

12-2-2023

National FinTech Ecosystem Leapfrogging – Case Study of Russia

Vladimir Nurbaev

National Cheng Kung University, Taiwan, vladimir@alum.ccu.edu.tw

Cheuk Hang Au

National Chung Cheng University, Taiwan, allenau@ccu.edu.tw

Chih-Yuan Chou

National Chengchi University, Taiwan, cy.chou@nccu.edu.tw

Follow this and additional works at: <https://aisel.aisnet.org/acis2023>

Recommended Citation

Nurbaev, Vladimir; Au, Cheuk Hang; and Chou, Chih-Yuan, "National FinTech Ecosystem Leapfrogging – Case Study of Russia" (2023). *ACIS 2023 Proceedings*. 3.

<https://aisel.aisnet.org/acis2023/3>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2023 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

National-Level FinTech Ecosystem Leapfrogging – Case Study of Russia

Research-in-progress

Nurbaev Vladimir

Department of Industrial and Information Management
National Cheng Kung University
Tainan, Taiwan
Email: vladimir@alum.ccu.edu.tw

Cheuk Hang Au

Department of Information Management
National Chung Cheng University
Chiayi, Taiwan
Email: allenau@ccu.edu.tw

Chih-Yuan Chou

Department of Management Information Systems
National Chengchi University
Taipei, Taiwan
Email: cy.chou@nccu.edu.tw

Abstract

The recent rapid development of FinTech and related spheres has fundamentally changed various economic sectors into increasingly innovative, varied, and customer-focused. Some countries have gradually arrived at a national-level FinTech ecosystem that can cater to different stakeholders' needs and leapfrogged those of other countries. And yet, not all countries can successfully leapfrog others in their FinTech ecosystem development. This paper focuses on the case of Russia and its successful development of the FinTech ecosystem bringing valuable insights for promoting growth, access, and innovation in financial ecosystems worldwide, benefiting society and the economy. Our preliminary findings suggested some of the triggers of such leapfrogging, as well as the involved stakeholders and their actions.

Keywords: FinTech, Leapfrogging, Customer FinTech adoption, Russia

1 Introduction

FinTech has become increasingly prevalent in recent decades, disrupting traditional financial services (Schueffel 2016), encompassing a wide range of technologies and services, such as mobile payments, P2P lending and cryptocurrencies. FinTech forces established companies to adapt to new technologies and business models, leading them to offer more convenient, accessible, and customer-centric products (Gomber et al. 2018; Haddad and Hornuf 2019; Walden 2022). Leading FinTech companies such as PayPal, Deloitte, and Binance demonstrate the substantial revenues already achieved in the industry. PayPal processes over \$25 billion annually (PayPal 2022), Deloitte generates more than \$50 billion globally (Deloitte 2022), Binance, the world's largest cryptocurrency exchange, facilitates over \$67 billion in daily transactions (CoinCarp 2023). Research projects the overall FinTech market size will surge to \$1.5 trillion by 2030 (BCG 2023), highlighting the sector's strong projected growth as these innovations increasingly displace conventional banking models.

According to Young (2019a) the FinTech service adoption rates have increased from 16% in 2015 to 64% in 2019. However, such rates vary across different countries. Notably, France and Japan have relatively low adoption rates of 35% and 34% respectively, in contrast to Russia's significant growth, even if Russia had started their FinTech journey relatively late (Young 2019b). This reflects the concept of technological leapfrogging, which is a process of adopting new and up-to-date technology that bypass intermediate stages without at least deploying the previous version of that technology (Tan et al. 2018). Leapfrogging allows for a more efficient and cost-effective implementation process. This approach benefits developing countries with limited resources, where traditional technological advancement may not be feasible. By leapfrogging to more advanced technologies, these countries can benefit from modern technologies without progressing through the same incremental steps as developed countries (Lee and Lim 2001).

Technological leapfrogging has gained attention as a development strategy (Davison et al. 2000). It holds the potential to drive progress and innovation. The United Nations has recognized this potential by including technology leapfrogging as a key strategy for tackling economic, social and environmental challenges, thus achieving different Sustainable Development Goals (SDGs) (Zhenmin 2018). Therefore, by embracing leapfrogging, developing countries may be able to “leap” directly to cutting-edge technologies, bypassing the traditional incremental steps followed by developed nations that align with the SDGs. By doing so, these countries can quickly reap the benefits of modern technologies, fostering accelerated development and socio-economic progress (Lee 2021). In the context of FinTech, leapfrogging holds particular promise for developing countries' national-level FinTech ecosystems, as it can significantly contribute to financial inclusion and economic growth.

However, many studies in FinTech are related to the development of successful FinTech companies (Au and Sun 2019), leaving the broader nation-level FinTech ecosystem development a gap. As a result, it can be harder for developing countries to leapfrog or rapidly develop their FinTech ecosystem. In turn, their overall economic development may be impeded.

To address this research gap, our study focuses on the national-level FinTech ecosystem of Russia, which has remarkably leapfrogged the FinTech ecosystems of more developed countries. Notable examples of successful players have emerged, including Yandex, Tinkoff, Sberbank, and Qiwi, who have made significant contributions to the growth and innovation of FinTech in Russia, despite facing various economic challenges. We aim to identify factors driving FinTech adoption and development in Russia to inform developing countries seeking to replicate FinTech leapfrogging to promote development and innovation. Accordingly, our research question (RQ) is “Why are some countries leapfrogging in their national-level FinTech ecosystem development?”

2 Literature Review

2.1 FinTech Ecosystem

The FinTech ecosystem encompasses a diverse array of organizations and individuals that utilize advanced technologies to provide innovative financial services. Within a national-level context, the FinTech ecosystem embodies a similar network, albeit on a country-specific scale. Government agencies, traditional institutions, and regulatory bodies are pivotal in fostering an environment conducive to innovation, collaboration, and expansion in these national-level ecosystems. Consequently, such ecosystems facilitate the emergence of novel products and services, cater to the dynamic demands of consumers, and promote economic growth (Lee and Shin 2018). Table 1 shows more details about the roles of various stakeholders within a national-level FinTech ecosystem.

Stakeholders	Descriptions
Customers	FinTech customers seek convenience and lower costs. However, they usually lack the skills to navigate data privacy risks and unclear product risks. Therefore, educational efforts are required for FinTech firms in order to maximize the benefits enabled by emerging technologies while mitigating harms (Brynjolfsson and McAfee 2014; Cuzzocrea 2014).
Traditional institutions	Traditional institutions are seen as inefficient and expensive in many nations. This pushes users to FinTech services (Frost 2020). However, they still fuel innovation via R&D, products, pacts and competition, driving tech advances while adhering to rules boosts adoption. (Surie and Groen 2017; WEF 2020).
FinTech startups	FinTech startups have disrupted traditional financial business models, fostered competition, attracted investment, and developed innovative products and services, such as mobile payment apps and blockchain-based solutions, contributing to the rapid growth of the FinTech industry (Muthukannan et al. 2020; WEF 2020). However, upon entering emerging markets, startups may encounter challenges in building brand awareness and trust, which impede their growth (Guillaume de Gantès 2023). This requires the employment of strategies like credibility-building, partnerships, and regulatory compliance, possibly including mechanisms such as platformization, decentralization, localization, and democratization, (Muthukannan et al. 2021)
Government	Governments promote financial technology innovation through regulations, policies, funding and infrastructure development. Regulations balance risks while policies create an enabling environment. Public-private collaborations and regulatory sandboxes incentivize start-ups. Strategic governmental actions can hasten technological advancement, benefiting the financial sector and wider economy (Aly 2020; Alzahrani et al. 2017; Huggins and Thompson 2015; WEF 2020).

Table 1: Stakeholders in a FinTech Ecosystem

A national-level FinTech ecosystem involves the integration of FinTech solutions through partnerships between customers, traditional financial institutions, FinTech start-ups, and regulators. Based on mutual trust, these stakeholders collaborate in developing the infrastructure and foundations required for different FinTech applications within the ecosystem, while both top-down and bottom-up approaches may be used (Brynjolfsson and McAfee 2014; Cuzzocrea 2014). Established businesses invest in, innovate around, and collaborate with innovative FinTech startups who encounter challenges in brand awareness and trusts, while governments provide supportive policies, funding, and regulatory frameworks (Muthukannan et al. 2020).

2.2 Technological Leapfrogging

Technological Leapfrogging is a process of adopting advanced technologies that skip previous evolutionary steps of development (Tan et al. 2018), bringing more efficient and cost-effective approaches to implementing updated technologies. This is especially relevant for resource-constrained environments where traditional technological advancements may not be feasible due to financial and other constraints. By leapfrogging to more advanced technology, early adopters can enjoy modern technology's benefits without going through the same developmental stages as more established markets (Lee 2021). For example, Azerbaijan has demonstrated leapfrogging in national ICT infrastructure development, with a variety of economics and social benefits generated for the country (Tan et al. 2018). Table 2 shows a list of arguments related to Technology Leapfrogging.

Sources	Key arguments
Sauter and Watson (2008)	For firms and countries in emerging economies, leapfrogging is a more effective strategy than incremental innovation since the latter can be costly and time-consuming.
Chen and Li-Hua (2011)	A favourable environment, where innovation and risk-taking are embraced, increases firms' likelihood of leapfrogging among their competitors. This environment supports the growth of FinTech companies, especially in industries with a strong connection between universities and industry.

Tan et al. (2018)	FinTech in emerging markets needs open rules, ICT access, literacy, local adaptation, and cross-sector partnerships to create inclusive growth that can help to leapfrog traditional constraints.
Heidenreich et al. (2022)	Consumer leapfrogging is driven by prohibitive costs, lacking infrastructure and attractive attributes of advanced technologies over inferior traditional options.
Chandrasekaran et al. (2022)	Incumbents can mitigate the negative effects of leapfrogging and cannibalization by adapting their strategies to meet the needs of consumers better. For instance, incumbents can develop lower-cost products or offer value-added services to differentiate their offerings from those of new entrants.
Guillaume de Gantès (2023)	In FinTech contexts, supportive policy frameworks, community outreach initiatives, together with innovative offerings of the firms, may enable the firm to leapfrog in their development, surmounting traditional barriers to scale facing such nascent enterprises.

Table 2: Studies related to the Technology Leapfrogging

As indicated in Table 2, in emerging markets, technology leapfrogging processes may face challenges related to infrastructure, socioeconomics, and culture. Companies that enter these markets with new technological solutions encounter obstacles such as building brand awareness, acquiring customers, managing fraud risk and forming strategic partnerships. Furthermore, previous research has adopted a range of theories for studying technology leapfrogging that provide a framework for systematic analysis, help researchers to develop hypotheses and test them empirically, and contribute to the development of new and innovative solutions (see Table 3).

Theories	Description
Catch-up theories	Latecomer countries can achieve accelerated economic growth by absorbing and adapting advanced technologies from leaders through social learning, replication and technological transference (Li et al. 2020; Radosevic 1999).
Institutional theories	Institutions facilitate technological dissemination by strategically regulating, implementing incentive policies and constructing adequate infrastructure to foster innovation uptake (Björck 2004; Chang 2011).
Resource constraints theories	Capital and infrastructure in developing countries can stimulate innovations that optimize available resources, driving the adoption of technologies with higher resource efficiency (Frankel 2010; Thong 2001).

Table 3: Theories that are related to the Technology Leapfrogging

And yet, our literature review suggested that many previous studies in technology leapfrogging were not contextualized. In response to our RQ, it will be desirable if we can advance our understanding in national-level FinTech ecosystem contexts, possibly by case studies on a successful ecosystem.

3 Methodology

We adopted a case study approach with netnography to explore the leapfrogging of national-level FinTech ecosystem development. First, case research methods are robust at exploring “why” research questions (Benbasat et al. 1987) and processes that cannot be separated from their contexts (Rynes and Gephart Jr 2004). Second, given the phenomena of national-level FinTech ecosystems is multi-dimensional with both external and technological aspects, it has become too complex to adopt an objective research approach (Gable 1994). A case study approach has, therefore, become appropriate to examine such phenomena (Klein and Myers 1999).

We identified two ideal case selection criteria. First, the selected national-level FinTech ecosystem should be highly successful with a significant population and public FinTech awareness so that we can build our theories on best practices (Pan and Tan 2011). Second, stakeholders within the selected national-level ecosystem should have adopted a variety of strategies to let us be able to identify more theoretical possibilities in response to the phenomena. Based on the above criteria, we chose Russia as our selected case because of its rapid growth in FinTech adoption from 43% in 2015 to 82% in 2019 (Young 2019b) and diverse actions by ecosystem stakeholders that are rich for us to build the theories.

To collect data for our study, we intend to employ a mix of data sources, including government records (e.g., kremlin.ru and дума.gov.ru), university research, official websites of FinTech firms (e.g., Tinkoff.ru, online.sberbank.ru, and qiwi.com) news articles, and online communities (e.g., banki.ru and sravni.ru). Each data source contributes uniquely to our research objectives. Government data allows us to analyze macroeconomic trends and regulatory frameworks, while university research provides theoretical frameworks and academic perspectives. The official websites of FinTech firms offer industry-specific insights, and news articles provide a broader view of public sentiment. Online communities represent the perspectives of end-users and stakeholders, ensuring a comprehensive range of voices and enabling data triangulation. This diverse mix of data sources will establish a deeper understanding of the phenomenon under study (Venkatesh et al. 2013), offer richer details for interpreting the findings (Gable 1994), and ensure the representativeness of our case study (Pan and Tan 2011). We plan to collect and analyze the data concurrently to take advantage of the flexibility of the case research method (Eisenhardt 1989). Data from our case study was collected and then coded by using a mix of open, axial, and selective coding processes (Strauss and Corbin 1998). More indicatively, open coding was used to identify new and validate existing theoretical dimensions. While at the same time, axial coding was used to point out the new, as well as validate existing, second-order themes that could fall under those dimensions (e.g., stakeholders of the national-level FinTech ecosystem). The selective coding was then used to distill our case evidence into several first-order categories, which were then assigned to the appropriate dimensions and themes (Pan and Tan 2011). We also plan to utilize visual maps and narratives to summarize our findings (Langley 1999). The study is still currently ongoing, but this process of iterating between data, analysis, and theory development will continue until the state of theoretical saturation is reached (Eisenhardt 1989).

4 Preliminary Findings

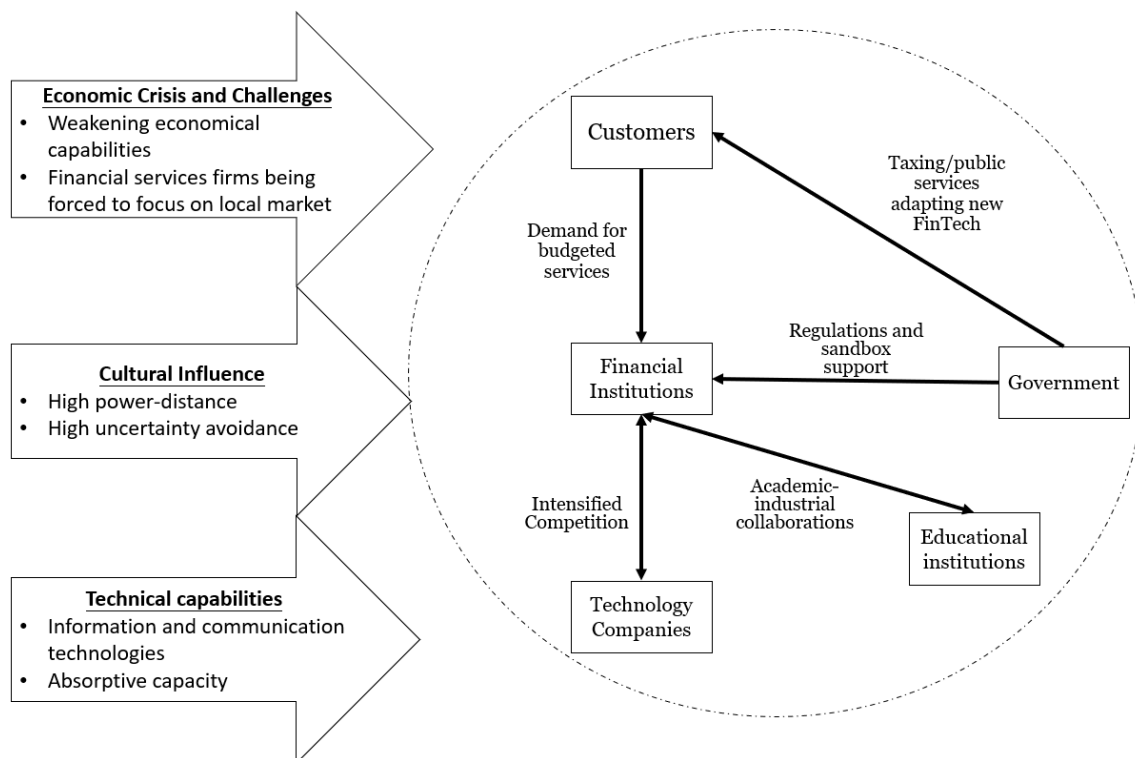


Figure 1: External Influence and Interactions between Players in the National FinTech Ecosystem

We identified that the leapfrogging of the Russian FinTech ecosystem had been driven by economic crisis/challenges encountered with existing developed technical capabilities, connectivity and information access becoming more rapid. Under such a macroenvironment, different actors, including customers, financial institutions, government, technology companies and educational institutions, collaborate and compete, which leads to the leapfrogging of the national-level FinTech ecosystem. Figure 1 summarize external influence and conditions that impact stakeholders' actions, as well as the relationships between them.

4.1 Economic Crisis and Challenges: Responses of Firms and Customers

The economic turmoil accompanying and following the imposition of extensive international sanctions in 2014 substantially intensified pre-existing challenges for Russian financial and technological companies (Bruegel 2022). Externally, Russian firms confronted vastly reduced cross-border capital flows, profoundly restricted international client acquisition efforts and stringent data localization policies. Internally, macroeconomic conditions deteriorated markedly as consumer purchasing power declined precipitously and demanded budgeted services. Some technology companies were also influenced by unfavorable microenvironment conditions and resorted to entering the financial services market. This intensified the competition which traditional financial institutions encountered. As a result, these traditional institutions resort to fundamentally restructuring their strategies and business models, prioritizing optimization of domestic market performance through affordably priced, competitively differentiated innovations targeting the local populace (Frankel 2010). Tinkoff Bank's rapid development of a mobile interface expedited financial services (Nurbaev et al. 2022). The CEO of Tinkoff Mobile highlighted the need to integrate different services in their mobile application. The CEO of Tinkoff Mobile highlighted the need to integrate different services in their mobile application.

“In today’s technological world, proper integration is key. You choose a service that is part of something bigger. In this system, everything is interconnected. There is no need to fill out an application ten times, leaving the same data. Here you are known.”

As a result, the offering of financial services has become different from what was previously seen in traditional financial institutions.

4.2 Technical Capabilities: Enabling Firms and Customers

However, technical capabilities are also required for firms to develop successful FinTech applications (Brynjolfsson and McAfee 2014; Cuzzocrea 2014). For customers to adopt these applications (Chen and Li-Hua 2011), pervasive mobile connectivity and information technology infrastructure positioned Russian customers and firms favourably to assimilate emerging FinTech solutions, providing a robust foundation upon which further innovations could diffuse and mature. In Russia, the internet penetration rate reached 84.73% in 2023 and is expected to grow further (Statista 2023). Insofar as technological proficiency was already widespread among the Russian, there was considerable potential for indigenous FinTech ecosystems to capitalize on existing technical skillsets by integrating increasingly sophisticated financial technologies into daily routines and practices, thereby augmenting macroeconomic efficiency and autonomous innovation potential (Chen and Li-Hua 2011).

4.3 Academic-Industrial Collaborations: Addressing Needs of Talent

Technical capabilities must constantly advance for continuous sustenance of the national-level FinTech ecosystem. Also, the proliferation of new technologies has significantly amplified the demand for IT specialists, yet the labor market's ability to achieve supply-demand equilibrium remains ineffectual (Frankel 2010). To address such demand, collaborations between educational institutions and financial institutions has emerged. The need for these collaborations was amplified by the economic crisis and challenges in Russia. Therefore, leading technology firms like Yandex and Sber indigenously cultivate talent, possibly by working with different educational institutions (Brynjolfsson and McAfee 2014; Cuzzocrea 2014). For example, the Faculty of Computational Mathematics and Cybernetics of Moscow State University (the most prestigious university in Russia) and Sberbank (the largest bank in Russia), opened a joint research lab in risk theory and data analysis. Aleksander Vedyakhin, the senior vice president of Sberbank, stated their goals of the best practices in response to the lab's establishment.

“Every large bank necessarily cooperates with a strong university. This is a global practice and our experience is not unique, but the lab corresponds to the concept of the best practice.”

Such collaborations serve dual purposes: provisioning firms with internal talent or conferring specialized FinTech degrees. For instance, graduates of Yandex's data analysis program are offered positions alongside accredited diplomas. Partnerships between educational institutions and firms will likely mitigate Russia's domestic talent shortfall.

4.4 Government Policies, Regulation and Support

No entity can escape from the policies and regulations imposed by the government. For national-level FinTech ecosystem contexts, governmental regulation plays a foundational role in configuring its development (Chang 2011) and oversight financial institutions to ensure their responsibilities and, thus macroeconomic stability. The Minister of Economic Development of Russia, Maxim Oreshkin, notes that:

"Information systems development is a powerful tool for innovation...to find new ways to solve problems. We need to encourage the development of information systems in all sectors of the economy."

As FinTech firms disrupt traditional banking models, governments seek to catalyze FinTech ecosystem growth to maintain economic vigor under turbulence. Recently, the Russian government considerably amplified its involvement in the FinTech sector. Authorities established regulatory sandboxes to allow experimentation and allocated substantial funding to support domestic FinTech development (Tan et al. 2018) as well as start work on the implementation of new technologies to government processes. In 2011, the Russian government launched the State Program "Information Society," aimed at utilizing information technologies to benefit citizens. Currently, under the National Project "Digital Economy" (2019-2024), the "Electronic Government" initiative aims to further improve the provision of online financial and administrative services through FinTech innovations. This interventionist approach further accelerated the adoption of digital technologies not only within the financial sector, but also to the wider public, improving their digital literacy and improve the trust in digital services (Alzahrani et al. 2017). Conversely, tailored tax policies for FinTech startups and investors can foster higher rates of entrepreneurship and investment, promoting wider FinTech application adoption and building essential user bases for sustained growth.

4.5 Cultural Influence on the Ecosystem

Finally, yet importantly, culture may also play a role in the behaviours of customers, entities and government, especially in IT adoption behaviour (Marangunić and Granić 2015). In terms of national culture, Russia scores exceptionally high in uncertainty avoidance, which means Russian users of FinTech applications may tend to be ambiguity-averse. Therefore, early Russian FinTech platforms educated customers about digital payments through user-friendly services (Sauter and Watson 2008). Then, Tinkoff Bank's mobile offerings demonstrated FinTech's tangible benefits by expediting account access. As trusted firms like Sberbank later adopted similar innovations, they signalled FinTech products' credibility, catalyzing accelerated diffusion (Nurbaev et al. 2022). Furthermore, Russian culture may also be regarded as high-power distance culture. Adopting an interventionist approach, Russian authorities have sought to foster FinTech diffusion through mandates requiring digital taxation and registration. The imposition of such requirements has compelled citizens and enterprises to integrate designated technological solutions (Aly 2020; Huggins and Thompson 2015; WEF 2020). Therefore, initiatives reveal ambitions to digitize large components of Russia's economy to bolster long-term efficiency and autonomy within an increasingly technology-centric global economy.

5 Discussion and Concluding Remarks

While our study is still ongoing, our preliminary findings suggested the leapfrogging of a national-level FinTech ecosystem could be triggered by economic crises and challenges, which decreased customer purchasing power, increased demand for more budgeted alternatives, and intensified competition among financial institutions. With existing technical capabilities, however, financial institutions can develop a wide range of FinTech applications quickly adopted by users. In addition, these institutions may collaborate with educational institutions to advance their practices. Moreover, government has a role in regulating and supporting the financial institutions for fostering the development of national-level FinTech ecosystem. Finally, yet importantly, we also identified the role of culture in national-level FinTech ecosystem development. To enhance the generalizability and validity of our implications, we plan to collect and analyze additional data from various countries. We will also conduct an ongoing literature review and explore the boundary conditions of our model through further data analysis. By doing so, we aim to refine our theoretical model and gain a more comprehensive understanding of the strategic and organizational implications of national-level FinTech ecosystem leapfrogging.

6 References

- Aly, H. 2020. "Digital transformation, development and productivity in developing countries: is artificial intelligence a curse or a blessing?," *Review of Economics and Political Science* (7:4), pp 238-256.
- Alzahrani, L., Al-Karaghoul, W., and Weerakkody, V. 2017. "Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework," *International business review* (26:1), pp 164-175.
- Au, C. H., and Sun, Y. 2019. "The development of P2P lending platforms: Strategies and implications," (available at https://aisel.aisnet.org/icis2019/crowds_social/crowds_social/10/).

- BCG, B. C. G. 2023. "Fintech Projected to Become a \$1.5 Trillion Industry by 2030," (available at <https://www.bcg.com/press/3may2023-fintech-1-5-trillion-industry-by-2030>).
- Benbasat, I., Goldstein, D. K., and Mead, M. 1987. "The Case Research Strategy in Studies of Information Systems," *MIS Quarterly* (11:3), pp 369-386.
- Björck, F. 2004. *Institutional theory: a new perspective for research into IS/IT security in organisations*.
- Bruegel 2022. (available at <https://www.bruegel.org/policy-brief/how-have-sanctions-impacted-russia>).
- Brynjolfsson, E., and McAfee, A. 2014. *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*, WW Norton & Company.
- Chandrasekaran, D., Tellis, G. J., and James, G. M. 2022. "Leapfrogging, cannibalization, and survival during disruptive technological change: the critical role of rate of disengagement," *Journal of Marketing* (86:1), pp 149-166.
- Chang, H.-J. 2011. "Institutions and economic development: theory, policy and history," *Journal of institutional economics* (7:4), pp 473-498.
- Chen, D., and Li-Hua, R. 2011. "Modes of technological leapfrogging: Five case studies from China," *Journal of Engineering and Technology Management* (28:1) 2011/03/01/, pp 93-108.
- CoinCarp 2023. "Binance 24h Trade Volume Analysis," (available at <https://www.binance.com/en/feed/post/457290>).
- Cuzzocrea, A. Year. "Privacy and security of big data: current challenges and future research perspectives," Proceedings of the first international workshop on privacy and security of big data 2014, pp. 45-47.
- Davison, R., Vogel, D., Harris, R., and Jones, N. 2000. "Technology Leapfrogging in Developing Countries - An Inevitable Luxury?," *Electronic Journal on Information Systems in Developing Countries* (1) 01/28.
- Deloitte 2022. "Annual Report FY22," (available at https://www2.deloitte.com/content/dam/Deloitte/dk/Documents/Annual_report_2022.pdf).
- Eisenhardt, K. M. 1989. "Building Theories From Case Study Research," *Academy of Management Review* (14:4), pp 532-550.
- Frankel, J. A. 2010. "The natural resource curse: a survey," National Bureau of Economic Research.
- Frost, J. 2020. "The economic forces driving fintech adoption across countries," *The technological revolution in financial services: how banks, fintechs, and customers win together* (838), pp 70-89.
- Gable, G. G. 1994. "Integrating Case Study and Survey Research Methods: An Example in Information Systems," *European Journal of Information Systems* (3:2), pp 112-126.
- Gomber, P., Kauffman, R. J., Parker, C., and Weber, B. W. 2018. "On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services," *Journal of Management Information Systems* (35:1), pp 220-265.
- Guillaume de Gantès, H. G., Kristine Romano 2023. "On the verge of a digital banking revolution in the Philippines," (available at <https://www.mckinsey.com/industries/financial-services/our-insights/on-the-verge-of-a-digital-banking-revolution-in-the-philippines>).
- Haddad, C., and Hornuf, L. 2019. "The emergence of the global fintech market: economic and technological determinants," *Small Business Economics* (53:1) 2019/06/01, pp 81-105.
- Heidenreich, S., Killmer, J. F., and Millemann, J. A. 2022. "If at first you don't adopt - Investigating determinants of new product leapfrogging behavior," *Technological Forecasting and Social Change* (176) 2022/03/01/, p 121437.
- Huggins, R., and Thompson, P. 2015. "Entrepreneurship, innovation and regional growth: a network theory," *Small business economics* (45), pp 103-128.
- Klein, H. K., and Myers, M. D. 1999. "A set of principles for conducting and evaluating interpretive field studies in information systems," *MIS Quarterly* (23:1), pp 67-94.

- Langley, A. 1999. "Strategies for theorizing from process data," *Academy of Management Review* (24:4), pp 691-710.
- Lee, I., and Shin, Y. J. 2018. "Fintech: Ecosystem, business models, investment decisions, and challenges," *Business Horizons* (61:1) 2018/01/01/, pp 35-46.
- Lee, K. 2021. "Economics of Technological Leapfrogging," in *The Challenges of Technology and Economic Catch-up in Emerging Economies*, Oxford University Press, p. 0.
- Lee, K., and Lim, C. 2001. "Technological Regimes, Catching-Up and Leapfrogging: Findings from the Korean Industries," *Research Policy* (30) 02/01, pp 459-483.
- Li, Y., Ji, Q., and Zhang, D. 2020. "Technological catching up and innovation policies in China: what is behind this largely successful story?," *Technological Forecasting and Social Change* (153), p 119918.
- Marangunić, N., and Granić, A. 2015. "Technology acceptance model: a literature review from 1986 to 2013," *Universal Access in the Information Society* (14:1) 2015/03/01, pp 81-95.
- Muthukannan, P., Tan, B., Gozman, D., and Johnson, L. 2020. "The emergence of a Fintech Ecosystem: A case study of the Vizag Fintech Valley in India," *Information & Management* (57:8) 2020/12/01/, p 103385.
- Muthukannan, P., Tan, B., Tan, F. T. C., and Leong, C. 2021. "Novel mechanisms of scalability of financial services in an emerging market context: Insights from Indonesian Fintech Ecosystem," *International Journal of Information Management* (61), p 102403.
- Nurbaev, V., Au, C. H. A., and Chou, C.-Y. 2022. "Exploring the Critical Success Factors of Different Types of FinTech: A Beginning Case of Neobank,").
- Pan, S. L., and Tan, B. 2011. "Demystifying case research: A structured–pragmatic–situational (SPS) approach to conducting case studies," *Information and Organization* (21:3), pp 161-176.
- PayPal 2022. "2023 Notice of Annual Meeting of Stockholders and Proxy Statement. 2022 Annual Report" (available at https://s201.q4cdn.com/231198771/files/doc_financials/2023/ar/PayPal-Holdings-Inc-Combined-2023-Proxy-Statement-and-2022-Annual-Report.pdf).
- Radosevic, S. 1999. *International technology transfer and catch-up in economic development*, Edward Elgar Publishing.
- Rynes, S., and Gephart Jr, R. P. 2004. "From the Editors: Qualitative Research and the" *Academy of Management Journal*," *The Academy of Management Journal* (47:4), pp 454-462.
- Sauter, R., and Watson, J. 2008. "Technology leapfrogging: a review of the evidence," *A Report for DFID. Brighton: Sussex Energy Group, University of Sussex*.
- Schueffel, P. 2016. "Taming the Beast: A Scientific Definition of Fintech," *Journal of Innovation Management* (4) 12/01, pp 32-54.
- Statista 2023. "Internet user penetration rate in Russia from 2018 to 2027,").
- Strauss, A., and Corbin, J. 1998. *Basics of qualitative research: Techniques and procedures for developing grounded theory, 2nd ed*, Sage Publications, Inc: Thousand Oaks, CA, US.
- Surie, G., and Groen, A. 2017. "The importance of social entrepreneurship in national systems of innovation—An introduction," Elsevier, pp. 181-183.
- Tan, B., Ng, E., and Jiang, J. 2018. "The process of Technology Leapfrogging: Case analysis of the national ICT infrastructure development journey of Azerbaijan," *International Journal of Information Management* (38:1) 2018/02/01/, pp 311-316.
- Thong, J. Y. L. 2001. "Resource constraints and information systems implementation in Singaporean small businesses," *Omega* (29:2) 2001/04/01/, pp 143-156.
- Venkatesh, V., Brown, S. A., and Bala, H. 2013. "Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems," *MIS Quarterly* (37:1), pp 21-54.
- Walden, S. 2022. "What Is Fintech?," (available at <https://www.forbes.com/advisor/banking/what-is-fintech/>).

- WEF 2020. "Private or public: What's really driving technological innovation?," (available at <https://www.weforum.org/agenda/2020/08/democratizing-innovation>).
- Young, E. a. 2019a. "Global FinTech Adoption Index 2019," (available at https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/banking-and-capital-markets/ey-global-fintech-adoption-index.pdf).
- Young, E. a. 2019b. "Индекс проникновения услуг финтех " (available at https://assets.ey.com/content/dam/ey-sites/ey-com/ru_ru/news/2019/11/ey-fai-2019-rus.pdf).
- Zhenmin, L. 2018. "Frontier Technologies: A Window of Opportunity for Leapfrogging!," (available at <https://www.un.org/en/un-chronicle/frontier-technologies-window-opportunity-leapfrogging>).

Copyright

Copyright © 2023 Nurbaev Vladimir, Cheuk Hang Au and Chih-Yuan Chou. This is an open-access article licensed under a [Creative Commons Attribution-Non-Commercial 4.0 Australia License](https://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial use, distribution, and reproduction in any medium, provided the original author and ACIS are credited.