European Journal of Business, Economics & Management

Vol. 1 No.1 2025

Article **Open Access**

Exploring Mongolia's Rare Earth Elements and Their Impact on Geopolitical Dynamics

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Received: 01 April 2025
Revised: 08 April 2025
Accepted: 14 April 2025
Published: 21 April 2025

Abstract: Mongolia's vast reserves of rare earth elements (REEs), including lithium and neodymium, position the country as a key actor in global geopolitics amid growing demand for sustainable technologies such as electric vehicles and wind turbines. This study explores how Mongolia's strategic geographic location — situated between China and Russia — together with its substantial REE resources, shapes its complex geopolitical relationships. China's control of over 90% of global REE production creates significant dependency risks for Mongolia, potentially limiting its autonomy. Conversely, Western nations such as the United States and the European Union view Mongolia as a vital alternative to reduce reliance on China. Russia plays a stabilizing role, reinforcing Mongolia's status as a geopolitical buffer. Drawing on classical geopolitical theories like Mackinder2019s Heartland theory and modern geo-economic frameworks, this analysis examines how Mongolia navigates competing influences. Although technological advancements enhance its strategic potential, challenges remain, including limited infrastructure and sovereignty concerns. By analyzing Mongolia's REE assets and international alignments, this study highlights both the opportunities and vulnerabilities facing the country in a resource-driven global order.

Keywords: rare earth elements; geopolitics; Mongolia; strategic location; China; Russia

1. Introduction

Rare earth elements (REEs), including vital minerals such as lithium, neodymium, and cerium, are indispensable to modern technologies like electric vehicles (EVs), wind turbines, and advanced electronics. Their critical role has triggered a global surge in demand, reshaping geopolitical landscapes. Mongolia, a landlocked nation strategically situated between the economic powerhouse of China and historically influential Russia, possesses substantial REE reserves, positioning it as a potential key player in this evolving arena. With rich deposits such as Lugiin Gol in Ömnögovi Province estimated to contain millions of tons of these crucial minerals, Mongolia stands at a pivotal juncture of opportunity and challenge. This research investigates how Mongolia's unique geographic location and REE wealth influence its geopolitical relationships, offering the potential to contribute to shifts in global power structures while simultaneously facing significant obstacles that may hinder its autonomy and international leverage.

China maintains a dominant position in the REE market, supplying over 90% of global demand — a concentration that has raised concerns among Western nations about the security and stability of their supply chains, particularly as industries pivot toward sustainable innovation [1]. Mongolia’s REE reserves offer a potential alternative source, potentially easing this heavy reliance and enhancing the country's strategic relevance on

the global stage [2]. However, its geographic location — between China, the leading REE supplier, and Russia, a regional actor with deep historical ties — adds complexity to its geopolitical role. China aims to integrate Mongolia's resources into its broader supply network by leveraging geographic proximity and existing infrastructure to strengthen its supply chain advantage [3]. Conversely, the United States and the European Union view Mongolia as a diversification partner, in line with broader resource security strategies that support emerging technologies [2]. Russia continues to exert a stabilizing influence, drawing upon historical connections to balance regional dynamics [4]. This study applies a dual analytical lens: classical geopolitical frameworks such as Mackinder's Heartland theory, which emphasizes control over central Eurasia, and contemporary geo-economic perspectives. It aims to analyze Mongolia's emerging role in the context of rising technological demand, evaluating its capacity to shape global supply chains while identifying inherent risks such as overdependence and infrastructural shortcomings.

2. Mongolia's Rare Earth Elements and Strategic Position

Mongolia's substantial rare earth element (REE) reserves, including essential minerals such as lithium, neodymium, and cerium, underscore its potential role in the global resource market. Notable deposits like Lugiin Gol in Ömnögovi Province are estimated to contain millions of tons of these minerals. Other promising sites, including Mushgai Khudag and Khotgor, contribute further to Mongolia's REE potential by offering a mix of light and heavy elements critical for sustainable technologies such as EV batteries, wind turbine magnets, and advanced telecommunications equipment. These resources align with the surging global demand driven by the transition to renewable energy and technological innovation, positioning Mongolia as a potential supplier amid increasing global resource scarcity [5]. However, Mongolia's strategic geography — situated between China, the global REE leader, and Russia, a regional power — amplifies both its opportunities and the complex geopolitical dynamics it must navigate.

China's dominance, supplying over 90% of the world's REEs, offers Mongolia certain economic advantages due to proximity [1]. Infrastructure projects like the China-Mongolia-Russia Economic Corridor, under China's Belt and Road Initiative, facilitate the export of mineral resources and support an economy where mining accounts for over 30% of GDP [3]. However, this connectivity also introduces risks of economic dependency. China's regulatory control over its REE exports — evident in past trade tensions with Japan — could bind Mongolia within a highly controlled supply chain, limiting its negotiation power [6]. On the other hand, Russia, sharing a 3485-kilometer border with Mongolia, views it as a strategic buffer against both Chinese economic influence and expanding Western interests, maintaining sway through energy partnerships like the proposed Power of Siberia 2 pipeline [4]. Mongolia's landlocked nature further intensifies these vulnerabilities, as it relies heavily on neighboring transit routes. This situation is reminiscent of Europe's reliance on Chinese REEs, where disruptions have threatened progress toward clean energy goals [7].

Nonetheless, Mongolia's location presents a form of strategic leverage in the global REE arena. Western nations, particularly the United States and the European Union, are increasingly seeking to diversify their supply chains to reduce reliance on China, identifying Mongolia as a critical partner in the competition for resources that power technologies like 5G networks and green energy systems [2]. While the U.S. still imports a large share of its REEs from China, and the EU depends on them to achieve climate targets, both view Mongolia as a viable alternative amid shifting geopolitical dynamics [8]. Mongolia's "Third Neighbor" policy supports this positioning by strengthening ties with countries such as the U.S., Japan, South Korea, and EU member states, increasing its visibility and value as a strategic alternative [8]. This aligns with broader global efforts to secure diversified and stable REE supplies [1].

Classical geopolitical theories provide a useful lens for analyzing Mongolia's strategic role. According to Mackinder's Heartland theory, control over central Eurasia affords significant global influence — a concept that applies to Mongolia's position in today's resource-driven landscape [4]. Its REE deposits represent modern strategic assets, offering economic and technological value rather than traditional military strength. The Lugiin Gol site, rich in heavy REEs, exemplifies this potential, providing materials essential for high-performance innovation [5]. Yet, leveraging this position comes with challenges. Mongolia lacks domestic REE processing capabilities and depends on foreign logistics infrastructure, which limits its independence [6]. Diplomatically, Mongolia must carefully balance China's economic pull, Russia's strategic presence, and Western engagement. Transforming its REE wealth into a geopolitical asset will require coordinated investment, infrastructure development, and adept diplomacy to avoid becoming overly reliant on any single power.

3. Geopolitical Relations Based on Rare Earth Elements

Mongolia's vast rare earth element (REE) reserves — encompassing lithium, neodymium, and cerium — fundamentally shape its geopolitical relations with China, Western nations (notably the United States and the European Union), and Russia, showcasing a delicate interplay of economic dependency and strategic opportunity. These relations are driven by the global demand for REEs, essential for technologies such as electric vehicles (EVs), wind turbines, and advanced electronics, positioning Mongolia as a significant player in a resource-driven geopolitical landscape. These dynamics reveal both the potential for Mongolia to exert influence and the risks of being absorbed by more dominant entities, necessitating careful navigation to safeguard national autonomy.

China's dominance in the REE market — controlling over 90% of global production — establishes it as Mongolia's primary economic partner [1]. Leveraging its geographic adjacency — sharing a 4,710-kilometer border — and robust infrastructure like the Belt and Road Initiative (BRI), China integrates Mongolia's REEs into its tightly managed technological supply chain. This integration, reinforced by mechanisms such as export quotas and price controls, fortifies China's supply chain resilience, demonstrated by its ability to withstand global disruptions while maintaining market supremacy [3]. For Mongolia, this partnership yields substantial economic benefits — mining contributes over 30% to its GDP — but risks relegating the country to a subordinate supplier. This recalls Japan's vulnerability to Chinese REE export restrictions during past trade tensions [6]. The threat to Mongolia's autonomy parallels Europe's predicament, where reliance on Chinese REEs exposes renewable industries to supply shocks, threatening energy transition targets [7]. Mongolia must navigate the challenge of leveraging Chinese demand without relinquishing control over its strategic resources.

Western nations, particularly the U.S. and EU, view Mongolia's REE reserves as a critical means of reducing dependence on China's monopoly — a concern heightened by rising geopolitical rivalries. The U.S., importing over 80% of its REEs from China, faces significant supply chain vulnerabilities across defense and high-tech sectors. Likewise, the EU sources about 40% of key materials for renewable technologies from China [2]. This competitive resource landscape has catalyzed Western engagement with Mongolia, aligning with global efforts to build alternative and resilient supply chains. Mongolia's "Third Neighbor" policy, a strategic initiative to develop ties beyond its two immediate neighbors, facilitates partnerships with the U.S., EU, Japan, and South Korea, bolstering its role as a counterweight to Chinese dominance. Initiatives such as U.S.-backed financing for Mongolian mining ventures and EU efforts under the Critical Raw Materials Act indicate increasing interest in tapping Mongolia's resource potential to enhance Western technological security [5]. However, Mongolia's landlocked geography poses a major logistical barrier. With exports dependent on Chinese or Russian transit routes, direct access to Western markets is constrained, limiting the practical leverage such partnerships can offer [5].

This infrastructure dependency highlights the challenges in converting Western interest into concrete strategic advantage.

Russia, although less focused on REEs compared to its energy priorities, plays a stabilizing role in Mongolia's geopolitical calculus, viewing it as a buffer against both Chinese economic expansion and Western influence. Sharing a 3485-kilometer border, Russia maintains its presence through historical ties dating back to the Soviet era and ongoing energy cooperation, including the proposed Power of Siberia 2 gas pipeline that may run through Mongolia to link Russian energy with Chinese markets [4]. This role reinforces Mongolia's position as a geopolitical pivot, allowing it to harness its REE potential amid technological rivalries without facing direct competition from Russia. Classical geopolitical theories, such as Mackinder's Heartland theory, provide a framework for understanding Mongolia's strategic role — suggesting that control over the central Eurasian landmass, now enriched with REE assets, offers significant geopolitical leverage [4]. Contemporary geo-economic perspectives build on this, emphasizing how demand for high-tech materials reconfigures power in a globalized economy, placing Mongolia at a critical node in the REE supply chain [8].

Despite its growing prominence, Mongolia faces formidable obstacles in independently capitalizing on the technological value of its REEs. Deficiencies in infrastructure, including the absence of domestic processing capabilities and reliance on Chinese or Russian transit corridors, hinder its ability to produce value-added REE products for global markets [6]. Without massive investment — estimated in the billions — and the adoption of advanced technologies, Mongolia risks remaining a mere supplier of unprocessed materials rather than evolving into a strategic actor on the global stage [5]. This reflects broader trends in the REE industry, where control over the supply chain often proves more decisive than resource possession itself [1]. Mongolia's success in balancing China's economic pull, Western strategic outreach, and Russia's stabilizing influence will ultimately determine whether its REE wealth becomes a tool for geopolitical empowerment or a source of enduring dependency.

4. Conclusion and Future Trends

Mongolia's extensive reserves of rare earth elements (REEs), including lithium and neodymium, present a unique opportunity to redefine its role in global geopolitics. In a world increasingly driven by sustainable technologies, these critical resources enable Mongolia to position itself as a strategic player in the international supply chain. Situated between China and Russia, Mongolia could leverage its geographic location to challenge China's overwhelming dominance in the REE market, offering Western powers — particularly the United States and the European Union — an essential alternative to diversify their sources. Meanwhile, Russia's role as a regional stabilizer reinforces a delicate but potentially advantageous triangular relationship, enhancing Mongolia's geopolitical relevance. Economically, REEs offer strong growth prospects, building upon an extractive industry that already constitutes a major share of the country's GDP, and potentially attracting foreign investment aligned with global technological priorities.

However, this strategic potential is accompanied by formidable challenges. Mongolia's reliance on Chinese infrastructure for both processing and transit creates a significant dependency, limiting its capacity to act as an autonomous actor in the REE supply chain. The lack of domestic refining and value-added capabilities further constrains its ability to move up the value chain, potentially relegating Mongolia to the role of a raw material supplier. This reflects broader global challenges, where resource possession alone does not translate into supply chain control or strategic influence. Looking ahead, the evolving REE landscape demands adaptability. Emerging trends — such as the development of recycling technologies and the pursuit of alternative materials — may eventually reduce global reliance on primary REE sources. To maintain its relevance, Mongolia must diversify its economy beyond raw mineral exports and invest in downstream sectors, such as

REE processing and the manufacturing of green technologies. Although growing competition among major powers over critical resources offers Mongolia a narrow strategic window, decisive and forward-looking policies are essential. With sustained investment and effective governance, Mongolia can shift from a peripheral resource provider to a key geopolitical influencer in a future shaped by resource security and technological innovation.

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