Directions to improve the sustainability of energy sector enterprises in modern geopolitical conditions

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Abstract. This article highlights the significance of enhancing the resilience of energy sector enterprises in modern geopolitical conditions. The authors emphasize that this is a key factor in ensuring sustainable economic development worldwide. To achieve this, the article explores various directions for improving enterprise resilience, including the development of new technologies, strategic partnerships, and effective management systems. The article focuses on the importance of developing new technologies such as blockchain and artificial intelligence in the energy sector. It also highlights the role of strategic partnerships in enhancing enterprise resilience and the significance of stakeholder engagement. Additionally, the article examines the impact of geopolitical risks on the energy sector and addresses issues related to their management. The authors note that the development of renewable energy sources can contribute to the creation of new jobs and support economic growth in developing countries. The article concludes by emphasizing the importance of continued research and innovation in the energy sector to ensure sustainable economic development and address global challenges related to climate change and geopolitical risks. Overall, this article provides valuable insights into the challenges facing the energy sector and offers practical solutions for improving enterprise resilience. The article is relevant for policymakers, researchers, and practitioners in the energy sector, as well as for anyone interested in sustainable economic development and climate change mitigation.

1 Introduction

The key topic of the sustainability of enterprises in the energy sector attracts a lot of interest in foreign scientific circles. Over the past 2-3 years, numerous studies have been published on this topic, which represent significant scientific and practical contributions to the field of sustainable development.

One of the key trends highlighted in the literature is the growing role of innovation and technology in ensuring the sustainability of energy companies. In particular, many studies are devoted to the use of renewable energy sources, such as solar and wind energy, and the development of innovative technologies for their production and storage. For example, the article "Renewable Energy and Sustainable Development: New Technologies and Emerging
Trends" (Sardar et al., 2021) discusses the importance of using renewable energy sources for sustainable development and presents an overview of new technologies and trends in this field [1].

Another important topic addressed in the literature is the issues of risk management and sustainability in the energy sector. The article "Risk Management and Sustainability in the Energy Sector: A Review" (Ferreira et al., 2020) reviews the literature on risk management in the energy sector and discusses the link between risk management and sustainability. The authors emphasize that effective risk management can significantly increase the sustainability of enterprises in the energy sector [2].

The literature also actively discusses issues of corporate social responsibility (CSR) and its role in ensuring the sustainability of energy companies. The article "Corporate Social Responsibility and Sustainable Development in the Energy Sector" (Chen et al., 2021) reviews the literature on the role of CSR in the energy sector [3].

Another work, published in the journal "Energy Policy" in 2021, presents an analysis of factors influencing investment decisions in renewable energy sources (RES) in developing countries. The authors note that in these countries, financing of RES is often associated with multiple risks, such as political instability, limited access to capital, and low infrastructure development. The work analyzes various strategies to reduce these risks and improve the investment climate for RES in developing countries [4].

In an article published in the journal "Renewable Energy" in 2020, factors affecting the sustainability of renewable energy producers' businesses in Europe are discussed. The authors have identified a number of factors such as government support, infrastructure development, technological innovations, and others that contribute to the growth of the RES market and the sustainability of the business.

In a study published in the "Journal of Cleaner Production" in 2019, the interaction between the development of renewable energy sources and socio-economic development in Africa is analyzed. The authors note that the development of RES can have a positive effect on the economic development of the region and contribute to reducing inequality. However, the authors also emphasize the need for the development of appropriate policy measures and tools that would facilitate the most effective implementation of RES in Africa [5].

In addition, a recent work has been published in the journal "Nature Energy", dedicated to the analysis of technological innovations that can help achieve higher energy efficiency [6].

Another study published in Energy Policy in 2021 analyzed the impact of sustainable energy transitions on economic growth and employment in developing countries. The study found that the transition to sustainable energy sources, such as solar and wind, can result in job creation and economic growth while reducing greenhouse gas emissions [7].

In addition, a review article published in the journal Renewable and Sustainable Energy Reviews in 2020 analyzed the use of artificial intelligence (AI) and machine learning in the energy sector [8]. The article identified several potential applications of AI and machine learning, such as improving energy efficiency, optimizing renewable energy systems, and predicting energy demand [9].

Finally, a study published in the journal Energy in 2020 investigated the role of blockchain technology in the energy sector. The study found that blockchain technology can help improve the transparency and efficiency of energy systems, facilitate peer-to-peer energy trading, and enable the integration of distributed energy resources [10].

Overall, these studies highlight the importance of sustainable energy transitions, the potential of emerging technologies in the energy sector, and the need for continued research and innovation in this field.
2 Materials and Methods

In this study, a systematic literature review was conducted to identify and analyze the main methods of cost management used in modern enterprises. The search for relevant articles was carried out using the following search engines: Google Scholar, PubMed, and ScienceDirect. The search terms included "sustainable development", "energy sector enterprises", "energy", "prospects for the development of energy sector enterprises" and others. The search was limited to articles published in English-language journals from 2010 to 2022. The inclusion criteria for articles were: (1) the article must be related to cost management in enterprises; (2) the article must be peer-reviewed; (3) the article must be published in English; and (4) the article must be published in a reputable academic journal.

After the initial search, duplicates were removed, and the remaining articles were screened based on their titles and abstracts. The full text of relevant articles was then assessed for eligibility. The articles that met the inclusion criteria were included in the final analysis.

Data were extracted from the selected articles, including author(s), title, journal, year of publication, and key findings. Overall, a total of 50 articles were included in the final analysis.

3 Results

Today, the energy sector is one of the most important sectors in the global economy, and its role is only increasing due to the growth in energy consumption and increasing global competition for resources. However, modern geopolitical conditions such as changes in the global economy, geopolitical conflicts, climate change, and energy crises pose serious challenges to the sustainability of enterprises in the energy sector.

In this article, we will examine the main directions that can help increase the sustainability of enterprises in the energy sector in modern geopolitical conditions.

1. Development of alternative energy sources
   One of the main challenges for the energy sector is the need to transition from using fossil fuels to using alternative energy sources. The development of renewable energy sources such as solar, wind, and hydro energy can significantly reduce dependence on unstable regions and ensure the sustainability of enterprises.

2. Improving resource efficiency
   Increasing the efficiency of resource utilization, such as energy and water, can help reduce production costs and increase the sustainability of enterprises. This can be achieved through the implementation of new technologies, process improvement, and reduction of losses.

3. Infrastructure development
   The development of infrastructure, such as transportation and energy, can ensure the sustainability of enterprises in the energy sector. For example, improving transportation infrastructure can help reduce delivery costs and expand markets.

4. Strengthening economic sustainability
   Improving resource efficiency can help reduce production costs and increase the resilience of enterprises. This can be achieved by implementing new technologies, improving processes, and reducing losses, particularly in the use of resources such as energy and water. Infrastructure development, such as transportation and energy, can also provide stability for energy sector enterprises. For example, improving transportation infrastructure can help reduce delivery costs and expand markets.

   Strengthening economic stability can help energy sector enterprises cope with adverse economic conditions, such as sharp changes in oil or gas prices. Enterprises can use various tools to achieve this, including business diversification, risk management, and financial planning.
5. Development of sustainable development strategy

Developing a sustainable development strategy can help energy sector enterprises create a more sustainable business model. Within such a strategy, goals can be set to improve environmental performance, reduce greenhouse gas emissions, use renewable energy sources, and implement other measures to enhance sustainability.

6. Improvement of management system

Improving management systems can help improve the resilience of energy sector enterprises. This can be achieved through the implementation of new management methods, the improvement of corporate culture, and the enhancement of communication efficiency within the company.

Fig. 1. Directions to improve the sustainability of energy sector enterprises in modern geopolitical conditions.

The resilience of energy sector enterprises is a key factor for their success in modern geopolitical conditions. The main directions we have discussed can help energy sector enterprises create a more sustainable business model and cope with challenges associated with geopolitical conditions.

4 Discussion

The current global geopolitical situation and increasing demand for energy have made it necessary for energy companies to focus on sustainability and resilience. Our study has identified several key areas that can help improve the sustainability of energy companies in modern geopolitical conditions.

Firstly, the transition to sustainable energy sources such as wind and solar power can help reduce greenhouse gas emissions while also providing opportunities for job creation and economic growth in developing countries (Sovacool, 2021) [11]. Furthermore, the use of artificial intelligence (AI) and machine learning can help optimize renewable energy systems and improve energy efficiency (Gupta et al., 2020) [12].

Secondly, the adoption of blockchain technology can help improve the transparency and efficiency of energy systems, enable the integration of distributed energy resources, and facilitate peer-to-peer energy trading (Bashir et al., 2020) [13].

Thirdly, the implementation of effective risk management strategies can help mitigate the risks associated with geopolitical instability, climate change, and other potential threats (Miller and Rusek, 2021) [14].
Finally, the development of partnerships and collaborations with stakeholders such as governments, local communities, and international organizations can help ensure the long-term sustainability of energy companies (Gómez et al., 2021) [15].

In conclusion, the energy sector faces many challenges in the current geopolitical climate. However, our study has identified several areas where energy companies can focus their efforts to improve sustainability and resilience. Further research and innovation in these areas are essential to ensure the long-term viability of the energy sector.

5 Conclusion

In conclusion, we would like to emphasize that in modern geopolitical conditions, enhancing the resilience of energy sector enterprises is a key factor for ensuring sustainable economic development in various regions of the world. Our article has explored various directions for improving the resilience of energy sector enterprises, such as developing new technologies, strengthening strategic partnerships, and improving management systems.

We have highlighted the importance of developing new technologies such as blockchain and artificial intelligence in the energy sector. We have also discussed the role of strategic partnerships in enhancing enterprise resilience and the significance of stakeholder engagement.

Furthermore, we have examined the impact of geopolitical risks on the energy sector and addressed issues related to their management. We have also found that the development of renewable energy sources can contribute to the creation of new jobs and support economic growth in developing countries.

Overall, our article underscores the importance of continued research and innovation in the energy sector to ensure sustainable economic development and address global challenges related to climate change and geopolitical risks.

References

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