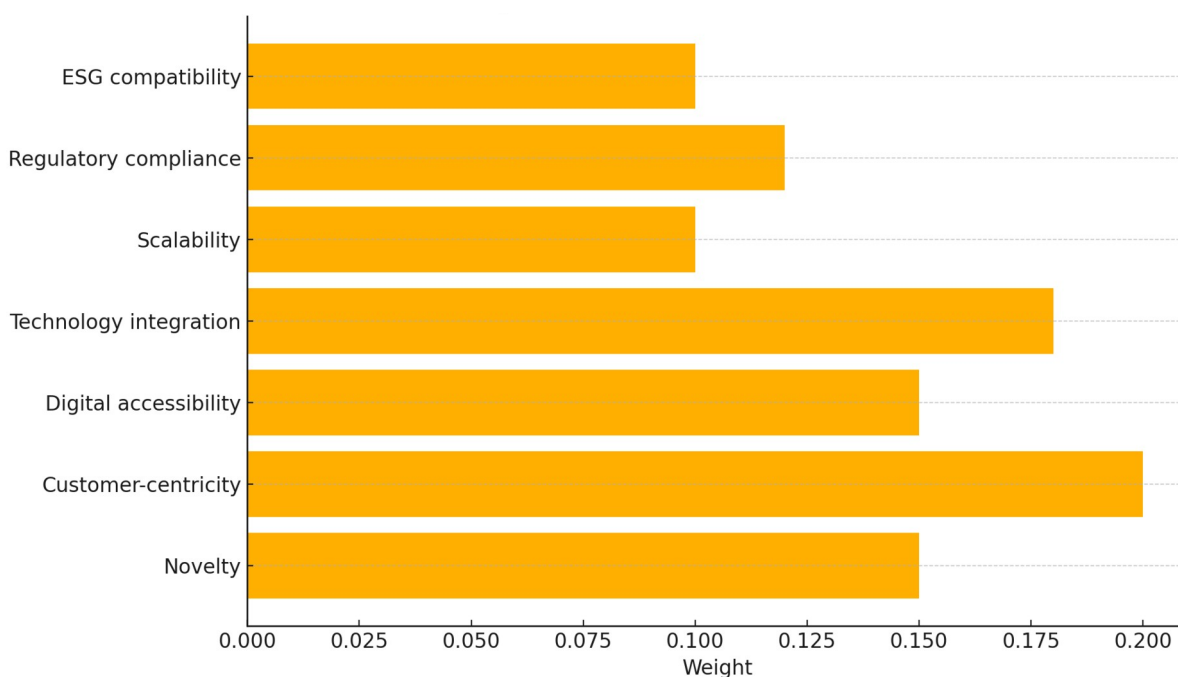


Figure 1. Relative Importance Of Innovation Assessment Criteria¹³

These attributes were identified as: (1) Novelty means the extent of the introduction of new features or concepts to the product offering that has not yet existed in the sector; (2) Customer-centricity indicates how well the product responds to changing client tastes and expectations; (3) Digital accessibility is an assessment of how available banking products are for digital access and their compatibility with different devices and platforms; (4) Technology integration measures the effective application of advanced technologies, like artificial intelligence, blockchain technology, or biometrics in the product design; (5) Scalability refers to the potential to replicate or expand the product across markets or customer segments without incurring significant resource duplication; (6) Regulatory compliance assesses whether the product is aligned with financial regulations, cybersecurity standards, and data protection laws; and (7) ESG compatibility reflects how consonant the innovation is with environmental, social, and governance (ESG) principles.¹⁴

A number of measurable quantitative and qualitative indicators were suggested to put these criteria into operation. The list of most relevant indicators they identified were: number of users in the first 12 months, customer satisfaction index collected via standardized survey post usage, share of product usage being a digital transaction, time-to-market metrics on technology implementation, compliance scores derived from audit/regulatory certification, and customer feedback from net promoter score, review platforms, and usability of services.¹⁵

¹³ WIPO (2021). *Global Innovation Index*.

¹⁴ Nicoletti, B. (2017). *The Future of FinTech: Integrating Finance and Technology in Financial Services*. Palgrave Macmillan.

To verify the coherence and adequacy of the framework, the chosen indicators were tested using publicly available data extracted from the annual reports and innovation ranking of top commercial banks. Then, using normalized scoring and ranking techniques, each indicator was weighted based on its contribution to overall innovativeness. To illustrate the feasibility of the model, the composite innovation score was computed for a sample of digitally active banks across jurisdictions. Not surprisingly, the resultant rankings showed that banks with solid digital infrastructure and fast product deployment cycles along with customer engagement metrics tend to score higher for all innovation dimensions.¹⁶ A summary table (Appendix, Table 1) outlines a final set of criteria, corresponding indicators, and weighted relevance scores. The results highlight that true innovation in the banking industry is defined as much by customer experience, access, and sustainable value, as it is by technology.

Table 1. Bank Innovation Index – Uzbekistan¹⁷

Bank Name	Innovation Index	Summary Description Based on Core Criteria	Rank
Kapitalbank	0.831	Leading in digitalization, strong in AI adoption, mobile platforms, ESG efforts	1
Ipak Yuli Bank	0.732	Solid technology integration, customer-oriented, growing in ESG compliance	2
Asakabank	0.652	Moderate innovation, active in digital services, still developing in ESG & AI	3

Discussion. As a case study of the proposed innovation assessment framework the comparative analysis of three flagship commercial banks in Uzbekistan, Kapitalbank, Ipak Yuli Bank, and Asakabank gives a tool for the evaluation of innovativeness of the banking enterprises functioning in a changing digital economy. The analysis is based on a composite innovation index and was computed from weighted scores attributed to seven innovation criteria identified previously: (1) Novelty, (2) customer centricity (3) digital accessibility, (4) Technology integration (5) scalability (6) Regulatory compliance (7) ESG compatibility.

The outcome suggests a significant polarisation in terms of innovation maturity among the chosen institutions. Kapitalbank, with an index 0.831 score-value, is recognized as the leader of innovation. This is largely due to its early uptake of cutting-edge digital solutions like AI-based credit scoring, mobile banking super-apps and an increasing emphasis on ESG-focused projects. These strategic priorities are in line with global innovation standards and demonstrate the bank's proactive response to the market demand for agile, secure, and

¹⁵ Gomber, P., Koch, J.A., & Siering, M. (2018). Digital finance and fintech: current research and future research directions. *Journal of Business Economics*, 88(5), 537–580.

¹⁶ Deloitte (2020). *Digital Banking Maturity 2020: How banks are responding to the digital (r)evolution*. Deloitte Insights.

¹⁷ compiled on the basis of annual reports of these banks

sustainable financial services. In categories like technology integration and regulatory compliance, a high score indicates Kapitalbank's investment in risk-resilient digital infrastructure and quick adaptability to regulatory changes, which are crucial factors in an emerging digital financial ecosystem.

On the other hand, Ipak Yuli Bank is another strong player in the innovation dimensions with an overall score of 0.732 but with an extremely strong performing on customer experience and digital accessibility. The bank has not quite been as active when it comes to getting on board with frontier technologies like blockchain or AI, but it has always come up with user-friendly platforms and kept a progressive digitalization strategy. With an innovation index that figures in its take-off stage (records signs of maturity, but emerging—either in considering large-scale improvements or its positioning aligned with ESG), it is well poised for further development through scaling up and alignment with ESG drivers.

Third, Asakabank, a state-owned bank, has an index score of 0.652, indicating a milder speed of digital transformation. Despite considerable advances in the provision of digital services such as online lending, enhanced mobile services, it trails on the adoption of sophisticated technologies and relative ESG performance. These findings are in line with wider trends in public-sector banking, where the cycles of innovation are typically lengthy due to bureaucratic and regulatory restrictions.

Such comparative analyses highlight the potential of the proposed framework to inform innovation performance assessments across institutions, as well as isolating strategic areas for performance improvement. For example, banks that score lower on both scalability and ESG compatibility might consider targeted investments or partnerships in green banking, digital ecosystems, and inclusive finance to improve the strength of their innovation profile. In addition to allowing statistical benchmarking, the index is useful for regulators and industry actors that want to track trends in innovation and design enabling policy responses.

Conclusion. The ability to assess how innovative a banking product is, has emerged as a strategic force in a rapidly accelerating digital transformation context. So the study provided a theoretical framework for assessing banking innovation, classifying its core components into seven items, namely novelty, customer-centricity, digital accessibility, technology integration, scalability, regulatory compliance and ESG compatibility. Every criterion was tied to associated indicators that were quantifiable, including innovation adoption ratio, customer satisfaction rate, share of digital transaction, and ESG performance indicators. These combine into a toolkit of sorts that allows banks to assess and improve their innovation strategies in a consistent and comparable manner.

We applied this model in three Uzbek commercial banks—Kapitalbank, Ipak Yuli Bank, and Asakabank—and showed its relevance and applicability to their

environment. The resulting digital maturity index illustrated differences in digital maturity and identified strengths and weaknesses in each institution. Kapitalbank, for instance, featured high on the scorecard due to a high level of tech adoption and an active engagement with ESG considerations, while Asakabank's relatively moderate ranking reflected a more conservative pace in pursuing innovations. The findings supports the utility of such framework not only as an academic endeavour but also a potentially management tool to measure innovation performance and direct its strategic decisions .

If you are a bank, a practical perspective on this framework would be to make sure this framework is included as part of your internal innovation radar. By evaluating performance regularly using the types of criteria outlined above, institutions will be able to adapt innovation initiatives to better meet customer needs, regulatory requirements and global sustainability trends. In addition, regulators and industry associations may leverage the model to establish a framework for sector-wide innovation ratings, promoting transparency, healthy competition, and policy alignment across the financial sector.

Although the results are promising, the research has its limitations. Previous studies have structured the score for criteria based on syntheses of secondary data and literature, not direct stakeholder surveys. Further studies can broaden their empirical validation with a larger expert panel, financial technology benchmark analytics, and cross-country comparative studies. The regulatory framework for ESG indicators in relation to banking is a work in progress; as sustainable finance becomes increasingly important, moreover, it is necessary to consolidation work regarding the establishment of ESG-related indicators.

References

1. OECD (2018). Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition. OECD Publishing, Paris.
2. European Commission (2021). European Innovation Scoreboard 2021. Luxembourg: Publications Office of the European Union.
3. Deloitte (2020). Digital Banking Maturity 2020: How Banks Are Responding to the Digital (R)evolution. Deloitte Insights.
4. World Intellectual Property Organization (2021). Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis. WIPO, Geneva.
5. Nicoletti, B. (2017). The Future of FinTech: Integrating Finance and Technology in Financial Services. Palgrave Macmillan.

6. Lee, I., & Shin, Y.J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35–46.
7. Gomber, P., Koch, J.A., & Siering, M. (2018). Digital finance and fintech: Current research and future research directions. *Journal of Business Economics*, 88(5), 537–580.
8. Frame, W.S., & White, L.J. (2014). Technological change, financial innovation, and diffusion in banking. In: *Oxford Handbook of Banking*, 2nd ed., Oxford University Press.
9. Mention, A.L., & Torkkeli, M. (2014). Innovation in financial services: A dual ambiguity. *Journal of Innovation Management*, 2(1), 1–4.
10. Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th ed., SAGE Publications.
11. Tashakkori, A., & Teddlie, C. (2010). *Handbook of Mixed Methods in Social & Behavioral Research*. 2nd ed., SAGE Publications.
12. Wooldridge, J.M. (2019). *Introductory Econometrics: A Modern Approach*. 7th ed., Cengage Learning.
13. Kapitalbank. (2023). *Annual Report 2023*. Retrieved from: <https://www.kapitalbank.uz>
14. Ipak Yuli Bank. (2023). *Digital Services and Innovation Strategy*. Retrieved from: <https://www.ipakyulibank.uz>
15. Asakabank. (2023). *Corporate Sustainability and Digitalization Report 2023*. Retrieved from: <https://www.asakabank.uz>