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Spatial Disparities in Economic Development: The Role of Industrial Agglomeration, Public Investment, and Transportation Networks in Indonesia

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ABSTRACT

This study explores the spatial disparities in economic development across Indonesia, with a focus on the role of industrial agglomeration, public investment, and transportation networks. Despite the country's overall economic growth, significant regional inequalities persist, particularly between Java and Bali, and the outer islands such as Papua and Maluku. Using a normative qualitative approach, this research examines the factors that contribute to these disparities. Industrial agglomeration is found to be a key driver of regional growth, with clustering of industries fostering innovation, job creation, and higher productivity. Public investment in infrastructure, education, and healthcare plays a critical role in mitigating these disparities, but its uneven distribution across regions exacerbates inequality. Transportation networks are essential for reducing transaction costs and facilitating economic integration, yet many remote areas still suffer from poor infrastructure, hindering their economic potential. The study concludes with policy recommendations to promote industrial development in underdeveloped regions, increase public investment, and enhance transportation networks to foster more balanced economic growth across Indonesia.

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1. INTRODUCTION

Indonesia, as one of Southeast Asia's largest and most diverse economies, faces persistent regional disparities in income, employment, infrastructure, and access to services, despite overall economic growth. These imbalances between urban-rural and industrialized-less developed regions hinder the nation's full economic potential and exacerbate poverty, inequality, and social exclusion. Key contributing factors include uneven infrastructure, disparities in human development, and varied economic policies. Income inequality is shaped by per capita income and foreign direct investment, which reduce inequality, while exports and imports tend to worsen it, with spatial linkages between regions showing minimal impact [1]. Infrastructure remains unevenly distributed, calling for strategic and inclusive planning to foster balanced development [2]. Urban-rural gaps significantly affect expenditure inequality, with intra-provincial disparities becoming more prominent [3]. Although regional autonomy is in place, development inequality persists due to inadequate infrastructure, lack of resources, limited human capital, and ineffective governance—highlighting the need for central support [4]. Furthermore, while the human development index reduces regional inequality, road infrastructure and foreign investment contribute positively to growth, indicating that comprehensive policies integrating human development, infrastructure, and investment are essential [5].

This paper explores the role of industrial agglomeration, public investment, and transportation networks in shaping spatial economic inequalities in Indonesia. Industrial agglomeration, defined as the concentration of firms and industries in specific geographic areas, contributes to economic benefits such as resource sharing, knowledge spillovers, and cost efficiencies. However, these benefits are often limited to urban centers, especially on Java Island, thereby exacerbating regional disparities and leaving rural and less developed regions behind [6]. While agglomeration boosts labor productivity through shared knowledge and resources, high labor density can diminish these gains [7], and in some cases, economic growth and investment may even reduce agglomeration by prompting industrial dispersion [8]. Public investment plays a dual role: it fosters economic growth and, in cases like East Java, helps reduce regional inequality, showing its potential in balancing development across areas [9]. Meanwhile, transportation networks are critical to shaping regional economies, though their improvements may not significantly attract industries to underdeveloped regions beyond Java, especially in sectors already established in leading areas [10].

Public investment, particularly in infrastructure development and social services, plays a crucial role in bridging regional development gaps by promoting economic growth and improving access to essential services. However, such investments are often concentrated in economically stronger areas, which can exacerbate disparities rather than alleviate them. Strategic and inclusive planning is therefore essential to ensure equitable infrastructure distribution and foster balanced development across regions [2]. Infrastructure development is fundamental to economic growth, but its uneven allocation worsens inequalities between urban and rural areas. Lessons from India emphasize the need for region-specific infrastructure investment to address diverse socio-economic challenges [11]. Public investments in transportation, housing, human capital, and innovation have been shown to significantly influence regional economic development by enhancing the foundational structures that support business and societal advancement [12]. In the Yangtze River Economic Zone, for instance, different types of infrastructure have varying spatial impacts—energy infrastructure contributes to broader regional growth, whereas transportation infrastructure tends to enhance local development but may hinder growth in neighboring regions [13]. These findings underscore the spatial dependence of economic growth and the importance of strategic investment planning to achieve both mutual benefits and regional equity [2], [13].

Transportation networks are a critical factor influencing spatial development, as they reduce transaction costs, facilitate the movement of goods, and promote regional connectivity. In Indonesia, the uneven distribution of transportation infrastructure has contributed to the concentration of economic activity in certain regions while leaving others isolated and underdeveloped. This disparity is evident in the spatial spillover effects of transportation improvements, such as Indonesia's highway upgrades during the 1990s, which helped disperse manufacturing activities across the country [14]. The Spatial Durbin Model reveals positive spatial dependencies between regional growth and transport infrastructure, although such infrastructure can negatively impact growth if distributed unequally [15]. Spatial inequality in transport access is a significant contributor to broader economic inequality in Southeast Asia, including Indonesia, where centrality measures expose a hierarchical distribution of transport networks—favoring some regions over others [16]. Consequently, regions with better transportation access experience stronger economic development, deepening existing disparities [17], [18]. Policy simulations further suggest that while toll roads connecting urban centers may drive industrial suburbanization, rural road upgrades often have limited effects on firm distribution [14]. Thus, strategic planning and effective management of transport networks are vital to harness their potential in supporting regional development and addressing spatial inequalities [18].

This paper adopts a normative qualitative approach to analyze these three key factors—industrial agglomeration, public investment, and transportation networks—and their role in shaping spatial economic disparities in Indonesia. The aim is to provide a deeper understanding of how these factors interact and influence the distribution of economic development, as well as to offer recommendations for addressing the spatial imbalances in Indonesia's economic landscape.

2. LITERATURE REVIEW

2.1 Spatial Disparities in Economic Development

Spatial disparities in economic development in Indonesia remain a significant concern, with pronounced differences between urban and rural areas and between more developed regions such as Java and Bali and less developed ones like Papua and Maluku. These disparities stem from historical advantages, current economic structures, and uneven infrastructure development. Urban centers like Jakarta and Surabaya have concentrated economic activity, benefiting from globalization and trade openness, which has led to inequalities in income, employment, and infrastructure access [19]. Historically, regions with better connectivity to trade routes and markets have enjoyed sustained growth, while others have lagged [20]. Economic activities remain concentrated in coastal and urban areas, further widening regional inequalities [19]. Infrastructure disparities significantly contribute to this gap, as shown by high Williamson Index values during 2011–2015, indicating the need to accelerate infrastructure development in underdeveloped regions [21]. Effective local governance is critical in addressing these issues, yet limited governance capacity often hinders impactful policy execution [20]. To mitigate spatial disparities, policy measures such as the equitable allocation of infrastructure and public services, along with efforts to facilitate interregional migration, are essential [22].

2.2 Industrial Agglomeration and Economic Growth

Industrial agglomeration in Indonesia has been a major driver of economic growth, particularly in regions like Greater Jakarta, Surabaya, and Batam, where manufacturing and finance sectors are heavily concentrated. This spatial concentration enhances productivity through knowledge spillovers, input sharing, and labor pooling, contributing significantly to economic performance [6], [7]. These positive externalities are particularly evident in large and medium manufacturing industries, where agglomeration boosts labor productivity and reinforces industrial clustering through increasing returns [6]. However, the benefits of agglomeration are unevenly distributed, favoring urban over rural regions, with Java remaining the primary corridor for industrial activities due to urbanization externalities and infrastructure advantages [23]. Despite government initiatives like the establishment of Special Economic Zones (SEZs) in less developed areas such as Kalimantan and Sumatra, challenges persist in attracting investment and sustaining industrial growth due to regulatory and infrastructure constraints [7], [23]. Moreover, economic growth and investment have shown unexpected negative impacts on agglomeration, suggesting that factors like population size may play a more influential role [8]. These complexities highlight the need for balanced development strategies and substantial infrastructure improvements to expand industrial clusters beyond Java and promote equitable regional development.

2.3 Public Investment and Regional Development

Public investment is crucial in addressing spatial disparities by enhancing infrastructure, education, and healthcare, which are essential for economic growth and improved living standards. In Indonesia, the concentration of public investment in developed regions like Java and Bali exacerbates regional inequalities, leaving outer islands underfunded and limiting their development potential. This uneven distribution of resources hampers the ability of less developed regions to improve infrastructure and human capital, perpetuating regional disparities. Infrastructure development plays a central role in reducing these inequalities by improving connectivity and access to essential services, as seen in projects like the Trans-Java toll road; however, similar investments are urgently needed in less developed areas to ensure balanced growth [2]. Public investment also lays the foundation for future economic prosperity, helping to reduce inequalities and respond to megatrends and shocks such as climate change and economic disruptions [24]. Furthermore, region-specific complementarity between infrastructure and education investments can amplify economic returns and productivity, with strategic dual-sector investments leading to significant positive impacts even when each sector's independent effect is limited [25], [26]. Therefore, inclusive and regionally balanced public investment policies are essential for fostering equitable and sustainable development across Indonesia.

2.4 Transportation Networks and Economic Integration

Transportation infrastructure plays a crucial role in regional economic development by facilitating the movement of goods, people, and services, thereby reducing transaction costs and enhancing market access. In Indonesia, the development of roads, railways, ports, and airports is a key component of government policy aimed at promoting regional growth and addressing spatial inequalities. Infrastructure investments, particularly in land and sea transport, have been shown to positively influence economic development and generate spatial spillover effects that extend beyond the immediate area of development [17], [27]. Improved infrastructure also enhances regional competitiveness by lowering logistical costs and integrating remote regions into national and global markets [27]. However, these benefits are not evenly distributed, as improvements often disproportionately favor already-developed regions, leaving many eastern and central areas of Indonesia poorly connected and economically disadvantaged [28]. Additionally, not all infrastructure investments yield positive outcomes; some road infrastructure projects have had insignificant or even negative effects on regional economic growth [28]. Furthermore, infrastructure functions more as a facilitator of organizational coordination rather than a direct driver of growth, with its effectiveness largely depending on integration within broader economic networks [29].

3. METHODS

This study adopts a normative qualitative research approach to examine the roles of industrial agglomeration, public investment, and transportation networks in shaping spatial disparities in Indonesia. Normative research is suited to analyzing existing norms, theories, and policies, while the qualitative method allows for an in-depth understanding of how these factors interact. The study relies entirely on secondary data, including academic articles, government reports, policy documents, and case studies from international organizations like the World Bank and UNDP. Regional economic indicators such as GDP, employment, and infrastructure access will also be reviewed. Data will be analyzed using thematic and comparative methods: thematic analysis will identify recurring patterns and key themes across the literature, while comparative analysis will evaluate regional differences in development strategies—for instance, comparing industrial clusters in Jakarta or Surabaya with underdeveloped regions like Papua and Maluku, or contrasting infrastructure investment in Java with that in outer islands.

The study's conceptual framework centers on three interrelated drivers of regional development. First, industrial agglomeration promotes growth through economies of scale, innovation, and productivity gains, typically benefiting regions with high industry concentration. Second, public investment in infrastructure, education, and social services is key to reducing regional inequalities, though its uneven distribution often reinforces disparities. Third, transportation networks are essential for improving regional connectivity, lowering transaction costs, and enabling economic integration. Together, these elements provide a foundation for analyzing spatial disparities and formulating more equitable regional development policies in Indonesia.

4. RESULTS AND DISCUSSION

4.1 Industrial Agglomeration and Regional Economic Growth

Industrial agglomeration, the clustering of industries in specific regions, has proven to be a significant driver of economic growth in Indonesia. Regions with established industrial clusters, such as Jakarta, Surabaya, and Batam, have experienced higher economic growth rates compared to those with less industrial activity. Industrial agglomeration leads to economies of scale, increased competition, innovation, and knowledge spillovers, all of which contribute to higher productivity and economic dynamism.

4.1.1 Case Studies of Industrial Agglomeration

In Indonesia, cities like Jakarta and Surabaya exemplify the positive effects of industrial agglomeration, with Jakarta developing a polycentric metropolitan structure where industrial centers attract manufacturing employment and support economic diversification [30], while Surabaya shows sectoral concentration in textiles, electronics, and automotive manufacturing, leading to increased employment and infrastructure development [31]. These urban agglomerations attract skilled labor, enhance access to resources, and foster innovation through knowledge spillovers and R&D support from top universities [32], resulting in higher wages and productivity, although disparities in education quality can influence outcomes [31]. In contrast, regions like Papua and Maluku suffer from limited industrial clustering, resulting in lower economic growth, higher poverty rates, and fewer opportunities for innovation and human capital development [7]. Geographic isolation and inadequate infrastructure in these areas further raise transaction costs and hinder economic integration, exacerbating underdevelopment [7]. The uneven distribution of industrial activity underscores the urgent need for policies that promote balanced regional growth and address infrastructure gaps across Indonesia.

4.1.2 Industrial Agglomeration and Regional Inequality

While industrial agglomeration has proven to be a powerful force for economic growth, it has also contributed to increasing regional inequality. As industrial clusters continue to grow in certain regions, others are left behind. This unequal distribution of economic activities leads to significant disparities in income levels, infrastructure quality, and access to services. For example, the rapid growth of the industrial sector in Java and Bali has created a stark contrast with the relatively underdeveloped eastern and outer islands of Indonesia.

The presence of large industrial hubs in certain regions also leads to an unequal distribution of investments, which disproportionately benefits these areas while leaving others with fewer opportunities for growth. This trend reinforces the concentration of wealth and resources in industrialized regions, exacerbating spatial disparities in Indonesia.

4.2 The Role of Public Investment in Mitigating Spatial Disparities

Public investment in infrastructure, education, healthcare, and social services is pivotal for reducing spatial disparities in Indonesia's economic development, as seen in regions like Java, Bali, and Yogyakarta, which have experienced significant growth due to improved connectivity and human capital. Projects such as the Trans-Java toll road and port developments in Kalimantan and Sumatra have enhanced trade and industrial activity; however, this progress remains uneven, with areas like Papua still facing infrastructure deficits, limited access to quality education and healthcare, and persistent poverty. The effectiveness of public investment in addressing regional inequality depends greatly on its equitable and strategic distribution. Uneven infrastructure development exacerbates disparities, with urban areas showing higher Infrastructure Development Index (IDI) values and greater growth compared to rural regions [2], [33]. Human capital, proxied by life expectancy and education, alongside trade openness, contributes significantly to growth, while road infrastructure has shown mixed impacts [28]. The Williamson Index reflects the persistent economic gap among provinces, emphasizing the need for proportional development in lagging areas [21]. Moreover, while policies that reduce transaction costs in richer regions may boost industrial concentration and growth, they can also widen income gaps, highlighting the trade-off between efficiency and equity in spatial development [34].

4.3 Transportation Networks and Regional Economic Integration

Transportation networks are a critical factor in reducing spatial disparities by enabling the efficient movement of goods, services, and labor, lowering transaction costs, and fostering economic integration. In Indonesia, regions like Java and Bali have benefited significantly from well-developed transportation infrastructure—including highways, railways, and airports—which has supported industrial growth and trade, exemplified by the Trans-Java toll road that enhances interregional connectivity and economic efficiency [27]. In contrast, remote areas such as Papua continue to face inadequate infrastructure, limiting market access and reinforcing regional inequalities [7]. The economic impact of transportation infrastructure is evident in its positive contribution to freight volumes and domestic trade, with its output elasticity for regional economic growth estimated between 0.05 and 0.07 [35], [36]. Additionally, transport infrastructure generates spatial spillover effects that stimulate regional economies, though outcomes vary; in developed areas like South Sulawesi, the development of Makassar Port has enhanced trade and industrial expansion, while fragmented geographies in less developed regions can lead to negative spillovers [36], [37]. In poorly connected areas, such as parts of Papua, high business costs, limited investment, and restricted entrepreneurship persist, further isolating these regions from national economic growth and exacerbating spatial inequality [16].

4.4 Policy Implications and Recommendations

Based on the findings of this study, several policy recommendations can be made to address spatial disparities in Indonesia:

The government should focus on promoting industrial development in less-developed regions, particularly in the eastern and outer islands. This can be achieved through targeted investments in infrastructure, incentives for businesses to set up operations in these regions, and the development of Special Economic Zones (SEZs).

Public investment should be directed towards infrastructure development in remote regions, particularly in transportation, education, and healthcare. This would help to reduce the isolation of these areas and promote economic integration.

The government should prioritize the development of transportation networks, especially in remote regions, to reduce transportation costs and facilitate the movement of goods and services. This would promote regional economic integration and improve access to markets.

The government should encourage private sector participation in regional development through Public-Private Partnerships (PPPs). This could lead to more efficient and sustainable investments in infrastructure and industry.

5. CONCLUSION

This study highlights the persistent spatial disparities in economic development across Indonesia and emphasizes the critical role of industrial agglomeration, public investment, and transportation networks in shaping these inequalities. Regions with well-developed industrial clusters, robust infrastructure, and significant public investment tend to achieve higher levels of economic growth and prosperity. Industrial agglomeration fosters innovation and dynamic business environments, while public investment—especially in infrastructure and human capital—can reduce disparities if distributed equitably. However, the uneven allocation of these resources has led to widening gaps, particularly in remote regions like Papua and Maluku, where limited infrastructure and investment hinder development. Transportation networks are especially vital for integrating isolated regions into the broader economy, yet many outer islands continue to face barriers due to poor connectivity and high logistical costs.

To address these disparities, the study recommends policies that promote industrial agglomeration in underdeveloped areas, increase public investment in remote regions, and prioritize the expansion of transportation infrastructure. These strategies can foster a more inclusive and balanced economic growth trajectory across Indonesia. In conclusion, overcoming regional disparities requires a comprehensive and integrated policy approach that strengthens the interconnected roles of agglomeration, investment, and infrastructure. By focusing on these pillars, policymakers can build a more equitable economic environment and support sustainable development for all regions of the country.

REFERENCES

[1] A. A. H. El Thamrin and N. E. Baskoro, "-Penerapan Sanksi Rehabilitasi Terhadap Pelaku Tindak Pidana Penyalahgunaan Narkotika Golongan I (Putusan Nomor 1016/Pid. Sus/2022/PN. Jkt. Brt): The Application of Rehabilitation Penalty to the Perpetrators of Class I Narcotics Abuse Crime (Verdict Numbe," *Reformasi Huk. Trisakti*, vol. 6, no. 3, pp. 997–1008, 2024.

[2] M. S. Siatan, S. Gustiyana, and S. Nurfitriani, "Infrastructure Development and Regional Disparities," *KnE Soc. Sci.*, pp. 799–806, 2024.

[3] T. Akita and S. Miyata, "Spatial inequalities in Indonesia, 1996–2010: A hierarchical decomposition analysis," *Soc. Indic. Res.*, vol. 138, pp. 829–852, 2018.

[4] M. Habibi, "Ketimpangan Pembangunan Daerah di Era Otonomi Daerah," *Multiverse Open Multidiscip. J.*, vol. 3, no. 1, pp. 59–63, 2024.

[5] A. N. Azim, H. Sutjipto, and R. A. F. Ginanjar, "Determinan ketimpangan pembangunan ekonomi antarprovinsi di indonesia," *J. Ris. Ilmu Ekon.*, vol. 2, no. 1, pp. 1–16, 2022.

[6] A. D. Nurlestari and S. Oktavilia, "Industrial agglomeration and economic growth in Indonesia," *Effic. Indones. J. Dev. Econ.*, vol. 6, no. 1, pp. 1–12, 2023.

[7] Y. N. A. Wibowo and T. Kudo, "Agglomeration and urban manufacture labor productivity in Indonesia," *Signifikan J. Ilmu Ekon.*, vol. 8, no. 2, pp. 145–158, 2019.

[8] A. Zaakiyyah and H. Khootimah, "Factors Influencing Industrial Agglomeration in Indonesia.," *Dinasti Int. J. Econ. Financ. Account.*, vol. 5, no. 5, 2024.

[9] F. Rahmawati and F. Romziatin, "Do Industrial Agglomeration and Investment Shrink Regional Inequality," *J. Pendidik. Ekon. Dan Bisnis*, vol. 8, no. 2, pp. 119–126, 2020.

[10] U. Deichmann, K. Kaiser, S. V Lall, and Z. Shalizi, "Agglomeration, transport, and regional development in Indonesia," *Available SSRN 647682*, 2005.

[11] T. R. Kumar, "The impact of regional infrastructure investment in India," *Reg. Stud.*, vol. 36, no. 2, pp. 194–200, 2002.

[12] D. Felsenstein, R. McQuaid, P. McCann, and D. Shefer, *Public investment and regional economic development*. Edward Elgar Publishing, 2001.

[13] J. Zhang, R. Zhang, J. Xu, J. Wang, and G. Shi, "Infrastructure investment and regional economic growth: Evidence from Yangtze River Economic Zone," *Land*, vol. 10, no. 3, p. 320, 2021.

[14] A. D. Rothenberg, *Essays on Spatial Development*. University of California, Berkeley, 2012.

[15] A. Fahmi, "Efek spasial infrastruktur terhadap pertumbuhan ekonomi," *AKUNTABEL*, vol. 19, no. 2, pp. 468–474, 2022.
[16] X. Liu, L. Dai, and B. Derudder, "Spatial inequality in the southeast Asian intercity transport network," *Geogr. Rev.*, vol. 107, no. 2, pp. 317–335, 2017.
[17] A. Karim and D. Prastyo, "Spatial spillover effect of transportation infrastructure on regional growth," *Экономика региона. 2020. Том 16, выпуск 3*, vol. 16, no. 3, pp. 911–920, 2020.
[18] F. J. Antón-Burgos, "Redes de transporte, articulación territorial y desarrollo regional.," *Rev. Estud. andaluces*, no. 30, pp. 27–47, 2013.
[19] R. Kanbur and A. J. Venables, "Rising spatial disparities and development," 2005.
[20] C. Cabasset, "Within-country spatial inequality and local governance capacity: the case of Indonesia," in *ASEAN Economic Community: A Model for Asia-wide Regional Integration?*, Springer, 2016, pp. 311–328.
[21] T. Sukwika, "Peran pembangunan infrastruktur terhadap ketimpangan ekonomi antarwilayah di Indonesia," *J. Wil. dan Lingkung.*, vol. 6, no. 2, pp. 115–130, 2018.
[22] R. Kanbur and A. J. Venables, "Spatial inequality and development overview of unu-wider project," 2005.
[23] S. Rahardja, A. Kuncoro, F. Fitriani, G. Varela, and M. A. Dipo, "Agglomeration and manufacturing activities in Indonesia," 2012.
[24] OECD, "Making the most of public investment to address regional inequalities, megatrends and future shocks," *OECD Reg. Dev. Pap. OECD Publ. Paris*, 2022.
[25] J. Stone, N. Bania, and J. A. Gray, "Public infrastructure, education, and economic growth: region-specific complementarity in a half-century panel of states," 2010.
[26] A. M. Pereira and J. M. Andraz, "On the economic effects of public infrastructure investment: A survey of the international evidence," *J. Econ. Dev.*, vol. 38, no. 4, pp. 1–37, 2013.
[27] P. R. Indah and N. NurulIstifadah, "The infrastructure investment effect and transportation sector toward economic growth in Indonesia," *Opción Rev. Ciencias Humanas y Soc.*, no. 27, p. 24, 2020.
[28] A. Kustanto, "Pertumbuhan ekonomi regional di Indonesia: Peran infrastruktur, modal manusia dan keterbukaan perdagangan," *Bul. Stud. Ekon.*, vol. 25, no. 1, 2020.
[29] P. Rosik and J. Wójcik, "Transport Infrastructure and Regional Development: A Survey of Literature on Wider Economic and Spatial Impacts," *Sustainability*, vol. 15, no. 1, p. 548, 2022.
[30] D. Hudalah, D. Viantari, T. Firman, and J. Woltjer, "Industrial land development and manufacturing deconcentration in Greater Jakarta," *Urban Geogr.*, vol. 34, no. 7, pp. 950–971, 2013.
[31] S. T. Wahyudi, "Geographical Concentration of Manufacturing Industries in Java Region, Indonesia." Universiti Utara Malaysia, 2011.
[32] L. Chen, R. Hasan, and Y. Jiang, "Urban agglomeration and firm innovation: Evidence from Asia," *World Bank Econ. Rev.*, vol. 36, no. 2, pp. 533–558, 2022.
[33] A. Jatayu *et al.*, "Measuring Levels of Infrastructure Development and its Impact on Regional Growth-Insights from Indonesia," in *IOP Conference Series: Earth and Environmental Science*, IOP Publishing, 2024, p. 12011.
[34] P. Martin, "Public policies, regional inequalities and growth," *J. Public Econ.*, vol. 73, no. 1, pp. 85–105, 1999.
[35] J. Shi, T. Bai, Z. Zhao, and H. Tan, "Driving Economic Growth through Transportation Infrastructure: An In-Depth Spatial Econometric Analysis," *Sustainability*, vol. 16, no. 10, p. 4283, 2024.
[36] Z. Xueliang, "Has transport infrastructure promoted regional economic growth?—With an analysis of the spatial spillover effects of transport infrastructure," *Soc. Sci. China*, vol. 34, no. 2, pp. 24–47, 2013.
[37] Y. Liu, "Transport infrastructure investment, regional economic growth and the spatial spillover effects: based on highway and marine's panel data analysis," *China Ind. Econ.*, vol. 12, pp. 37–46, 2010.