The Role of Geography in Economic Development: Insights from Historical and Modern Perspectives

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Posted Date: 1 October 2024

doi: 10.20944/preprints202410.0006.v1

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 doi:10.20944/preprints202410.0006.v1

Article

The Role of Geography in Economic Development: Insights from Historical and Modern Perspectives

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Abstract: Geography has been a fundamental determinant of economic development throughout history, influencing resource distribution, trade routes, climate conditions, and the spatial organization of economic activity. This essay delves into the multifaceted role of geography in shaping economic outcomes, drawing upon historical analyses and contemporary economic theories. By examining the historical origins of economic growth, the impact of geographical barriers and advantages, the influence of climate and natural resources, and the spatial distribution of industries, we explore how geographical factors contribute to international inequality and the divergent development trajectories of nations and regions. The discussion incorporates insights from seminal works, including Koyama and Rubin's "How the World Became Rich," Davis and Weinstein's analysis of the geography of economic activity, and Redding and Venables' exploration of economic geography and international inequality, among others. We also consider the roles of institutions, governance, and technology as mediating factors that can amplify or mitigate the influence of geography on economic development. By highlighting the interplay between geography and these mediating factors, the essay underscores the importance of tailored policy interventions that consider geographical realities. Understanding this complex relationship is essential for addressing global and regional disparities and formulating effective development strategies that leverage geographical advantages while mitigating disadvantages.

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Section 1. Introduction

Geography has long been acknowledged as a fundamental determinant of economic development. The spatial characteristics of a region—including its climate, natural resources, topography, and proximity to trade routes—profoundly influence its economic potential and trajectory. The interplay between geographical factors and economic outcomes is complex, involving historical contingencies, technological advancements, and institutional frameworks. Understanding those relations is crucial for explaining the persistent economic disparities observed across different regions and for formulating policies aimed at fostering inclusive growth.

In their comprehensive analysis, Koyama and Rubin (2022) explore the historical origins of economic growth, emphasizing how geographical advantages facilitated the rise of prosperous societies. They argue that regions endowed with *favorable geographical features, such as fertile land and access to navigable waterways, were more likely to develop complex economies capable of sustaining long-term growth*. This perspective resonates with earlier historical analyses, notably Jared Diamond's "Guns, Germs, and Steel," which posits that environmental factors significantly influenced the divergent development paths of human societies. Diamond suggests that the availability of domesticable plants and animals, along with the orientation of continental axes, played a pivotal role in shaping the diffusion of agriculture, technology, and ultimately economic prosperity.

The significance of geography extends beyond resource endowments to include the spatial distribution of economic activity. Davis and Weinstein (2002) investigate how geography affects economic resilience in the face of shocks, using the example of Japanese cities during World War II.

 doi:10.20944/preprints202410.0006.v1

Despite the devastating bombings, cities with strategic geographical positions rebounded more effectively, suggesting that inherent geographical advantages contribute to economic recovery and sustainability. Their findings underscore the enduring impact of geography on economic structures, even amidst significant disruptions.

Redding and Venables (2004) further explore the role of economic geography in international inequality, emphasizing *how geographical isolation can impede trade and limit economic opportunities.* Their research demonstrates that countries distant from major markets face higher transportation costs, which can hinder their integration into the global economy. This isolation exacerbates income disparities between nations, highlighting the importance of geographical positioning in economic development. The concept of "market access" becomes critical, as proximity to large markets enhances the potential for trade, investment, and even knowledge spillovers.

The theoretical underpinnings of economic geography have been extensively developed in the field of spatial economics. Paul Krugman's work on the "new economic geography" introduces models that explain the concentration of economic activity in certain regions due to increasing returns to scale and transportation costs. Krugman argues that firms and workers are drawn to regions with existing economic activity, leading to agglomeration effects that reinforce regional disparities. These models provide a framework for understanding how geography can lead to persistent economic inequalities, as *initial advantages become self-reinforcing over time*.

Section 1.1 Climate

Climate is another geographical factor influencing economic development. Jeffrey Sachs (2001) discusses how tropical climates present challenges such as disease burdens and agricultural limitations, which can impede economic progress. Tropical regions often grapple with vector-borne diseases like malaria and have soils less suitable for staple crops that drove agricultural surpluses in temperate regions. Sachs suggests that geographical disadvantages related to climate require targeted interventions, such as investments in health and agricultural technologies, to overcome structural barriers to development.

The historical impact of geography is also evident in the colonial experiences of different regions. Acemoglu, Johnson, and Robinson (2001) argue *that the institutions established during colonial times were influenced by geographical factors, which in turn affected long-term economic development*. In regions where Europeans faced high mortality rates due to unfavorable geography, they established extractive institutions rather than inclusive ones, leading to persistent economic challenges. This institutional perspective highlights how geography can indirectly shape economic outcomes through its influence on governance structures.

Technological advancements have the potential to mitigate some geographical constraints. The Industrial Revolution and subsequent technological innovations reduced transportation costs and facilitated the movement of goods and people. As Koyama and Rubin (2022) note, the expansion of railways and steamships in the 19th century diminished the impact of distance, enabling regions previously hindered by geography to participate in industrialization. However, the extent to which technology can offset geographical disadvantages is often mediated by institutional factors and the ability of societies to adopt and adapt new technologies.

Section 1.2 Institutions

Institutions play a crucial role in harnessing geographical advantages for economic development. *Even in regions with favorable geography, poor institutional frameworks can hinder development*. North (1990) emphasizes that institutions—defined as "the humanly devised constraints that shape human interaction"—are essential for economic performance. Effective institutions facilitate market transactions, protect property rights, and promote investment and innovation. Conversely, weak institutions can exacerbate the challenges posed by unfavorable geography, leading to a cycle of underdevelopment.

Section 1.3 Recent Globalization

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The globalization of trade has altered the significance of geographical proximity, with digital technologies enabling new forms of economic activity that are less dependent on physical location. Yet, as Rodríguez-Pose (2018) argues, "the revenge of the places that don't matter" highlights how geographical disparities persist, with lagging regions often unable to capitalize on global economic trends. *The digital divide, infrastructural limitations, and human capital deficits can prevent geographically disadvantaged areas from benefiting from globalization, reinforcing existing inequalities*.

Contemporary research continues to explore the nuances of geography's impact on economic development. For instance, Gallup, Sachs, and Mellinger (1999) examine how geographical factors like access to the sea and prevalence of tropical diseases influence economic growth. They find that coastal regions and those in temperate climates tend to have higher economic growth rates, supporting the notion that geography remains a significant determinant of economic outcomes in the modern era.

Moreover, the concept of "geographical clustering" has gained attention in explaining regional economic development. Porter (1998) introduces the idea of clusters—geographic concentrations of interconnected companies and institutions in a particular field—which drive productivity and innovation. *Silicon Valley is a quintessential example of how geographical clustering fosters an environment conducive to economic dynamism*. These clusters benefit from localized knowledge spillovers, specialized labor markets, and supplier networks, illustrating how geography can enhance competitive advantage.

Environmental challenges linked to geography are increasingly relevant in discussions on sustainable development. Climate change disproportionately affects certain geographical regions, exacerbating economic vulnerabilities. Coastal areas face rising sea levels, while arid regions confront desertification. These environmental shifts can undermine agricultural productivity, displace populations, and strain resources, necessitating adaptive strategies that consider geographical realities.

In summary, geography remains a fundamental factor in economic development, influencing resource distribution, trade potential, and the spatial organization of economic activity. Historical and modern analyses demonstrate that while technology and institutions can modify the impact of geography, they do not eliminate its significance. The persistent economic disparities observed across the globe underscore the need to consider geographical factors in development policies. By understanding the role of geography, policymakers can design interventions that leverage geographical advantages and mitigate disadvantages, promoting more equitable and sustainable economic growth.

Section 2. Discussion

Indeed, Geography plays a multifaceted role in economic development, influencing everything from resource availability to trade opportunities and the spatial distribution of industries. The relationship between geography and economic outcomes is complex and mediated by a variety of factors, including technology, institutions, and historical contingencies. This discussion delves deeper into how geographical factors contribute to economic development, drawing on a wide range of literature to elucidate the mechanisms at play.

Section 2.1 Natural Resources and Environmental Endowments

One of the most direct ways geography impacts economic development is through the distribution of natural resources. Regions rich in minerals, oil, fertile land, and favorable climatic conditions often have a head start in economic development. Sachs and Warner (2001) discuss the "resource curse," where countries abundant in natural resources sometimes experience slower economic growth due to factors like rent-seeking behavior and neglect of other economic sectors. However, this is not a universal outcome; countries like Norway have successfully leveraged their natural resources to achieve high levels of development through sound management and strong institutions.

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Diamond (1997) highlights how the availability of domesticable plants and animals allowed certain societies to develop agriculture early, leading to food surpluses, population growth, and complex societal structures. These early advantages set the stage for technological innovations and the accumulation of knowledge, contributing to long-term economic development.

Section 2.2 Geographical Barriers and Transportation Costs

Geography can impose significant barriers to economic activity through physical obstacles like mountains, deserts, and lack of access to navigable waterways. Limão and Venables (2001) find that poor infrastructure and geographical isolation significantly increase transportation costs, which can hinder trade and economic integration. Landlocked countries, for instance, often face higher costs in accessing global markets compared to their coastal counterparts. Faye et al. (2004) discuss the unique challenges faced by landlocked developing countries, emphasizing the need for regional cooperation to improve trade logistics.

The development of transportation technologies has historically mitigated some of these geographical constraints. The advent of the steam engine, railways, and more recently, air transport and container shipping, has reduced the friction of distance. As Koyama and Rubin (2022) note, technological advancements in transportation have been crucial in integrating remote regions into the global economy. Yet, the uneven distribution of infrastructure investment means that not all regions benefit equally from these technologies.

Section 2.3 Climate and Disease Burden

Climate plays a significant role in economic development through its impact on agriculture, health, and labor productivity. Tropical climates are often associated with a higher burden of infectious diseases, such as malaria and dengue fever, which can reduce labor productivity and increase healthcare costs. Sachs (2003) argues that disease burdens in tropical regions have a substantial negative effect on economic growth. Efforts to control and eliminate these diseases can thus have a significant positive impact on economic development.

In addition, climate affects agricultural productivity. Temperate regions have historically been more conducive to staple crop cultivation, supporting higher population densities and freeing up labor for industrial activities. Bloom and Sachs (1998) discuss how climatic conditions influence agricultural cycles and labor availability, which in turn affect economic growth patterns.

Section 2.4 Spatial Distribution of Economic Activity and Agglomeration Effects

The spatial concentration of industries and populations in certain geographical areas leads to agglomeration economies, which can enhance productivity and innovation. Krugman (1991) introduces the concept of "new economic geography," explaining how increasing returns to scale and transportation costs can lead to the clustering of economic activities. Firms benefit from proximity to suppliers, customers, and a skilled labor pool, creating a self-reinforcing cycle of economic concentration.

Porter's (1998) work on clusters emphasizes how geographical proximity facilitates knowledge spillovers, collaboration, and competition, all of which drive innovation and economic growth. Silicon Valley is the most evident example as a prime of how geographical clustering can lead to technological advancements and substantial economic development, but São Paulo, in Brazil, in a lesser scale, also is an example.

However, not all regions can develop such clusters due to initial geographical disadvantages or lack of critical mass. Rodríguez-Pose and Crescenzi (2008) highlight the role of regional innovation systems and how peripheral regions can struggle to catch up with core areas. Policies aimed at developing infrastructure, education, and innovation capacity are essential for these regions to overcome geographical constraints.

Section 2.5 Institutions and Governance

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While geography sets the stage for economic development, institutions determine how geographical advantages or disadvantages are managed. Acemoglu, Johnson, and Robinson (2001) argue that institutional quality is a more significant determinant of economic development than geography itself. They suggest that inclusive institutions that promote property rights, rule of law, and open markets enable societies to capitalize on their geographical endowments.

Engerman and Sokoloff (1997) examine how differences in colonial institutions, influenced by geographical factors like climate and resource availability, led to divergent development paths in the Americas. Regions suitable for plantation agriculture with abundant labor (often through slavery) developed extractive institutions, while regions with smaller-scale farming encouraged more egalitarian institutions. These institutional differences have had long-lasting impacts on economic development.

Moreover, geography can influence institutional development. Herbst (2000) discusses how the challenging geography of Africa, characterized by vast territories with low population densities and difficult terrains, affected state formation and governance structures. The inability to project power over large distances hindered the development of strong centralized institutions, impacting economic development. The same, with some differences can be seen in Brazil.

Section 2.6 Trade and Market Access

Geographical proximity to major markets significantly affects a country's trade potential and economic growth. Redding and Venables (2004) emphasize that access to markets and sources of supply is crucial for export performance and income levels. Countries located near large, wealthy markets benefit from lower transportation costs and greater opportunities for trade.

Frankel and Romer (1999) investigate the relationship between trade and income, finding that geography-induced trade has a positive effect on income levels. Their analysis suggests that policies promoting trade openness can partially offset geographical disadvantages by integrating countries into the global economy.

Additionally, globalization and advances in communication technologies have altered the traditional constraints of geography. Baldwin (2016) introduces the concept of "the great convergence," where developing countries can participate in global value chains despite geographical distances. Digital technologies enable remote collaboration and access to international markets, although disparities in digital infrastructure can still pose challenges.

Section 2.7 Urbanization and Economic Development

Urbanization is closely linked to economic development, with cities acting as engines of growth. Glaeser (2011) discusses how urban areas facilitate innovation, entrepreneurship, and economic dynamism through dense networks of interactions. Geography influences urbanization patterns by determining the locations where cities emerge and grow.

However, rapid urbanization in developing countries can strain infrastructure and lead to urban slums and marginalization if not managed properly. Henderson (2002) examines the relationship between urbanization and economic development, highlighting the need for policies that support sustainable urban growth. Geography plays a role in determining the capacity of cities to expand, with natural barriers like mountains or bodies of water influencing urban planning.

Section 2.8 Geographical Inequalities and Regional Development

Within countries, geographical disparities often exist between regions, such as between urban and rural areas or coastal and inland regions. These disparities can lead to unequal economic opportunities and social outcomes. Kanbur and Venables (2005) discuss spatial inequalities and how they can impede overall economic development. Addressing regional disparities requires targeted policies that consider the unique geographical challenges and potentials of different areas.

China's economic development provides a pertinent example. The coastal regions have experienced rapid growth due to their access to international trade and investment, while inland

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regions lag behind. Fan, Kanbur, and Zhang (2011) analyze the regional disparities in China and the government's efforts to promote balanced development through initiatives like the "Go West" strategy.

Section 2.9 Environmental Challenges and Sustainability

Geographical factors also encompass environmental challenges that can impact long-term economic sustainability. *Climate change poses significant risks*, especially for geographically vulnerable regions like small island developing states and arid regions prone to desertification. Dell, Jones, and Olken (2012) study the impact of climate change on economic growth, finding that higher temperatures can negatively affect economic output, particularly in poorer countries. See Montgomery(2024) for a realistic simulation.

Water scarcity, soil degradation, and natural disasters are geographical factors that can undermine economic development. Investing in climate resilience and sustainable resource management is crucial for mitigating these risks. The United Nations' Sustainable Development Goals (SDGs) emphasize the importance of addressing geographical and environmental challenges to achieve sustainable economic development.[2]

Section 2.10 Technological Diffusion and Geography

The diffusion of technology is often uneven across different geographical regions, affecting economic development. Comin and Mestieri (2013) explore how geographical barriers can slow down the spread of technology, leading to income disparities. Regions with better connectivity and access to information tend to adopt new technologies more rapidly, enhancing productivity and growth. Mobile technology has shown promise in bridging some geographical gaps. Aker and Mbiti (2010) discuss how mobile phones have improved market efficiency and access to information in sub-Saharan Africa, benefiting rural populations. However, the digital divide remains a significant issue, with remote areas often lacking the infrastructure needed to take advantage of technological advancements.

Section 2.11 Policy Implications

Understanding the role of geography in economic development has important policy implications. Policymakers need to design strategies that account for geographical advantages and constraints. For instance, investments in infrastructure can reduce transportation costs and improve market access for isolated regions. In Ethiopia, the construction of the Addis Ababa–Djibouti Railway has enhanced trade opportunities for the landlocked country.

Education and health interventions also can help overcome some of the challenges posed by unfavorable climates and disease burdens. The eradication of diseases like malaria can have substantial economic benefits, as seen in countries that have successfully implemented public health campaigns.

Regional integration efforts, such as the African Continental Free Trade Area (AfCFTA), aim to reduce trade barriers and enhance economic cooperation among geographically proximate countries. Such initiatives can mitigate the disadvantages faced by landlocked or isolated countries by expanding their market access.

Section 2.12 Cultural and Social Factors

Geography also influences cultural and social factors that can impact economic development. The geographical isolation of certain communities can lead to the preservation of traditional practices that may or may not be conducive to economic modernization. Tabellini (2010) examines how historical institutions and cultural norms, influenced by geography, affect economic development in European regions.

Social capital and networks are often geographically bounded, affecting the diffusion of ideas and innovations. Granovetter (1973) discusses the "strength of weak ties," highlighting how broader

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networks facilitate access to new information and opportunities. Geographical proximity enhances the formation of such networks, influencing economic outcomes.

Section 2.12.1 Historical Contingencies and Path Dependence

Historical events, shaped by geographical factors, can set regions on particular development paths. The concept of path dependence suggests that initial conditions and historical accidents can have long-lasting effects on economic trajectories. David (1985) explores how technological adoption can be influenced by historical choices, which are often geographically situated.

The Industrial Revolution, which began in Britain, was facilitated by geographical factors such as abundant coal reserves and navigable rivers. Allen (2009) argues that Britain's unique combination of high wages and cheap energy, influenced by geography, drove technological innovation. This set in motion a divergence in economic development between industrializing nations and others.

Section 2.13 Globalization and Changing Geographical Dynamics

Globalization has altered the significance of geography in some respects, but it has also introduced new geographical considerations. The rise of global value chains means that production processes are fragmented across different regions, often based on comparative advantages influenced by geography. Gereffi and Lee (2012) discuss how global value chains impact development strategies, with countries specializing in particular stages of production.

Nevertheless, global supply chains can be vulnerable to geographical disruptions, such as natural disasters or geopolitical tensions. The COVID-19 pandemic highlighted the fragility of global logistics, prompting discussions on reshoring and diversification of supply chains. Baldwin and Tomiura (2020) examine how the pandemic may reshape global production networks, with geography playing a role in decisions about supply chain resilience. For example, many technological industries migrated to India or returned home when China had several delays due to its particular severe restrictions.

Section 3. Conclusion

Geography's profound influence on economic development is a multifaceted and enduring reality that continues to shape the fortunes of nations and regions across the globe. From the distribution of natural resources to the spatial patterns of trade and industry, geographical factors are deeply intertwined with the economic trajectories of societies. This essay has explored the numerous ways in which geography impacts economic development, drawing on historical examples, theoretical frameworks, and empirical studies to provide a comprehensive understanding of this complex relationship.

One of the fundamental insights is that geography sets the stage upon which economic activities unfold. Natural resource endowments, such as fertile land, minerals, and energy sources, provide the raw materials necessary for production and trade. Historically, societies that capitalized on these resources, like those in the Fertile Crescent or coal-rich Britain during the Industrial Revolution, were able to achieve significant economic advancements. However, as the concept of the "resource curse" illustrates, resource abundance alone does not guarantee prosperity. Effective governance, sound institutions, and strategic management are crucial for translating natural wealth into sustainable development.

Geographical barriers and transportation costs have historically constrained economic interactions, limiting market access and increasing the cost of trade. The advent of transportation technologies has alleviated some of these constraints, enabling greater integration of distant regions into the global economy. Yet, disparities persist, particularly for landlocked and isolated countries that face inherent geographical disadvantages. Investments in infrastructure and regional cooperation are essential strategies for mitigating these challenges, as evidenced by projects like the Addis Ababa–Djibouti Railway and initiatives like the African Continental Free Trade Area.

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Climate and disease burdens associated with geographical locations have significant implications for economic productivity and human capital development. Tropical regions often contend with health challenges that reduce labor productivity and strain healthcare systems. Addressing these issues requires targeted public health interventions and investments in technologies suited to local environmental conditions. The impact of climate change further complicates these challenges, introducing new risks that disproportionately affect vulnerable regions. Sustainable development strategies must therefore incorporate considerations of environmental resilience and adaptation.

The spatial distribution of economic activity, influenced by geographical factors, leads to agglomeration effects that can either concentrate wealth or exacerbate regional inequalities. Urban centers and industrial clusters benefit from economies of scale, knowledge spillovers, and network effects that drive innovation and growth. However, not all regions have the geographical advantages or initial conditions to develop such clusters. Policies aimed at fostering regional development and reducing spatial inequalities are critical for ensuring that the benefits of economic growth are more evenly distributed.

Institutions emerge as a pivotal element in the geography-development nexus. The quality of institutions determines how effectively a society can harness its geographical endowments and overcome its limitations. Inclusive institutions that promote property rights, rule of law, and market openness enable societies to leverage their resources and engage in productive economic activities. Conversely, extractive institutions can impede development, even in regions with favorable geography. The interplay between geography and institutions underscores the importance of governance in shaping economic outcomes.

Trade and market access are heavily influenced by geographical positioning. Proximity to major markets reduces transportation costs and facilitates the flow of goods, services, and ideas. Globalization and technological advancements have altered some traditional geographical constraints, allowing for greater participation in global value chains. However, the benefits of globalization are not uniformly distributed, and geographical disparities can be perpetuated or even exacerbated by unequal access to technology and infrastructure. Policies promoting trade openness and technological diffusion are essential for integrating geographically disadvantaged regions into the global economy.

Cultural and social factors, shaped by geography, also play a role in economic development. Geographical isolation can lead to the preservation of traditional practices and norms that may affect the adoption of new technologies or economic models. Social networks and capital, often geographically bounded, influence the dissemination of information and innovations. Recognizing the cultural dimensions of geography can enhance the effectiveness of development interventions by ensuring they are contextually appropriate and socially acceptable.

Historical contingencies and path dependence highlight how initial geographical advantages or disadvantages can set regions on specific development paths with long-lasting effects. The legacy of colonialism, influenced by geographical factors, has left enduring institutional and economic imprints on many societies. Understanding these historical contexts is crucial for addressing current development challenges and designing policies that acknowledge and rectify historical injustices.

Looking forward, the relationship between geography and economic development continues to evolve in the face of technological innovation, environmental change, and shifting global dynamics. The digital revolution offers opportunities to transcend some geographical limitations, with remote work and digital services reducing the importance of physical proximity in certain economic activities. However, the digital divide remains a significant barrier for many regions, necessitating investments in digital infrastructure and education.

Climate change *presents one of the most pressing geographical challenges of our time, with far-reaching economic implications*. Geographical regions vulnerable to extreme weather events, sea-level rise, and other climate-related risks require comprehensive strategies that integrate economic development with environmental sustainability. International cooperation and adherence to global agreements, such as the Paris Agreement, are essential for addressing these shared challenges.

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In conclusion, geography is an inextricable component of economic development, shaping opportunities and constraints in diverse and profound ways. While it sets the foundational parameters for economic activity, human agency—through institutions, policies, and innovations—plays a decisive role in determining how geographical factors translate into economic outcomes. Recognizing the importance of geography enables policymakers, scholars, and practitioners to design more effective strategies that harness geographical advantages, mitigate disadvantages, and promote equitable and sustainable development.

A nuanced understanding of the geography-development nexus calls for interdisciplinary approaches that integrate insights from economics, geography, history, political science, and environmental studies. Future research should continue to explore the dynamic interactions between geography and development, particularly in the context of emerging global challenges. By embracing a holistic perspective, societies can better navigate the complexities of economic development in a world where geography remains as relevant as ever.

Conflicts of Interest: The Author claims no conflicts of interest.

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