

THE IMPACT OF GOVERNMENT REGULATION ON THE ECONOMIC EFFICIENCY OF THE TELECOMMUNICATIONS INDUSTRY

Mustam

Prodi Manajemen, Fakultas Ekonomi dan Bisnis Islam, Universitas Muhammadiyah
Kendari

mustam@umkendari.ac.id

Abstract

Government policy in the telecommunications industry is aimed at ensuring economic efficiency by regulating tariffs, spectrum management, and encouraging fair competition. These regulations are important because they prevent market domination by foreign companies, such as those regulated in the rules regarding share ownership by foreign investors with certain limits. The study conducted in this research used the literature research method. The results show that first, well-designed regulations can increase economic efficiency by keeping tariffs affordable, optimising spectrum usage, and encouraging healthy competition among companies. Second, overly strict or bureaucratic regulations can slow innovation and infrastructure investment, which in turn can hinder the growth and efficiency of the telecommunications industry. Third, excessive regulation can have negative impacts, such as lengthening the licensing process and reducing companies' incentives to invest in research and development. On the other hand, the absence of adequate regulation can trigger anti-competitive practices and market abuse, which also adversely affect economic efficiency. Thus, it is important to find the right balance in regulation such as being strict enough to maintain fairness and transparency, but also flexible enough to allow for innovation and quick responses to technological change.

Keywords: Government Regulation, Economic Efficiency, Telecommunication Industry.

Introduction

The telecommunications industry has always been one of the important pivots in a country's development. The rapid development of information and communication technology has changed the way people, businesses, and even governments exchange information. This sector has a strategic role in promoting innovation, increasing productivity, and strengthening global competitiveness.

The telecommunications industry focuses on providing electronic communication networks such as telephony, internet, and television broadcasting. It plays a vital role in modern life by connecting people, businesses, and governments around the world (Tang & Jefferson, 2024). Thanks to technological advances, the telecoms industry has transformed from a mere telephone service to a complex global network with a wide range of digital services. Typically, telecoms companies are responsible for the infrastructure that provides communications such as cellular towers, submarine cables, and satellites. Through these services, information can be delivered

more quickly and efficiently to support economic and social activities both locally and internationally (Shin et al., 2022).

Recently, the telecommunications industry has undergone fundamental changes due to innovations such as 4G and 5G networks, fibre optics, and cloud computing. These changes encourage the emergence of new business models such as OTT services and IoT that further expand the reach and potential of the industry (Arslan-Ayaydin et al., 2020). In addition, competition in the telecommunications industry has also intensified with the emergence of new players competing for market share both nationally and globally. Government regulations also play an important role in developing the industry, from spectrum allocation to tariff policies and competition (Yu et al., 2021). These factors make the telecommunications industry one of the most dynamic and innovative sectors in the modern economy.

However, the complexity and dynamism of the telecommunications industry demands adequate regulation from the government. This regulation aims to ensure that the telecommunications sector operates fairly, efficiently, and provides maximum benefits to society. The government sets various policies ranging from tariff setting, frequency spectrum allocation, to competition regulation to create a healthy and sustainable business climate (Hedvičáková, 2022).

Therefore, government regulation in the telecommunications industry cannot be ignored, as it helps ensure that the sector is able to operate efficiently, fairly, and sustainably. Government regulation covers various aspects such as tariff setting, frequency spectrum allocation, and competition monitoring (Bader, 2020). With proper tariff setting, consumers can enjoy telecommunication services at a reasonable price, while service providers still have incentives to innovate and improve service quality. In addition, effective allocation of the frequency spectrum is essential to optimise the use of this limited resource, so that communication services can run without significant disruption (Yildiz & Karan, 2020).

Government regulation also plays a role in ensuring fair competition among telecoms service providers. Without regulation, large companies with more resources can dominate the market and monopolise services, which in turn can harm consumers and smaller companies. Antitrust regulation and policies to prevent unfair business practices ensure that all firms, large and small, have equal opportunities to compete in the market (Kwon & Park, 2021). This not only encourages innovation and efficiency in the telecoms industry but also ensures that consumers have a wide range of service options that can fulfil various needs. Thus, government regulation acts as a critical counterbalance in driving the growth and stability of the telecoms industry (Barkley, 2021).

Therefore, the effect of government regulation on economic efficiency in the telecommunications industry is still questioned by various parties (Mendolia et al., 2021). Some explain that overly strict regulation can limit business innovation and investment,

while others believe that proper regulation can promote effective operations and reduce costs for consumers (Gumata & Ndou, 2021). Therefore, it is worth exploring how regulation actually affects the economic efficiency of the telecoms network sector.

Research Methods

The study conducted in this research uses the literature research method. The literature research method is an approach that focuses on collecting, evaluating, and synthesising information that has been published by other researchers. This method serves to understand the research problem in depth by looking at various perspectives that have been generated from previous studies. Literature research is often used as the first step in a study to identify gaps in existing knowledge, determine relevant methodologies, and gain fundamental theoretical insights. In literature research, sources such as scientific journals, books, reports and conference articles are often the main materials analysed. (Raco, 2018); (Sugiyono, 2010); (Sukmadinata, 2009).

Results and Discussion

Definition and Concept of Economic Efficiency

Economic efficiency in the telecommunications industry refers to the optimum use of resources to maximise output and service quality at minimal cost. The importance of this efficiency is that the industry requires large investments in infrastructure such as towers, fibre optic cables, and advanced networks (Platon et al., 2024). Efficient telecoms companies can provide high-quality services at competitive prices, improving accessibility and consumer satisfaction. Economic efficiency also allows telecommunication companies to utilise the best technology, reduce operational costs, and increase profits to continue investing in the development of new technologies (Sozansky, 2021).

Moreover, economic efficiency in the telecoms industry has far-reaching implications for the economy as a whole. With more efficient and affordable telecoms services, sectors such as education, healthcare, and business can access better communication services, supporting productivity and innovation. For example, companies can utilise faster and more reliable communications to speed up decision-making and business processes (Rəsulov, 2022). Efficient telecoms services can also support economic growth in remote areas by connecting them to wider markets. Therefore, economic efficiency in the telecoms industry is not only important for the profits of companies in the sector, but also for the growth and well-being of the wider economy.

The measurement of economic efficiency involves the process of assessing the optimised level of resources used to achieve an expected output. One of the main methodologies often used is Data Envelopment Analysis or DEA and Stochastic Constraint Analysis or SFA. DEA, for example, determines the relative efficiency levels

of various decision-making units or DMUs by comparing the inputs applied against the outputs produced (Merzlikina, 2021). This method can identify units operating at peak efficiency as well as reveal efficiency gaps among other units. Meanwhile, SFA incorporates statistical methods to measure technical efficiency and identify factors causing inefficiency (Obukhova, 2022).

Moreover, in an industrial context, economic efficiency can also be measured through financial and operational indicators such as operating cost to revenue ratio, Return on Assets (ROA), and labour productivity ratio. These assessments provide an overview of the extent to which companies can manage their resources to generate profits and added value efficiently (Frank-Fahle & Zimmermann, 2020). Efficiency measurement is not only limited to internal aspects of the company, but also includes external analyses such as benchmarking against competitors and industry standards. Using a combination of quantitative and qualitative methods, companies can identify areas of improvement and design strategies to improve their operational and economic efficiency (Sørensen, 2023).

As such, economic efficiency in the telecoms industry is important to a company's ability to optimally utilise resources in order to offer quality services to consumers at minimal cost. This not only leads to increased profitability of the company, but also to expanded accessibility and improved social welfare. Economic efficiency can be measured using various methods, such as Data Envelopment Analysis or DEA and Stochastic Constraint Analysis or SFA, as well as financial indicators such as operating cost to revenue ratio and Return on Assets or ROA. By applying these measurements, a company can identify areas of improvement and design strategies to increase its efficiency, which in turn will provide far-reaching benefits to both the company itself and the economy as a whole.

The Effect of Regulation on the Telecommunications Industry

Government regulation of the telecommunications industry plays an important role in maintaining fair competition, user protection, and infrastructure development. Ministries often set policies on the radio frequency spectrum, which is a limited resource and essential for wireless network operations (Obeng & Sakano, 2020). In addition, regulations on tariffs and prices of telecommunications services aim to prevent monopolistic practices and ensure that prices remain affordable for users. Regulations also include provisions on technical standards and service quality, which aim to ensure that telecoms companies provide reliable and high-quality services to users (Mamatzakis et al., 2023).

In addition, the government has also implemented regulations related to data privacy and security to protect users' personal information in the growing digital era. This policy includes the implementation of strict and mandatory security measures for telecoms companies in managing user data (Ma & Zhu, 2020). The government also

encourages innovation through various incentives and funding programmes for the development of new technologies, and supports the acceleration of telecommunications infrastructure development in remote areas. With effective regulation, the government is able to create a conducive environment for the growth of the telecommunications industry while ensuring optimal benefits for society at large (Pudryk et al., 2021).

Types of regulation include Tariff regulation is a mechanism implemented by the government to ensure that telecommunication service tariffs remain affordable and reasonable for users. The aim is to prevent monopolistic practices and protect the interests of users. Tariff regulation can cover various types of prices, such as call rates, internet data rates, and additional service fees (Blesl & Kessler, 2021). With these regulations, the government seeks to create a balanced environment where companies can still make a reasonable profit without burdening users. In some cases, the government may also set a maximum price cap or set a tariff scale to ensure diverse tariffs for different user segments (Schoubben, 2020).

Frequency spectrum is a scarce resource and essential for the operation of wireless networks such as mobile phones and the internet. The government conducts spectrum management to ensure efficient and fair allocation and use of frequencies. This includes auctioning spectrum or granting licences to telecommunications operators, monitoring spectrum usage, and enforcing rules to prevent interference and illegal use (Aliyu, 2024). A refarming policy allows for the redistribution of spectrum in favour of new, more efficient technologies. With effective spectrum management, the government seeks to maximise the potential use of frequencies in supporting various telecommunications services and technological innovation (Akac et al., 2023).

Competition regulation is implemented to create a healthy and competitive telecommunications market. It aims to prevent monopolies and other anti-competitive practices that harm consumers and limit innovation. These regulations include oversight of mergers and acquisitions, fair pricing practices, and regulations that encourage the entry of new players into the market (Xiong & Gao, 2023). For example, the obligation to open up access to large infrastructure to small service providers. It is expected that with strict competition regulation, service quality will improve, prices will be more competitive, and innovation will continue to develop to provide wider benefits to consumers and the economy (Chen & Sun, 2020).

In the increasingly advanced digital era, data privacy and security regulations are very important. The government sets strict regulations on how customer data should be collected, stored, and used by telecoms companies. This includes the obligation to conduct strict security measures to protect data from unauthorised access, as well as rules on transparency and customer consent in the collection of personal data (Ediger et al., 2020). Legislation such as the EU General Data Protection Regulation is an example of how governments can implement high standards for consumer data

protection. The ultimate goal is to protect consumers from data abuse and increase public trust in telecoms services (Musa et al., 2024).

Cross-connection and access regulations are decisions that govern how different operators' networks connect and interconnect with each other. The government sets these rules to ensure that no operator dominates the market and hinders fair access for others. These regulations include technical provisions and tariffs for interconnection, ensuring that charges are fair and non-discriminatory (Bailey, 2023). Regulators may also set technical standards to ensure interoperability between different networks. With these regulations in place, users can enjoy seamless and barrier-free communication between operators, improving overall service quality (Ducman et al., 2023).

Regulation of Innovation and Infrastructure Development. To support technological development and expand the reach of telecoms services, governments also implement regulations that promote innovation and infrastructure development. This could be in the form of tax incentives, grants, or special funding policies for the development of new technologies such as 5G and internet of things (IoT) (Bhise, 2021). In addition, the government also adopts policies that accelerate telecoms infrastructure development in remote or less developed areas. Concrete examples include the granting of special licences or financial support for the construction of cellular towers and fibre optic cable networks in rural areas. With these regulations, the main goal is to narrow the digital divide and ensure equitable telecoms access for all (Qiao & Fei, 2022).

Thus, government policies in the telecoms industry are a crucial tool in creating a healthy, affordable, and innovative ecosystem. Through a wide range of policies—from tariffs, spectrum management, competition, data privacy and security, to innovation and infrastructure development—governments seek to ensure that the industry operates efficiently and fairly (Wang et al., 2021). Effective policies not only protect consumers from harmful practices but also encourage innovation and infrastructure expansion, thereby providing broader benefits to society. With good policies in place, the telecoms industry can continue to evolve and adapt to the demands of the times, while ensuring that all levels of society have the access they need to communicate and participate in the digital economy (Ergashovich, 2020).

Policies in the telecommunications industry have some very significant positive impacts. Firstly, tariff policies help ensure that telecoms services remain affordable for the general public. This is important to ensure that all segments of society, including those in remote or low-income areas, can access essential services such as telephony and internet (Alenykh, 2020). Second, spectrum management policies support efficiency and fairness in the use of the frequency spectrum, which is a limited resource. With good spectrum management, telecoms services can operate without interruption and new service offerings can be implemented quickly (Morgunova, 2022).

Despite its many benefits, policy can also have negative impacts. One such impact is the potential for excessive bureaucracy that can slow innovation and industry

response to technological change. For example, lengthy licensing processes for obtaining frequency spectrum or building new infrastructure can hinder the launch of new services (Dorsman et al., 2020). In addition, overly restrictive policies on competition can make it difficult for large companies to maintain cost efficiency, which in turn can increase their operational burden and affect the final price for consumers. In some cases, excessive policies can also reduce incentives for companies to invest in research and development (Chatterjee, 2020).

Overall, telecoms regulation plays an important role in shaping a fair and efficient industry, although it presents some challenges. To maximise the positive impact, it is important for governments and regulators to find a balance between strict regulation and flexibility that allows for innovation (Lucia & Braga, 2022). With the right regulation, the telecoms industry can continue to grow, offer better services to consumers, and support inclusive economic development. However, it is also important to continuously evaluate and update regulations to keep them relevant to technological developments and market needs (Sylva & Scott, 2020).

Conclusion

This study reveals that government regulation has a significant impact on economic efficiency in the telecommunications industry. Appropriate regulation can promote efficiency by regulating tariffs reasonably, managing spectrum effectively, and supporting fair competition. By carefully regulating tariffs, consumers can choose services at affordable prices without sacrificing quality. Good spectrum management also ensures that this scarce resource is optimally utilised, allowing companies to offer diverse services with better quality.

However, the research also found that over- or under-regulation can hinder economic efficiency in the industry. Cumbersome bureaucracy and overly stringent regulations can slow down the process of innovation and infrastructure investment. For example, delays in obtaining spectrum licences or permits to build new networks can prevent companies from offering new services or improving existing ones. This can reduce a company's competitiveness in a highly dynamic and fast-changing market.

On the other hand, the study also emphasises that regulation must be balanced. It should be strict enough to prevent anticompetitive practices and market abuse, but also flexible enough to support innovation and expansion. Outcome-oriented regulation that focuses on creating value for consumers and operators can help achieve higher economic efficiency. This includes policies that encourage the deployment of new technologies such as 5G and IoT, as well as incentives to build infrastructure in less developed regions.

Overall, this study emphasises the importance of adaptation and continuous evaluation in government regulation of the telecommunications industry to achieve optimal economic efficiency. The government and regulators need to continuously

monitor the impact of regulations and make adjustments when necessary to accommodate changes in technology and market dynamics. With a holistic and adaptive approach, government regulation can serve as a catalyst that not only protects consumers but also drives growth and efficiency in the telecommunications industry.

References

- Akac, A., Anagnostopoulou, A., & Kappatos, V. (2023). Evaluation of maritime industry compliance with existing environmental regulations – A benchmarking assessment from energy efficiency perspective. *E3S Web of Conferences*, 436(Query date: 2024-07-24 04:44:06), 5002–5002. <https://doi.org/10.1051/e3sconf/202343605002>
- Aliyu, A. (2024). Evaluation of building regulations in Nigeria as regards energy efficiency. *Baze University Journal of Entrepreneurship & Interdisciplinary Studies*, Query date: 2024-07-24 04:44:06. <https://doi.org/10.61955/lbvyuj>
- Allenykh, M. (2020). Industry 4.0 in nuclear energy: Economic efficiency of the digitalization of the industry. *Drukerovskij Vestnik*, 6, 29–49. <https://doi.org/10.17213/2312-6469-2020-6-29-49>
- Arslan-Ayaydin, Ö., Shrestha, P., & Thewissen, J. (2020). Blockchain as a Technology Backbone for an Open Energy Market. *Regulations in the Energy Industry*, Query date: 2024-07-24 04:44:06, 65–84. https://doi.org/10.1007/978-3-030-32296-0_5
- Bader, M. E. (2020). Complying with Government Regulations. *Practical Quality Management in the Chemical Process Industry*, Query date: 2024-07-24 04:44:06, 93–112. <https://doi.org/10.4324/9781003064916-6>
- Bailey, R. (2023). Government Organisations and Industry. *Managing the British Economy*, Query date: 2024-07-24 04:44:06, 49–65. <https://doi.org/10.4324/9781003400332-4>
- Barkley, A. (2021). Cost and Efficiency in Government Outsourcing: Evidence from the Dredging Industry. *American Economic Journal: Microeconomics*, 13(4), 514–547. <https://doi.org/10.1257/mic.20190018>
- Bhise, V. D. (2021). Government Regulations. *Decision-Making in Energy Systems*, Query date: 2024-07-24 04:44:06, 209–220. <https://doi.org/10.1201/9781003107514-14>
- Blesl, M., & Kessler, A. (2021). Energy Efficiency from an Energy Economic Perspective. *Energy Efficiency in Industry*, Query date: 2024-07-24 04:44:06, 443–468. https://doi.org/10.1007/978-3-662-63923-8_9
- Chatterjee, T. (2020). IT Industry, Environmental Regulations and International Trade-A Two-Sided General Equilibrium Approach. *Role of IT- ITES in Economic Development of Asia*, Query date: 2024-07-24 04:44:06, 149–162. https://doi.org/10.1007/978-981-15-4206-0_12
- Chen, J., & Sun, P. (2020). Temporal arbitrage, fragmented rush, and opportunistic behaviors: The labor politics of time in the platform economy. *New Media & Society*, Query date: 2024-07-23 15:05:21. <https://doi.org/10.1177/1461444820913567>
- Dorsman, A. B., Arslan-Ayaydin, Ö., & Thewissen, J. (2020). Introduction: Financial Implications of Regulations in the Energy Industry. *Regulations in the Energy*

- Industry, Query date: 2024-07-24 04:44:06, 1–6. https://doi.org/10.1007/978-3-030-32296-0_1
- Ducman, A. A., Diaconita, V., Simonca, I., Belciu, A., & Corbea, A. M. I. (2023). Government Oversight and Economic Impacts: Sustainability in the Vineyard and the Evolution of Wine Regulations, Trade and Production. *Agronomy*, 13(12), 2991–2991. <https://doi.org/10.3390/agronomy13122991>
- Ediger, V. Ş., Bowlus, J. V., & Aydın, M. (2020). Geopolitics and Gas-Transit Security Through Pipelines. *Regulations in the Energy Industry*, Query date: 2024-07-24 04:44:06, 85–106. https://doi.org/10.1007/978-3-030-32296-0_6
- Ergashovich, O. B. (2020). Increasing Foreign Investments in the Extractive Industry of Uzbekistan’s Economy: Economic and Legal Aspects of Improving Efficiency. *Journal of Advanced Research in Dynamical and Control Systems*, 12(Query date: 2024-07-24 04:44:06), 2346–2356. <https://doi.org/10.5373/jardcs/v12sp7/20202363>
- Frank-Fahle, C., & Zimmermann, M. (2020). Economic Substance Regulations. *Essentials*, Query date: 2024-07-24 04:44:06, 5–15. https://doi.org/10.1007/978-3-658-31098-1_2
- Gumata, N., & Ndou, E. (2021). Does an Increase in Government Debt Threaten Economic Growth Recovery Via Tightening Credit Conditions? *Achieving Price, Financial and Macro-Economic Stability in South Africa*, Query date: 2024-07-24 04:44:06, 181–188. https://doi.org/10.1007/978-3-030-66340-7_12
- Hedvičáková, M. (2022). Capital-Labor Substitution and Economic Efficiency in the Context of Industry 4.0. *Proceedings of the International Scientific Conference Hradec Economic Days 2022*, Query date: 2024-07-24 04:44:06. <https://doi.org/10.36689/uhk/hed/2022-01-023>
- Kwon, I., & Park, C.-Y. (2021). Corporate Governance and the Efficiency of Government R&D Grants. *Global Economic Review*, 50(4), 293–309. <https://doi.org/10.1080/1226508x.2021.1908156>
- Lucia, W. M. D., & Braga, W. L. M. (2022). iTLS™ model for increasing operational efficiency: Application in an energy and telecommunications systems industry. Query date: 2024-07-24 04:44:06. <https://doi.org/10.21203/rs.3.rs-1578532/v1>
- Ma, M., & Zhu, H. (2020). Efficiency of Decisions under Membership Heterogeneity and Government Regulations: Insights from Farmer Cooperatives in China. *Economic Development and Cultural Change*, 68(3), 1009–1040. <https://doi.org/10.1086/701318>
- Mamatzakis, E. C., pegkas, panos, & Staikouras, C. (2023). Efficiency in Tourism Industry and Labour Market Regulations. *SSRN Electronic Journal*, Query date: 2024-07-24 04:44:06. <https://doi.org/10.2139/ssrn.4590048>
- Mendolia, S., Stavrunova, O., & Yerokhin, O. (2021). Determinants of the community mobility during the COVID-19 epidemic: The role of government regulations and information. *Journal of Economic Behavior & Organization*, 184(Query date: 2024-07-24 04:44:06), 199–231. <https://doi.org/10.1016/j.jebo.2021.01.023>
- Merzlikina, G. S. (2021). Economic efficiency of smart production: From targets to regulations. *Vestnik of Astrakhan State Technical University. Series: Economics*, 2021(3), 17–27. <https://doi.org/10.24143/2073-5537-2021-3-17-27>

- Morgunova, M. K. (2022). INFLUENCE OF RISK FACTORS ON THE ECONOMIC EFFICIENCY OF ENERGY SERVICE PROJECTS OF ECONOMIC ENTITIES OF THE TELECOMMUNICATIONS INDUSTRY. *EKONOMIKA I UPRAVLENIE: PROBLEMY, RESHENIYA*, 6(126), 61–68. <https://doi.org/10.36871/ek.up.p.r.2022.06.02.009>
- Musa, A., Abdulfatai, A. O., Jacob, S. E., & Oluyemi, D. F. (2024). Government and economic regulations on federated learning in emerging digital healthcare systems. *Federated Learning for Digital Healthcare Systems*, Query date: 2024-07-24 04:44:06, 325–354. <https://doi.org/10.1016/b978-0-443-13897-3.00012-6>
- Obeng, K., & Sakano, R. (2020). Effects of government regulations and input subsidies on cost efficiency: A decomposition approach. *Transport Policy*, 91(Query date: 2024-07-24 04:44:06), 95–107. <https://doi.org/10.1016/j.tranpol.2020.03.015>
- Obukhova, M. R. (2022). ECONOMIC EFFICIENCY OF THE FOOD TECHNOLOGY INDUSTRY IN THE PANDEMIC CONTEXT. *Business Strategies*, 10(1), 13–15. <https://doi.org/10.17747/2311-7184-2022-1-13-15>
- Platon, N., Zaporojan, F., & Zaporojan, E. C. (2024). Economic And Social Efficiency Of Tourism Industry. *Competitiveness and Innovation in the Knowledge Economy*, 2023, Query date: 2024-07-24 04:44:06. <https://doi.org/10.53486/cike2023.09>
- Pudryk, D., Kwilinski, O., & Vasylyna, T. (2021). EFFICIENCY OF GOVERNMENT EDUCATIONAL POLICY: IMPACT OF MIGRATION. *Economic Analysis*, 31, 289–295. <https://doi.org/10.35774/econa2021.01.289>
- Qiao, L., & Fei, J. (2022). Government subsidies, enterprise operating efficiency, and “stiff but deathless” zombie firms. *Economic Modelling*, 107(Query date: 2024-07-24 04:44:06), 105728–105728. <https://doi.org/10.1016/j.econmod.2021.105728>
- Raco, J. (2018). *Metode penelitian kualitatif: Jenis, karakteristik dan keunggulannya*. Query date: 2024-05-25 20:59:55. <https://doi.org/10.31219/osf.io/mfzuj>
- Rəsulov, K. (2022). Economic Efficiency of Innovative Development in Industry. *Path of Science*, 8(4), 2001–2007. <https://doi.org/10.22178/pos.80-2>
- Schoubben, F. (2020). Environmental Regulatory Arbitrage by Business Groups in the Context of the European Union’s Emission Trading System (EU-ETS). *Regulations in the Energy Industry*, Query date: 2024-07-24 04:44:06, 7–31. https://doi.org/10.1007/978-3-030-32296-0_2
- Shin, J., Kim, Y., & Kim, C. (2022). A Study on the Relationship Between Government Regulations and Innovation Efficiency in Information and Communication Technology (ICT) Industry. *International Journal of Software Innovation*, 10(1), 1–12. <https://doi.org/10.4018/ijsi.301218>
- Sørensen, R. J. (2023). Educated politicians and government efficiency: Evidence from Norwegian local government. *Journal of Economic Behavior & Organization*, 210(Query date: 2024-07-24 04:44:06), 163–179. <https://doi.org/10.1016/j.jebo.2023.04.007>
- Sozansky, L. Y. (2021). Economic assessment of the industry efficiency in Poland and its regions. *Socio-Economic Problems of the Modern Period of Ukraine*, 3, 47–52. <https://doi.org/10.36818/2071-4653-2021-3-8>
- Sugiyono. (2010). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Sukmadinata, N. S. (2009). *Metode Penelitian Pendidikan*. PT Remaja Rosdakarya Offset.

- Sylva, W., & Scott, O. C. (2020). PROMOTERS OF ARTIFICIAL INTELLIGENCE CAPABILITY IN THE NIGERIAN TELECOMMUNICATIONS INDUSTRY. *EPRA International Journal of Economic and Business Review*, Query date: 2024-07-24 04:44:06, 46–64. <https://doi.org/10.36713/epra5439>
- Tang, L., & Jefferson, G. (2024). A DSGE model of energy efficiency with vintage capital in Chinese industry. *Economic Modelling*, 132(Query date: 2024-07-24 04:44:06), 106664–106664. <https://doi.org/10.1016/j.econmod.2024.106664>
- Wang, G., Cheng, K., Luo, Y., & Salman, M. (2021). *Heterogeneous Environmental Regulations And Green Economic Efficiency In China: The Mediating Role of Industrial Structure*. Query date: 2024-07-24 04:44:06. <https://doi.org/10.21203/rs.3.rs-1085727/v1>
- Xiong, R., & Gao, D. (2023). Exploring the Impact of Heterogeneous Environmental Regulations on Green Innovation Efficiency: Evidence from China's Yangtze River Economic Belt. *Systems*, 11(10), 516–516. <https://doi.org/10.3390/systems11100516>
- Yildiz, Y., & Karan, M. B. (2020). Corporate Cash Holdings in the Oil and Gas Industry: The Role of Energy Directives. *Regulations in the Energy Industry*, Query date: 2024-07-24 04:44:06, 187–213. https://doi.org/10.1007/978-3-030-32296-0_11
- Yu, W., Liang, P., & Gao, N. (2021). Can higher levels of disclosure bring greater efficiency: Empirical research on the effect of government information disclosure on enterprise investment efficiency. *China Economic Quarterly International*, 1(3), 221–232. <https://doi.org/10.1016/j.ceqi.2021.09.001>