African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

CHANGING REGULATORY APPROACHES IN THE GLOBAL ECONOMY: FROM TRADITIONAL TO INNOVATIVE PARADIGMS

Morozov, V.[1], Ivanova, V.[2], Deneha, O.[3], Ioanno, V.[4] and Sokhatskyi, O.[5]
[1]Department of International Economic Relations and Business, Faculty of International Relations, National Aviation University, Kyiv, Ukraine.
[2]Department of Financial and Economic Security, National Academy of the Security Service of Ukraine, Kyiv, Ukraine.
[3]Interregional Academy of Personnel Management, Kyiv, Ukraine.
[4] Marketing and IT, Ukraine.
[5]Department of International Relations, Bohdan Havrylyshyn Education and Research Institute, West Ukrainian National University, Ternopil, Ukraine.
[1]vm.mailservice@gmail.com

ABSTRACT
Purpose: This paper examines key aspects of innovative regulatory paradigms and their impact on global economic development.
Design/Methodology/Approach: This research methodology is grounded in a comprehensive analytical framework incorporating system analysis, structural-functional approaches, and synthesis and decomposition methods. The synthesis method consolidates insights from diverse data sources, crafting a cohesive understanding of how innovative regulatory paradigms shape economic and technological progress.
Research Limitation: The study is geographically confined to analysing regulatory paradigms in economies with significant global influence, such as Germany, while examples from emerging economies serve as complementary illustrations.
Findings: This research reveals that innovative regulatory paradigms significantly enhance adaptability and foster innovation within the global economy. The study identifies a noticeable shift in adopting regulatory sandboxes from developed to emerging economies, highlighting their role in driving technological advancement and economic competitiveness. Furthermore, it was established that integrating flexible regulatory frameworks fosters innovation and ensures economic stability.
Social Implication: By fostering green innovations and enabling digital transformation, these paradigms address pressing global challenges such as climate change, resource efficiency, and equitable access to technological advancements.
Practical Implication: This research provides industries with actionable insights into the advantages of adopting innovative regulatory paradigms, such as regulatory sandboxes, to foster technological advancements and improve competitiveness.
Originality/Value: This study introduces a novel perspective on the global shift from traditional regulatory frameworks to innovative paradigms, specifically emphasising regulatory sandboxes. policies.

Keywords: *Economic regulation. globalisation. innovation. management. technology*
ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

INTRODUCTION

In the ever-changing maelstrom of global economic processes, regulatory approaches act as guiding vectors that direct the flow of innovation and traditional practices. The global economy is experiencing unprecedented reformation of its fundamental foundations, from strict state regulation to free market principles, from monolithic standards to dynamic, adaptive models (Tödtling & Trippl, 2021).

The present academic paper aims to reveal the nature and consequences of these transformations. It starts by analysing historically established regulatory approaches that formed the backbone of the international economic system and discusses innovative paradigms that offer alternative vectors of development. In this discussion, special attention is paid to economic, social, political, and technological determinants that form the fabric of the modern economic space.

By focusing on this complex topic, we aim to identify how the shift in regulatory emphasis influences the structural adaptability of economies, the capacity of countries to innovate, and the ability of the international community to cooperate in addressing global challenges. The overarching motive of the research is to find answers to the optimal balance between regulatory intervention by the state and market self-regulation, between protecting traditional industries and stimulating innovation activity.

In this context, the academic paper seeks not only to make sense of the already known facts but also to shed light on less apparent interconnections and the potential for further studies that could point the way to a more balanced and sustainable global economic system. Thus, deploying this narrative framework allows us to better understand the global economy's current state and project the possible contours of its future development.

LITERATURE REVIEW

The subject matter indicated in the present academic paper's title has attracted scholars' attention on both sides of the Atlantic Ocean, determining the significant amount of literature devoted to it.

Aghion et al. (2023) study analyses the impact of regulation on innovation. The authors argue that regulation can positively and negatively affect innovation, depending on its nature and context. This comprehensive view of the interrelationship between regulation and innovation provides a basis for further analysis in the context of specific technology markets, such as the 5G market.

The research by Bauer and Bohlin (2022) deepens the understanding of this correlation by concretising it on the example of regulation and innovation in 5G markets. The authors reveal

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

that flexible regulation adapting to rapid technological change can foster innovative development in the industry. This study demonstrates how sector-specific regulatory frameworks influence the pace and direction of innovation.

Ren and Ji (2021) expand on this theme by investigating the impact of environmental regulation and technological innovation on the sustainable development of the maritime economy in China. They have found that strict environmental regulation stimulates innovation in the maritime industry, improving its environmental sustainability and economic efficiency. This case emphasises the importance of considering the environmental dimension when formulating regulatory policies.

The analysis by Liu et al. (2021) deepens the understanding of the interaction between environmental regulation and green innovation by examining the impact of China's new environmental protection law on companies' innovation activities. They reveal that stronger environmental regulation can effectively stimulate the development of green innovation, which contributes to the transition to a more sustainable development.

Zhu et al. (2021) examine the dual effect of various environmental regulations on the technological innovation of Chinese steel mills. They demonstrate that innovation activity can be stimulated and suppressed depending on the nature and intensity of environmental regulation. This emphasises the need to balance the strictness of regulation with the provision of space for innovative development.

Wang et al. (2021b) investigate the impact of environmental regulation and government subsidies on green technology innovation using panel data from Chinese provinces. Their findings emphasise that the combination of environmental regulation and government financial support can significantly contribute to the development of green technology innovation.

Behera and Sethi (2022) expand on this topic by examining the correlation between environmental regulation, foreign direct investment (FDI), and green technology innovation in OECD countries (Shen et al., 2021). They have concluded that effective environmental regulation can directly promote green innovation and enhance the positive impact of FDI on environmentally oriented technological innovation.

Delving even deeper into the impact of macroeconomic factors on innovation, Peng et al. (2023) analyse how economic policy and uncertainty influence green innovation. They reveal that economic policy uncertainty can deter investment in green innovations, emphasising the importance of a stable regulatory environment to stimulate innovation activity.

Jiang et al. (2021) investigate how environmental regulations affect corporate innovation through mandatory rules and voluntary governance. They discover that an effective combination of strict regulatory requirements and flexible, voluntary practices can significantly

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

increase companies' innovation potential, particularly in the context of environmental innovation.

Hsu et al. (2021) examine the correlation between green innovation and financial development performance, focusing on the role of environmental regulation as a mediator. They establish that strict environmental standards can foster the growth of green innovation, thereby improving companies' environmental performance and financial results.

The study by Fu and Jian (2021) highlights the impact of environmental regulations on corporate innovation from the perspective of a developing country, demonstrating that such regulations can encourage innovation even in the context of corruption. This discusses the complex interactions between regulation, corruption and innovation.

In this context, Wang et al. (2021a) examine the evolution and equilibrium of a green technology innovation system through a simulation of a three-party game model. The authors emphasise the importance of collaboration between stakeholders to promote green innovation.

Following up on innovation policies, Tödtling and Trippl (2021) analyse regional innovation policies that promote new development pathways beyond neoliberal and traditional systemic views. This study emphasises the need for flexible approaches to regional innovation development.

Popelo et al. (2021) contribute to understanding the role of modern innovations and information technologies in the functioning of financial institutions by exploring the global experience of their implementation. Their findings emphasise the importance of technological innovations for improving the efficiency of the financial sector.

Based on a systematic literature review, Suchek et al. (2021) examine the connection between innovation and the circular economy. They reveal that innovation is crucial in transitioning to a more sustainable and efficient use of resources.

Hao et al. (2023) study the impact of digitalisation on green economic growth by analysing the role of industrial structure optimisation and green innovation. They have concluded that digitalisation contributes to sustainable development by increasing resource efficiency and stimulating innovation processes.

Lee et al. (2021) investigate whether fintech innovations improve bank efficiency by providing evidence from the Chinese banking industry. Their analysis confirms that innovations in financial technology can significantly increase the productivity of the banking sector, which is important for improving the economy's overall efficiency.

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Zhong and Peng (2022) examine whether environmental regulation can promote green innovation in enterprises with high pollution levels. They use data from a quasi-natural experiment in China to demonstrate that relevant regulation can effectively stimulate green innovation in such enterprises.

Pan et al. (2022) analyse the role of the digital economy as a driver of innovation for overall factor productivity. Their findings indicate a significant impact of digitalisation on increasing productivity and stimulating economic growth through innovation processes.

Botelho et al. (2021) explore innovative business models as drivers of projector integration, identifying their opportunities and barriers. They emphasise the importance of adapting business models to modern sustainability requirements.

Cao et al. (2021) study the correlation between digital finance, green technological innovation, and energy-environmental productivity. Their results confirm that digital finance can contribute to environmental and energy improvement in China’s regional economies.

Zhao et al. (2022a) investigate how restrictions on public participation can promote green technological innovation by Chinese enterprises, focusing on the moderating role of government environmental regulation enforcement. They reveal that active enforcement of environmental regulations can amplify the positive impact of public participation on innovation.

Using data from Chinese cities, Zhao et al. (2022b) analyse whether green innovation contributes to total factor productivity. Their findings confirm that green innovation significantly impacts economic efficiency and sustainability.

Liang et al. (2022) examine the difference between substantive and symbolic green innovation. They focus on the impact of environmental regulation (ER) on enterprises' innovation activities and consider dual moderating effects. They reveal that effective environmental regulation can stimulate genuine green innovation.

Nemlioglu and Mallik (2021) study how effective company management can promote innovation in times of crisis through financial leverage. They point out the importance of financial sustainability in supporting innovation activity.

Shang et al. (2022) analyse the correlation between environmental regulation, import trade, and green technological innovation. They reveal that strict environmental regulation fosters innovation, reduces import dependence, and increases environmental efficiency.

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Wen et al. (2021) investigate whether higher government efficiency leads to higher innovation. They conclude that enterprises' innovation activities are enhanced under high governmental efficiency conditions, contributing to economic development.

Summarising the literature review, several key areas that have emerged in recent studies can be emphasised. First, the emphasis is on the importance of digitalisation and innovation in promoting green economic growth, with a particular focus on financial sector efficiency and green technological innovation. It is crucial to note that government regulation and environmental initiatives can significantly stimulate the innovation activity of enterprises, especially in the context of high levels of public participation and effective public administration.

The idea that innovations ensuring sustainable development contribute to economic efficiency and play a critical role in shaping environmentally sustainable business models deserves special attention. Such innovations require active support both on the part of government agencies and through public and private sector involvement.

These conclusions make the relevance of our research topic, "Changing Regulatory Approaches in the Global Economy: From Traditional to Innovative Paradigms," even more evident. The global economic landscape is undergoing significant transformations driven by rapid technological development and the growing need for environmental sustainability. In this context, regulatory approaches that can adapt to new challenges and stimulate innovation are becoming crucial to achieving economic and environmental goals.

Thus, consideration of changes in regulatory approaches, notably the transition from traditional to innovative paradigms, is relevant and necessary to understand ways to improve the global economy's efficiency and sustainability in the face of rapid change. A special focus on digitalisation, green innovations, and the effectiveness of government management in this process opens up new perspectives for studies and policy development aimed at creating a more sustainable and innovative future.

The present research aims to analyse the changes in regulatory approaches in the global economy, which are transitioning from traditional models to innovative paradigms, to determine their impact on stimulating innovation and promoting sustainable development. The research aims to identify key aspects and mechanisms through which modern regulatory initiatives can effectively influence economic efficiency, green innovation and digital transformation in various sectors of the global economy. Special attention will be paid to analysing the role of governmental and international regulatory bodies in shaping a favourable innovation environment, as well as identifying challenges and opportunities arising from the transition to new regulatory paradigms.

ISSN: 2408-7920

GBPA
Ghana Book Publishers Association

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

METHODOLOGY

The methodology employed a purposive sampling method, focusing on case studies and reports from international regulatory bodies, industry white papers, and academic literature relevant to innovative regulatory paradigms. The sample size included over 50 key sources, encompassing global regulatory frameworks and country-specific examples, particularly those implementing regulatory sandboxes. The primary research instruments included document analysis and comparative analysis of policies and outcomes across sectors. Data were analysed using qualitative content analysis to identify trends, patterns, and impacts of innovative regulatory mechanisms. It was supported by thematic categorisation to ensure a structured evaluation of their economic and technological development implications.

RESULTS AND DISCUSSION

Innovative regulatory paradigms mark a shift from rigid, often inflexible regulatory frameworks to more adaptive and dynamic forms of regulation that aim to promote innovation and sustainable development. These paradigms distinguish themselves by integrating the latest technologies, fostering public-private collaboration, and adapting to rapidly changing global market conditions. In contrast to traditional approaches, which often focus on control and restriction, innovation paradigms seek to create an environment where innovation is not only allowed but actively encouraged.

One key feature of innovative regulatory paradigms is data-driven regulation, which allows regulators to use large amounts of information to make informed decisions. This starkly contrasts traditional approaches, where decisions were often made based on limited data or historical experience. Innovative regulatory paradigms also emphasise the importance of collaboration between stakeholders, including governments, businesses, academia, and the public, to jointly address complex challenges such as climate change or digital transformation.

When analysing the impact of innovative regulatory paradigms on the economy and economic growth, it is important to note that they create favourable conditions for innovation, investment, and competitiveness. These paradigms can help expand markets, increase productivity and efficiency, and ensure sustainable resource use. Innovation regulation can also play an important role in stimulating green innovation, which is crucial for transitioning to a low-carbon economy and achieving sustainable development goals.

Taken together, innovative regulatory paradigms play a crucial role in shaping the future of the global economy by creating an environment in which innovation not only survives but thrives. The transition to such paradigms requires regulators to change their approaches to regulation and be ready to constantly learn and adapt to meet the needs of the rapidly changing innovation

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

landscape. The introduction of so-called regulatory sandboxes is one manifestation of innovative regulatory paradigms.

Regulatory sandboxes are an innovative regulatory mechanism that provides a legal space for temporary experimentation with innovative products, services, business models and delivery in the face of regulatory uncertainty due to rapid technological development. The concept arose in response to the need to balance consumer protection with promoting innovation, especially in areas where existing regulation has not kept pace with technological change.

Regulatory sandboxes were first introduced in the financial sector, where rapid innovation, particularly in fintech, often outpaces traditional financial regulatory frameworks (Zarrouk et al., 2021). This tool has allowed financial startups and innovators to test their products and services in actual market conditions but with limited regulatory oversight and reduced risk. This, in turn, has provided regulators with a better understanding of new technologies and their potential market impact, allowing them to adapt existing regulatory frameworks without inhibiting innovation.

Although regulatory sandboxes originated in the financial sector, the concept quickly spread to other industries. For instance, they are applied in healthcare, energy, transportation, and education, where innovations also have enormous societal potential but often face regulatory barriers. In these sectors, regulatory sandboxes play a critical role in determining the future of regulation that promotes innovation and protects the public interest.

Despite their promising potential, regulatory sandboxes also face challenges. These include achieving an appropriate balance between innovation and risk and developing exit criteria to ensure that new products or services meet generally accepted safety and reliability standards. In addition, there is a risk that regulatory sandboxes may create an uneven playing field where some companies receive preferences, which may affect competition.

Nevertheless, the positive impact of regulatory sandboxes on the economy and economic growth cannot be overstated. They allow companies to respond quickly to changing market conditions and test and implement innovations, leading to job creation, attracting investment, and stimulating scientific and technological progress. In addition, regulatory sandboxes can foster the development of a startup and entrepreneurial ecosystem, which are important drivers of innovation and economic growth.

Given the above, regulatory sandboxes are an important tool for innovative regulatory paradigms, opening up new opportunities for innovative development in interaction with the regulatory environment. This demonstrates their importance in shaping flexible, adaptive approaches to regulation, which contributes to maintaining a dynamic and innovative global economic landscape.

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

The proliferation of regulatory sandboxes is noteworthy, as illustrated by the following graph prepared by the World Bank (Figure 1).

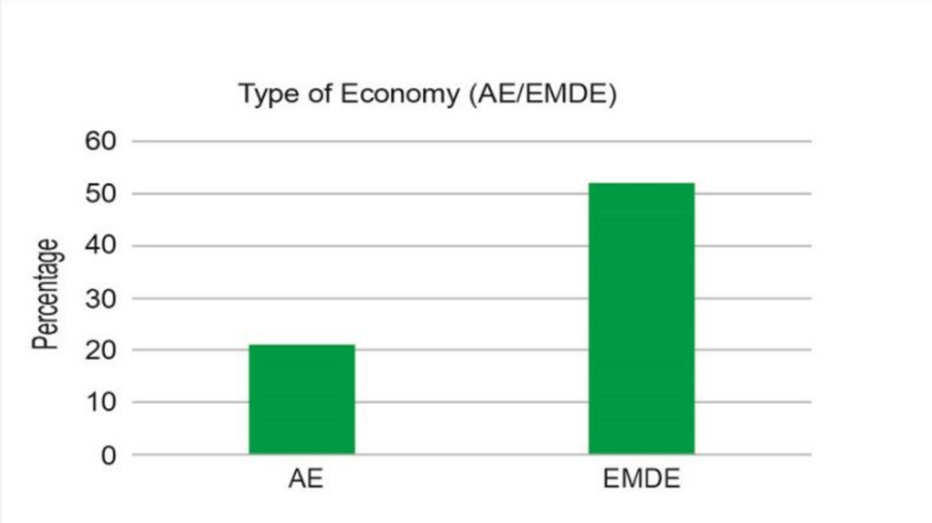

Figure 1: The World Bank's timeline of regulatory sandboxes
Source: The World Bank, 2020

The chart below shows the percentage of regulatory sandboxes in advanced economies (AE) compared to emerging and developing economies (EMDE). According to the chart, the share of regulatory sandboxes in EMDEs is significantly higher than in AEs.

This may indicate that emerging economies and markets are more actively adopting innovative regulatory mechanisms to stimulate the development of new technologies and business models despite AEs being the "cradle" of regulatory sandboxes. This trend is driven by the need to quickly adapt to changing global market conditions and the desire to accelerate economic growth through innovation. At the same time, developed economies often have a more conservative approach to regulation or do not have a sufficiently developed infrastructure that allows innovations to flourish in a more stable environment.

Germany holds a special place among the countries that play a significant role in shaping modern regulatory approaches. Thanks to its historical experience, innovative technologies, and high economic efficiency, Germany serves as an example of the successful application of modern regulatory strategies on a global scale. Understanding its experience can open new opportunities for other countries seeking stable and sustainable economic development.

Germany is renowned for its effective regulatory system, which ensures stability and innovative economic development. Specific examples that reflect this process are essential.

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Energy transformation and emissions reduction policy. In response to growing awareness of climate change, Germany is actively developing policies to reduce greenhouse gas emissions and transition to renewable energy sources. This strategy includes promoting solar and wind energy use and gradually phasing out coal-fired power plants. An example is the energy transition in the Federal Republic of Germany and the "Energiewende" program (Clean Energy Wire, 2024).

The following examples demonstrate a broad spectrum of regulatory strategies and policies that promote sustainable development and innovation in the German economy: Germany is noted for its active development of green technologies and implementation of environmentally oriented policies. The government encourages investment in renewable energy sources, energy efficiency, and CO2 emissions reduction programs. An example is the development of solar energy and programs promoting solar power plants in Germany (National Geographic, 2023).

Digital Strategy and Innovation Promotion: Germany actively develops a digital strategy to enhance competitiveness and stimulate innovation across all economic sectors. This strategy includes investments in research and development of new technologies and creating favourable conditions for developing startups and innovative companies. As an example, consider the "Industry 4.0" program and the development of the digital industry in Germany (Federal Ministry of Education and Research, 2024).

Germany is known for its multifaceted support of innovative startups and entrepreneurship (Al-Qudah et al., 2022). The government actively develops programs and financial tools to stimulate innovative ideas and support young entrepreneurs. An example is the "German Accelerator" program supporting innovative startups in Germany (German Accelerator, 2024). Implementing innovative regulatory approaches in the German economy is accompanied by specific results and impacts on critical sectors of the country. For example, financial sector reform has contributed to stabilising the banking system and reducing financial crisis risks, as confirmed by specific data from the "Deutsche Bundesbank" (2024) for the relevant post-crisis analysis period.

A comparative analysis of traditional and innovative approaches to economic regulation using Germany as an example can form the basis for defining optimal strategies for managing economic development. Indeed, innovative approaches that stimulate investment in new technologies and startups can be essential for ensuring a country's competitiveness.

Germany is known for its high efficiency in regulatory policies, leading to stable economic development. Over the last decades, it has transitioned from focusing on the development of heavy industry to actively encouraging innovation and startups.

Implementing innovative regulatory approaches in the German economy has already shown significant results. For example, according to Statista (2024), the number of startups in the

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

country has steadily increased over the last five years, demonstrating the stimulating effect of innovative policies.

Germany's experience in changing regulatory approaches underscores the importance of adapting to contemporary challenges and applying innovative strategies for achieving sustainable economic development. As one of the leading economies in the world, Germany is constantly at the epicentre of regulatory changes aimed at stimulating economic growth and innovation.

Historically, the country has actively applied the principles of the social market economy, where significant attention is paid to ensuring fair competition conditions while maintaining citizens' social guarantees. Over recent decades, there has been a shift from traditional industry-specific regulatory models to more integrated and innovative strategies. One example is implementing the “Energiewende 2050” strategy, which anticipates a transition to exclusively renewable energy and reduced carbon emissions. This strategy affects many economic sectors, from industry to transportation and construction (Tews & Braun, 2021).

The introduction of innovative regulatory approaches in the German economy is accompanied by a thorough analysis and assessment of their impact. For example, the “Industrial Strategy 2025” envisages the creation of innovative Industry 4.0 networks to ensure sustainable industry growth and competitiveness on an international level. This strategy activates investments in research and development and stimulates the creation of new jobs in high-tech sectors (PwC, 2021).

Comparing traditional and innovative approaches to regulating the German economy, it can be noted that the latter demonstrate significantly greater effectiveness in ensuring sustainable and inclusive economic growth. Although traditional methods reflect the values of stability and social protection, they are often limited to sector-specific or industry-specific details. In contrast, innovative approaches promote greater interconnection and interaction between different spheres of the economy. Furthermore, traditional methods, which are based on protecting social rights and industry limitations, often fail to meet the demands of the modern world. On the other hand, innovative approaches facilitate flexibility, competitiveness, and sustainable economic development.

Another perspective involves strengthening support for innovative startups and small enterprises. It could include financial support, tax incentives, and facilitating market access. Such measures will promote the development of cutting-edge technologies and enhance the competitiveness of the German economy.

Therefore, Germany's experience in changing regulatory approaches is essential for other countries, especially transitioning and developing economies. Studying the German experience can help other countries identify optimal paths for reforming their regulatory policies,

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

particularly in innovation, sustainable development, and responding to global challenges. Moreover, further development of innovative regulatory approaches remains crucial for Germany, enabling the country to maintain its leadership in the global economy and ensure sustainable economic growth.

The distribution of regulatory sandboxes indicates that EMDE countries use these instruments to attract investment and high-tech startups and encourage domestic innovation activity. This contributes to the development of local markets, improves competitiveness, and even reduces the gap with developed countries in specific sectors.

Evaluating this information in the context of the global economy underscores the importance of a flexible regulatory framework that can adapt to rapid changes in the innovation landscape and support the development of the technology sector.

Discussion

The discussion on promoting innovation through deregulation versus the protection of the public interest is deeply reflected in the literature. Aghion et al. (2023) emphasise that deregulation fosters competition and drives innovation, particularly in technology-driven industries. However, this view is nuanced by Zhu et al. (2021), who argue that strict regulatory oversight is often necessary to ensure innovation does not compromise safety or environmental standards. For instance, Zarrouk et al. (2021) noted that regulatory sandboxes represent a middle ground where innovation is tested in controlled environments, minimising risks while fostering creativity.

Regarding the globalisation of regulatory standards, Bauer and Bohlin (2022) support that international standardisation can enhance market access and innovation scalability, particularly in sectors like 5G technology. Conversely, Ren and Ji (2021) highlight that localised regulatory approaches can better address specific regional challenges, such as environmental sustainability in the maritime economy. This dual perspective underscores the relevance of flexible, hybrid regulatory models integrating global and local needs.

The debate about prioritising innovation versus economic stability is echoed in research by Jiang et al. (2021), who advocate for a balanced approach combining strict mandates and voluntary governance to promote stable yet innovative economies. Similarly, Behera and Sethi (2022) highlight that regulatory frameworks should simultaneously stimulate green technological innovation while safeguarding economic stability. In contrast, Hsu et al. (2021) warn that excessive reliance on innovation without robust regulatory checks could lead to instability, such as financial crises or environmental degradation.

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

These findings collectively affirm this study's central argument: achieving a balance between innovation and regulatory stability requires adaptive mechanisms like regulatory sandboxes, which allow controlled experimentation without undermining systemic security.

CONCLUSION

The present paper focuses on the key aspects of innovative regulatory paradigms and their impact on the dynamics of global economic development. The main focus was analysing the differences between traditional and innovative approaches to regulation and the role of regulatory sandboxes in stimulating technological innovation.

Innovative regulatory paradigms differ from traditional ones mainly in their flexibility and adaptability and focus on facilitating innovation. This allows companies to adapt more effectively to rapid changes in the technological landscape and market conditions. As part of these paradigms, regulatory sandboxes create a safe environment for testing innovative products and business models while minimising regulatory risks and protecting consumers and other stakeholders.

The positive impact of regulatory sandboxes on the economy lies in their ability to accelerate innovation and improve market competitiveness, especially in developing countries. This creates opportunities for business growth, stimulates scientific and technological progress, and promotes job creation.

However, our research has revealed certain limitations, including limited data on innovative regulatory paradigms' long-term effects. Therefore, analysing the long-term impact of these paradigms on the structural transformation of economies and their resilience to economic shocks is an essential area for further studies. State the novelty of the study. Indicate the practical and social implications

Based on the analysis conducted, we recommend further study of the effectiveness of regulatory sandboxes and the development of comprehensive regulatory approaches that can promote innovative development without sacrificing the stability and security of the economic system. It is also essential to establish mechanisms to monitor and evaluate the impact of regulatory innovations on various sectors of the economy to ensure their social and environmental responsibility.

REFERENCES

Aghion, P., Bergeaud, A., & Van Reenen, J. (2023). The impact of regulation on innovation. *American Economic Review*, *113*(11), 2894–2936. https://doi.org/10.1257/aer.20210107

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Al-Qudah, A. A., Al-Okaily, M., & Alqudah, H. (2022). The relationship between social entrepreneurship and sustainable development from economic growth perspective: 15 'RCEP'countries. *Journal of Sustainable Finance & Investment*, *12*(1), 44–61. https://doi.org/10.1080/20430795.2021.1880219

Bauer, J. M., & Bohlin, E. (2022). Regulation and innovation in 5G markets. *Telecommunications Policy*, *46*(4), 102260. https://doi.org/10.1016/j.telpol.2021.102260

Behera, P., & Sethi, N. (2022). Nexus between environment regulation, FDI, and green technology innovation in OECD countries. *Environmental Science and Pollution Research*, *29*(35), 52940–52953. https://doi.org/10.1007/s11356-022-19458-7

Botelho, D. F., Dias, B. H., de Oliveira, L. W., Soares, T. A., Rezende, I., & Sousa, T. (2021). Innovative business models as drivers for prosumers integration-Enablers and barriers. *Renewable and Sustainable Energy Reviews*, *144*, 111057. https://doi.org/10.1016/j.rser.2021.111057

Cao, S., Nie, L., Sun, H., Sun, W., & Taghizadeh-Hesary, F. (2021). Digital finance, green technological innovation and energy-environmental performance: Evidence from China's regional economies. *Journal of Cleaner Production*, *327*, 129458. https://doi.org/10.1016/j.jclepro.2021.129458

Clean Energy Wire. (2024). *Energiewende in Germany*. https://www.cleanenergywire.org/factsheets/germanys-energy-consumption-and-power-mix-charts

Deutsche Bundesbank. (2024). *Financial Stability*. (pp. 15–20). https://www.bundesbank.de/en/tasks/financial-stability/financial-stability-766812

Federal Ministry of Education and Research (BMBF). (2024). *Germany's High-Tech Strategy.* https://www.bmbf.de/en/high-tech-strategy-2025-456.html

Fu, T., & Jian, Z. (2021). Corruption pays off: How environmental regulations promote corporate innovation in a developing country. *Ecological Economics*, *183*, 106969. https://doi.org/10.1016/j.ecolecon.2021.106969

German Accelerator. (2024). https://www.germanaccelerator.com/

Hao, X., Li, Y., Ren, S., Wu, H., & Hao, Y. (2023). The role of digitalisation on green economic growth: Does industrial structure optimisation and green innovation matter? *Journal of Environmental Management*, *325*, 116504. https://doi.org/10.1016/j.jenvman.2022.116504

Hsu, C. C., Quang-Thanh, N., Chien, F., Li, L., & Mohsin, M. (2021). Evaluating green innovation and performance of financial development: mediating concerns of environmental regulation. *Environmental Science and Pollution Research*, *28*(40), 57386–57397. https://doi.org/10.1007/s11356-021-14499-w

Jiang, Z., Wang, Z., & Lan, X. (2021). How environmental regulations affect corporate innovation? The coupling mechanism of mandatory rules and voluntary management. *Technology in Society*, *65*, 101575. https://doi.org/10.1016/j.techsoc.2021.101575

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Lee, C. C., Li, X., Yu, C. H., & Zhao, J. (2021). Does fintech innovation improve bank efficiency? Evidence from China's banking industry. *International Review of Economics & Finance*, *74*, 468–483. https://doi.org/10.1016/j.iref.2021.03.009

Lian, G., Xu, A., & Zhu, Y. (2022). Substantive green innovation or symbolic green innovation? The impact of ER on enterprise green innovation based on the dual moderating effects. *Journal of Innovation & Knowledge*, *7*(3), 100203. https://doi.org/10.1016/j.jik.2022.100203

Liu, Y., Wang, A., & Wu, Y. (2021). Environmental regulation and green innovation: Evidence from China's new environmental protection law. *Journal of Cleaner Production*, *297*, 126698. https://doi.org/10.1016/j.jclepro.2021.126698

National Geographic. (2023). *Germany's Solar Power Revolution.* https://www.nationalgeographic.com/environment/article/solar-power-revolution-germany-clean-energy-shift

Nemlioglu, I., & Mallick, S. (2021). Effective innovation via better management of firms: The role of leverage in times of crisis. *Research Policy*, *50*(7), 104259. https://doi.org/10.1016/j.respol.2021.104259

Pan, W., Xie, T., Wang, Z., & Ma, L. (2022). Digital economy: An innovation driver for total factor productivity. *Journal of Business Research*, *139*, 303–311. https://doi.org/10.1016/j.jbusres.2021.09.061

Peng, X. Y., Zou, X. Y., Zhao, X. X., & Chang, C. P. (2023). How does economic policy uncertainty affect green innovation? *Technological and Economic Development of Economy*, *29*(1), 114–140. https://doi.org/10.3846/tede.2022.17760

Popelo, O., Dubyna, M., & Kholiavko, N. (2021). World experience in the introduction of modern innovation and information technologies in the functioning of financial institutions. *Baltic Journal of Economic Studies*, *7*(2), 188–199. https://doi.org/10.30525/2256-0742/2021-7-2-188-199

PwC. (2021). *Industry 4.0: Building the digital enterprise*. (pp. 70–75). https://www.pwc.de/de/de/industrie-40/digital-enterprise.html

Ren, W., & Ji, J. (2021). How do environmental regulation and technological innovation affect the sustainable development of marine economy: New evidence from China's coastal provinces and cities. *Marine Policy*, *128*, 104468. https://doi.org/10.1016/j.marpol.2021.104468

Shang, L., Tan, D., Feng, S., & Zhou, W. (2022). Environmental regulation, import trade, and green technology innovation. *Environmental Science and Pollution Research*, *29*(9), 12864–12874. https://doi.org/10.1007/s11356-021-13490-9

Shen, F., Liu, B., Luo, F., Wu, C., Chen, H., & Wei, W. (2021). The effect of economic growth target constraints on green technology innovation. *Journal of environmental management*, *292*, 112765. https://doi.org/10.1016/j.jenvman.2021.112765

Statista. (2021). *Germany: Number of Startups*. (pp. 45–50). https://www.statista.com/statistics/756117/number-of-start-ups-germany/

ISSN: 2408-7920

African Journal of Applied Research
Vol. 11, No. 1 (2025), pp.456-471
http://www.ajaronline.com
https://doi.org/10.26437/ajar.v11i1.
Received: July 14, 2024
Peer reviewed: October 4, 2024
Revised: November 8, 2024
Published: January 2025

Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. *Business Strategy and the Environment*, *30*(8), 3686–3702. https://doi.org/10.1002/bse.2834

Tews, K., & Braun, T. (2021). Energy Transition in Germany: A Case Study on the Socio-Economic Dimension. *Energies, 13*(5), 1125, 30–35.

The World Bank (2020). Key Data from Regulatory Sandboxes across the Globe. https://www.worldbank.org/en/topic/fintech/brief/key-data-from-regulatory-sandboxes-across-the-globe

Tödtling, F., & Trippl, M. (2021). Regional innovation policies for new path development–beyond neo-liberal and traditional systemic views. In *Dislocation: Awkward Spatial Transitions.* (pp. 79–95). Routledge. https://doi.org/10.4324/9781003133551-6

Wang, M., Li, Y., Cheng, Z., Zhong, C., & Ma, W. (2021a). Evolution and equilibrium of a green technological innovation system: Simulation of a tripartite game model. *Journal of Cleaner Production*, *278*, 123944. https://doi.org/10.1016/j.jclepro.2020.123944

Wang, P., Dong, C., Chen, N., Qi, M., Yang, S., Nnenna, A. B., & Li, W. (2021b). Environmental regulation, government subsidies, and green technology innovation—a provincial panel data analysis from China. *International Journal of Environmental Research and Public Health*, *18*(22), 11991. https://doi.org/10.3390/ijerph182211991

Wen, J., Deng, P., Zhang, Q., & Chang, C. P. (2021). Is higher government efficiency bringing about higher innovation? *Technological and economic development of economy*, *27*(3), 626–655. https://doi.org/10.3846/tede.2021.14269

Zarrouk, H., El Ghak, T., & Bakhouche, A. (2021). Exploring economic and technological determinants of FinTech startups' success and growth in the United Arab Emirates. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 50. https://doi.org/10.3390/joitmc7010050

Zhao, L., Zhang, L., Sun, J., & He, P. (2022a). Can public participation constraints promote green technological innovation of Chinese enterprises? The moderating role of government environmental regulatory enforcement. *Technological Forecasting and Social Change*, *174*, 121198. https://doi.org/10.1016/j.techfore.2021.121198

Zhao, X., Nakonieczny, J., Jabeen, F., Shahzad, U., & Jia, W. (2022b). Does green innovation induce green total factor productivity? Novel findings from Chinese city level data. *Technological Forecasting and Social Change*, *185*, 122021. https://doi.org/10.1016/j.techfore.2022.122021

Zhong, Z., & Peng, B. (2022). Can environmental regulation promote green innovation in heavily polluting enterprises? Empirical evidence from a quasi-natural experiment in China. *Sustainable Production and Consumption*, *30*, 815–828. https://doi.org/10.1016/j.spc.2022.01.017

Zhu, X., Zuo, X., & Li, H. (2021). The dual effects of heterogeneous environmental regulation on the technological innovation of Chinese steel enterprises—Based on a high-dimensional fixed effects model. *Ecological Economics*, *188*, 107113. https://doi.org/10.1016/j.ecolecon.2021.107113

ISSN: 2408-7920