

DYNAMICS OF REGIONAL DISPARITY: FROM THEORY TO REALITY

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Abstract

Balanced regional development is vital for nation's upliftment because uneven growth across regions leads to disparities in the economy, society, and infrastructure that affect the people's quality of life. The paper's goal is to comprehend the dynamics of regional disparity. The paper also examines the debates regarding various economic and social theories required for the overall development of the region. The study is based on a review of theoretical and empirical literature. Existing definitions, types, and approaches to regional disparity have been studied to provide the necessary theoretical context. The analysis is set in the context of how the interpretations of terms and theories, on the part of both scholars and international organizations, have evolved over several decades. In the evolving landscape of regional planning, development interventions should prioritize both sustainability and social inclusion. The paper underscores the need to address regional disparity and offers valuable insight into future avenues.

Keywords: Balanced Regional Development, Quality of Life, Regional Disparity, Sustainability, Social inclusion.

Introduction

Regional disparity deviates from the concept of equality. It highlights the difference between two or more entities that encompasses the particular set of population or region. It manifests in various forms, including economic, social, spatial and environmental disparities [1]. Development is usually used as a baseline to measure disparity. The difference in development cause widening of disparity affecting the overall progress of region. Development strategies were initially aimed to create balance economic productivity with spatial equity [2]. Social inequality, migration, political unrest etc are the profound effects of regional disparity. Social and economic disparity create lasting disadvantage for certain regions, groups, or individuals, blocking their access to the same opportunities as others. Unemployment, higher levels of poverty, and limited access to services like healthcare and education are faced by lagging regions.

Regional disparity continues to grow unchecked and has become more prominent. The growing in inequality has deepened social and economic conditions, affecting both developed and developing nations. The Commitment to Reducing Inequality (CRI) Index 2024 [3] reveal that regional disparities have widened significantly after the outbreak of COVID-19 pandemic in 2020. A staggering eighty four percent of nation have reduced public spending on critical sectors such as health, education, and social protection. It has become a challenge for the low-income nations to recover from shocks such as the COVID-19 pandemic (World Social Report 2024) [4]. This is an additional setback in the fight against regional disparity. These trends in regional disparities emphasises upon the urgent need for targeted policy interventions. This study reviews various theoretical and empirical literature. The paper aims to comprehend the dynamics of regional disparity by analysing various theoretical

frameworks and developmental paradigms drawn from both classical and contemporary literature .

Balanced regional development is crucial for national progress and economic equity. It promotes overall competitiveness and creates more equitable metropolitan regions [5]. To eliminate disparity, it requires not only comprehensive and integrated action models but also strong institutional power [6]. Addressing the disparity and going through the path of development eventually helps to maintain social harmony, sustainable economic growth, and promotes inclusive development.

Research Methodology, Literature search strategy and selection process of articles

The paper aims to understand how scholars' study regional disparity. The reviewed work was collected from research database such as Science direct and web of science. The literature search combined nine search terms: Regional disparity, disparity, regional inequality, socio-economic inequality, socio-economic disparity, spatial inequality, spatial disparity, equitable development, regional development. The review also includes those papers that does not get captured in 'disparity' term search. The papers comprising the concepts of regional development and quality of life are also taken into consideration as it is linked to the concept of disparity. The reason for choosing these scientific databases was to extract high-quality peer-reviewed review articles to explore consolidated scholarly work from these largest science databases. Multi-disciplinary research captures the wider perspective on the topics of urban planning, regional planning, regional science and social sciences. The screening was carried out in three stages. First, titles were screened. Second, abstracts were independently reviewed. The studies not meeting the screening criterion i.e. title and abstract were removed. Finally, full-text screening was conducted. Papers meeting the following criterion were included for full-text screening:

1. databases include academic journal articles, book chapters, working papers and reports excluding the review articles and conference proceedings.
2. published between January 2010- February 2025, except for the research articles containing theories and models
3. conceptually focused on regional disparity and advocate for balanced regional development
4. empirical findings based on primary fieldwork, secondary research, or computational modelling.
5. documents were limited to English-language articles and reports.

Evolution of Regional Disparity

Economists, geographers, planners, and policymakers have extensively discussed disparity as a phenomenon. The definition of regional disparity has evolved significantly over the years. Regional disparity is often being considered synonymous with "inequality" to describe differences between areas or societies [7, 8]. Initially, regional disparity was primarily viewed through the lens of income distribution and production agglomeration [9]. As economies transitioned, economists began to emphasize the unequal spread of economic growth across regions [10]. Industrial revolution caused the speeding of industrialisation and urbanisation, further leading to unequal distribution of resources.

Social dimensions of the disparity, such as education, healthcare, and access to infrastructure have been explored. Ing Alois Kutscherauer et al. [7] define regional disparity as "divergence or disparity of characters, phenomena or processes having specific territorial allocation (can be allocated in defined territorial structure) and occurring at least in two entities of the territorial structure". Yousuf et al. [11] explains the disparity characters such as cognitive, psychological, social, economic, political and limits it with the spatial identity. The

differences exist in all societies which arises from unequal distribution of natural resources and/or man-made neglect of some regions in favour of others in terms of development and infrastructural facilities.

The definition of regional disparity has emerged to be holistic including socio-economic, environmental, and governance dimensions. According to some study [12] [13] 'regional disparity has been defined as the multidimensional phenomenon'. Unbalanced regional development for various regions depend upon the factor such as socio-cultural, economic and demographic characteristics. Michálek et al. [14] define it as the result of difference in the original conditions, complicate and unequal development, difference in degree of potential utilisation and diversified impact of market mechanism. Yadav [15] refers regional disparity to the wide differences in per capita income, health and education services, levels of industrialization, literacy rates, and infrastructural facilities between different regions and states of the country. Taubenböck et al. [16] consider regional disparity as a phenomenon which is a complex mesh of various attributes beyond socio-economic indicators. The understanding of regional disparity has expanded to include quality of life, digital access, climate resilience, and political representation. Definition of regional disparity evolved as a condition of asymmetry in standard of living and quality of life in different parts of a given area [17], [18]. It reflects change in economic structures, globalisation, and technological advancements.

Table 1: Dimensions of Regional Disparity, 2010-2023

| Year | Author | Dimension focused in Definition |
|------|--------------------|---------------------------------|
| 2010 | Kutscherauer et al | territorial structure |
| 2014 | Yusuf et al. | Socio-economic, Environmental |
| 2017 | Ray & Rahman | multidimensional |
| 2018 | Michalek et al | multidimensional |
| 2019 | Jose | multidimensional |
| 2019 | Taubenböck et al | multidimensional |
| 2019 | Kumar & Rani | Quality of life |
| 2020 | Basu & Das | Quality of life |
| 2023 | Yadav | Social |

(Source: Author 2024)

This proves that authors reconstructed the definition of regional disparity over the time (Table 1). Regional disparity is defined as a multidimensional phenomenon which creates a wide difference between two geographical unit within a region. It led to the difference and downgrading of the quality of life, human capital and social dynamic in the society. All these elements are interrelated and affect the balanced growth of the region. Quality of life depicts the living standard of the average population with access to health care benefit, education facility and other infrastructure facilities. Human capital catalyses negative effects such as poor working conditions, increase in unemployment rate, and inefficient workforce to positively affect the economic growth of the region. Incoherent social dynamic give rise to problem of separatism. The regionalism exists in the form of states division into smaller parts i.e. Bihar further divided into Bihar and Jharkhand, and erstwhile Andhra Pradesh into Andhra Pradesh and Telangana.

Global framework of Sustainable Development Goals (SDGs), emphasize reducing inequalities and ensuring inclusive growth. Disparity in terms of economic and spatial development is a persistent trend and a universal phenomenon [11]. It existed ever since the societies evolved from simple communities into the complex one. These disparities generate unequal opportunities, resulting in differential growth among communities or groups. To

enhance our understanding of the phenomenon, it is important to expand research into new dimensions.

Types of Regional Disparity

Two critical questions disparity of what? and disparity between whom? arise while conceptualising the notion of disparity. These questions provide a framework to explore the inequalities that exist in different contexts. Regional disparity is categorized into two main types: horizontal disparity and vertical disparity [7]. Each type helps to clarify the nature and scale of inequality.

Horizontal disparity focuses on what is unequal. This type of disparity focuses on the various dimensions or aspects in which differences occur within regions or across groups within a similar level of development. Khalid et al. [19] highlight that disparity encompasses a wide range of factors that contribute to overall well-being and development. It contributes to social tension and hinders inclusive growth.

Horizontal disparities are key to understand, Why inequalities persist across communities or regions? and how they affect individual outcomes? One of the primary areas of horizontal disparity is economic, which includes difference in income and wealth. It highlights situations where a few individuals or groups have access to material resources and choices while others are excluded. Economic disparity is the most fundamental type of disparity having direct impact on poverty and unemployment [20]. Beyond economic factors, horizontal disparity extends differences in several aspects, including opportunities, achievements, freedoms, rights, and access to resources.

Vertical disparity addresses the question "between whom?". It focuses on the spatial scales or units to analyse the disparity. This type of disparity is crucial for understanding the hierarchical nature of disparity and how they manifest at different demographic scales and geographical organization [21]. It includes interpersonal differences, gender-based inequalities, ethnic disparities, or disparities between geographical regions and nations. Interporal analysis is another aspect of vertical disparity which helps to understand the persistence or reduction of inequality over time.

Geographical unit represent one of the key scales for studying vertical disparities. This ranges from local level comparisons between neighbourhoods or districts to broader regional analyses between states or provinces. Geographical disparities reflect historical patterns of development, resource distribution, and policy interventions. They are particularly important in the context of regional development, planning and to promote balanced growth. At the highest scale, vertical disparities can be examined between nations. International comparisons of development indicators, economic performance, and quality of life metrics reveal global patterns of inequality. The factors such as historical legacies, geopolitical relationships, and global economic structures influence vertical disparities (Fig.1).

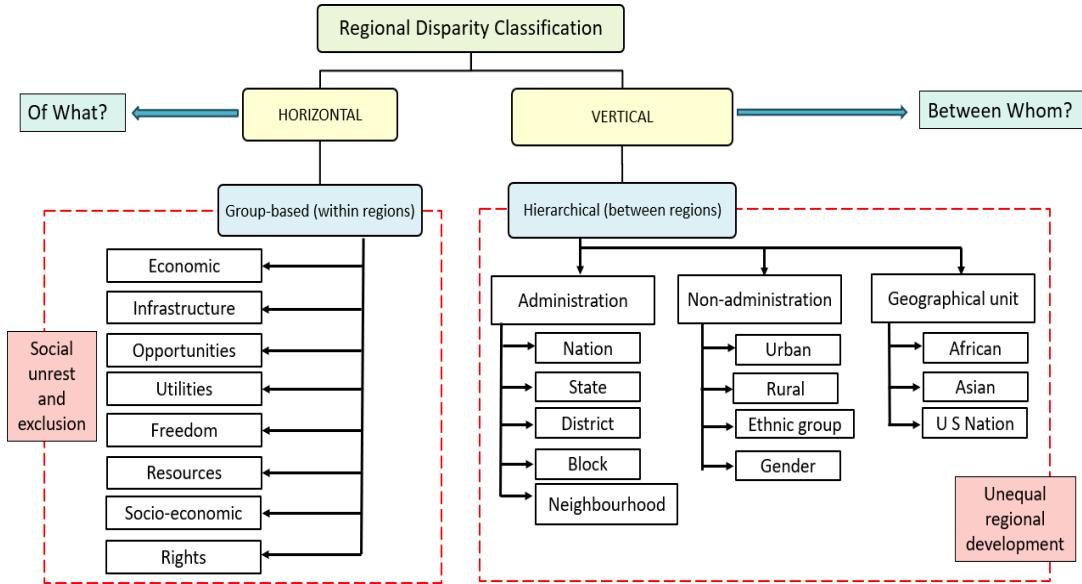


Fig.1 Different types of Regional Disparity

(Source: Authors 2024 based on [7])

Horizontal and vertical disparities concept provide a comprehensive framework for understanding and analysing regional disparities. Horizontal disparities reveal the relationships between groups or regions, while vertical disparities shed light on the aspects of inequality. Both type of disparities is often interconnected and reinforces each other. These classifications provide a comprehensive lens for analysing regional disparities. The interrelation of these disparities highlights the complexity of addressing regional disparity. It highlights the need for nuanced, multi-level approaches in development planning and decision making. It enables targeted strategies to reduce inequality and promote balanced development.

Regional Disparity Approaches

Regional disparity is analysed through two main approaches i.e. disparities approach and the comparative approach. Both these approaches provide different perspectives on understanding the socio-economic and spatial disparity in regional development. They explain how regional inequalities evolve as economies grow and undergo structural changes (Fig.2).

The disparities approach generates a negative regional difference, which underlines backwardness, and uneven development. Therefore, it focuses of how regional polarization creates a separation between regions, which develops stagnation and going to make the region disparate. Bhagat and Kumar [22] and Mondal et al. [23] examined inter- and intra-district backwardness in the specific regions to reveal considerable disparity within the spatial pattern of the socio-economic conditions.

The comparative approach compares the development trajectories of different regions over time and perceives regional disparity as positive. It involves longitudinal studies which highlights competitive advantages between regions. This approach highlights the spillover effect which explains how the development of one area drives growth in its neighbouring areas (Fig.2). It investigates whether regions are converging or diverging in terms of economic levels, economic growth and human development. A positive spillover effect has been identified among the pillars of sustainable development in developing countries [24]. A similar study explored spatial spillover effects of skilled migration and their changes over time [25]. It revealed that spillover of skilled migration benefitted developed region more than developed regions, leading to regional disparity. These approaches reveal that regional

disparity can be seen as challenge for some and opportunity for others. It is crucial to amalgamate both approaches to develop a comprehensive understanding of regional disparities, especially in developing country such as India.

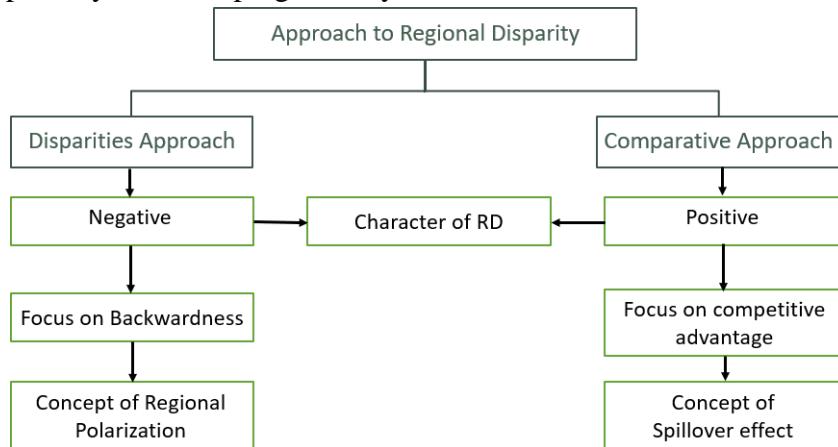


Fig.2 Approach to Regional Disparity

(Source: Authors 2024)

Theory of Regional Disparity

Regional disparity is linked with the spatial analysis of unequal growth pattern or economic development. Over time, various theoretical models have been developed to explain these disparities. They give differing opinions on whether economic growth leads to convergence or divergence of regional incomes. While some theories such as the Neoclassical growth theory, predict convergence in income levels across regions, other theories such as cumulative causation and core-periphery model argue that initial inequalities tend to widen over time. Key theoretical contributions in this domain include the Solow's Neoclassical Growth Theory [26], Gunnar Myrdal's [27] Cumulative Causation Theory, Hirschman's [28] Polarization Effect, Simon Kuznets's [29] Inverted U Hypothesis, Friedman's [30] Core-Periphery Theory, Paul Krugman's [31] New Economic Geography (NEG) and the Evolutionary Economic Geography [32]. Each of these theories offers distinct perspectives on the dynamics of regional growth and the persistence of disparities, particularly in developing regions such as India.

The Neoclassical Growth theory advocates the possibility of convergence in the economy across region. The theory focuses on the role of capital accumulation, labour growth, and technological progress to explain how economies grow over time. Solow's growth model is a prominent model which draws its perspective on regional economic development and disparity [26]. The theory uses the convergence hypothesis that poor economies tend to grow at faster rates than richer economies. Under probable assumptions, this model demonstrates convergence of incomes. Recent studies have explored various aspects of economic growth and regional disparities incorporating the aspects of standard of living and income. Dominicis [33], Geloso et al. [34] and Kufenko et al. [35] exhibits convergence and highlight the importance of context-specific analyses. However, studies have also revealed contradictions to the convergence hypothesis [21, 36]. Lack of unanimity of empirical support for the convergence hypothesis led to emergence of other theories such as new economic geography, inverted U hypothesis and Endogenous growth theory.

Gunner Myrdal's Cumulative causation theory retort to the neoclassical economic, which depends heavily on the equilibrium assumption. The theory postulates that initial inequalities

in economic and social development tend to perpetuate and even widen over time, leading to regional disparities and persistent poverty [37]. The theory also argue that economic growth is not linear or balanced rather it follows a cumulative path [27]. All economic activities in a developing economy tend to be self-reinforcing. Capital, talent and resource would further accelerate growth in certain region, leaving the rest of the region in a backward state. This phenomenon is due to two types of forces i.e. backwash effects and spread effects [38]. Backwash effects are those centripetal forces, which favour the concentration of economic activities in particular region and leave another region backward. Spread effects are centrifugal forces that helps in spreading developmental activities outward from the centre. The main cause of regional disparities is due to the strong backwash effects and weak spread effects [39]. A study highlighted market transition and institutional change in a particular region led to social inequalities by unevenly distributing opportunities and resources [40]. Han (2022) [41] study applied a dissimilarity-based clustering algorithm and found socio-spatial inequalities due to uneven spatial arrangement of economic and service facilities.

Hirschman [28] used the concepts 'Trickling down effect' and 'Polarization Effects' to define polarized development. The theory had a viewpoint that unbalanced growth stimulates growth to both developing regions and adjoining hinterland regions [38]. Economic growth does not take place everywhere at the same time and when development process stated initial location will be excelling in economic activity concentration. The geographical imbalances are produced through creation of development centres that further diffuse the process of economic development at subsequent points in the backward hinterland [37]. Li et al. [42] discusses the idea of "trickling down effect" in German urban regions, where peripheries benefit from spill overs generated by nearby urban cores. Study has indicated that innovation can help to reduce regional disparities [43]. However, this may also lead to further polarization if the innovation is highly complex.

In the year 1963, Simon Kuznets propounded inverted U-shapes curve development theories. The theory preached that as economies develop, regional inequalities initially increase and then decrease in advanced stage of development, forming an inverted U-shape [44]. It depicts the relationship of two variables when economy develops from an agrarian rural society to an industrialized urban economy. Studies on regional inequalities have its foundation in testing the famous Kuznets' inverted U-shaped hypothesis. Studies have shown the evidence of U-shapes curve, confirming this hypothesis [45, 46]. However, in many studies' inequality persists or even increases despite economic growth, challenging the theory [44, 47, 48, 49]. Breau and Lee [48] indicates that regional disparities may increase again at later stages of development, forming the curve turns upward. Hypothesis of the inverted U-curve theory does not consider the overarching role of social and political contexts in the development of society [49].

Friedman's theory has explained the spatial structure of economic development and disparities between core and periphery [30, 50]. Periphery subsidises the growth of the centre. A balanced integrated region is developed after an early process that encourages the creation of spatial inequalities [37]. Friedman's model depicts the concentrated economic growth in core regions which failed to reach peripheral areas, exacerbating disparities [51].

Traditional theories were unable to sufficiently explain the concentration of economic activity in particular locations prompted to New Economic Geography (NEG). Paul Krugman study explains the spatial distribution of economic activities and regional disparities [31]. It tends to decrease as the economy move from the restrictive trade to open trade. NEG models suggest that the interaction between these factors lead to the concentration of economic

activities in certain regions, potentially exacerbating spatial inequalities. Within the framework of NEG, Pentagon model serves as a policy impact model. It integrated interacting forces to enhance socio-economic quality [52]. This model advocates the proper combination of geographically specific factors of hardware, software, ecoware, finware and orgware. They mould the economic activities in any region to prompt uneven development and changes. Lovely et al. [53] discussed the influence of market access on wages for workers. NEG theory is applied to predict transport cost and spatial distribution. The theory provided the theoretical foundation to explicate that infrastructure reshapes geographical connectivity and helps in economic agglomeration [54].

The evolutionary economic geography emerged in the 1980s as a response to the limitations of the neoclassical theory and Solow growth model. The theory emphasised the role of internal factors such as path dependence, institutional contexts, 'economic complexity', adaptability and resilience rather than external factor in addressing regional disparities [32], [55]. Despite rapid economic growth and innovation capabilities, significant development gaps and regional disparities persist [56]. Huggins and Thompson [57] suggests that regions influence their growth trajectories through investments in education, research, and development.

The evolution of theories explains that regional disparities highlight the complexity of the relationship between economic growth and spatial inequalities. Neoclassical model predicts convergence but empirical evidence from developing region often supports divergence and polarisation. Models such as Myrdal's Cumulative Causation, Hirschman's Polarization, and Friedman's Core-Periphery Theory capture the persistence of disparities. Newer approaches such as New Economic Geography and Evolutionary Economic Geography provide deeper insights into the role of innovation, infrastructure, and human capital. Given the conflicting findings, testing these models against region-specific data is essential for developing effective policies to mitigate disparities and ensure inclusive growth.

These theories provide background for presenting evidence-based insights on how disparities manifest across different regions and time period. It is important have a relationship between theoretical and empirical studies, so that disparity can be resolve effectively. Empirical studies test these theoretical assumptions using real-time data. It helps in revealing patterns, trends and effectiveness of interventions. This interaction ensures that theories remain true to reality while empirical studies is directed by logical conceptual framework. Moreover, it assists to bridge gap and reshape theories and practices.

Review of Studies in Regional Disparity

Literature review of the empirical studies is crucial to analyse the recent trends, understand the cause and consequences of regional disparities both in India and globally. These studies provide evidence-based insights that go beyond theoretical framework. It helps to highlight how disparities manifest across various spatial scales and sectors. The coverage of empirical studies in Indian context focuses on inter-state and intra-state disparity. Globally, empirical literature encompasses cross-nation and cross-region comparison. This disparity includes range of themes such as infrastructure development, income, wealth, access to basic amenities, gender etc. These literature helps to uncover patterns of inequality, provide comparative frameworks and share best practices to address regional disparity.

India

The numerous policies measures aim at providing equity in development across states. India had a steady economic growth of several decades. However, growth has not been evenly distributed among the different regions of India, thereby causing widen inequalities among region [13]. A recent review of the studies has underscored the growing persistent regional disparities in India. The evidence of economic divide is particularly stark. The World Inequality Report [58] reveals that the richest one percent of the population holds twenty two percent of the total national income, while the top ten percent owns fifty seven percent of the income. In stark contrast, the bottom half of the population earns just thirteen percent of the total national income. Based on the report by Oxfam state that Indian households was severely impacted by the COVID-19 pandemic [59]. The report also reveals that eighty five percent of Indian household have witnessed decline in their income during this period.

Wealth concentration among a small elite in India is worrisome. In year 2021 alone an increase in number of billionaires from 102 to 142 was seen where the majority of the population faced economic challenges. The poorest 552 million people in India own the same wealth as the top 98 richest, which highlights the extreme inequality in the country. This growing disparity between the ultra-wealthy and the rest of the population raises serious concerns about social cohesion, economic stability, and the overall development trajectory of the country. More recent study [60] depicts wealth inequality across 707 districts in India and revealed significant regional disparities. Affluent households were found to be concentrated in the north-western and southern regions. In contrast it was observed that higher levels of poor and marginalized people reside in the central and north-eastern areas. Yasmin and Bhat [61] study found substantial disparities at the inter-state level. Disparity in terms of per capita gross state domestic product has widened during the post-reform period (2003-04 to 2012-13) as compared to the 1990's.

The trend of increasing regional disparity is visible not just in economic growth but also in socio-economic conditions, social well-being, infrastructure, and human development indicators. Kumar and Rani [17] study used the Social Development Index (SDI) to prove significant disparities among states and union territories in India. The findings confirmed a north-south divide in social development. The study also found substantial disparities at the district level within some states. This highlights the complexity of regional disparities, which exist not only between states but also within them. A similar study [15] was done which highlighted the socio-economic inequalities across its 28 states. The study identifies colonial legacies, history, geography, economics, and inadequate infrastructure as factors contributing to these disparities. Jose [13] also found a huge income disparity among various states in India coupled with the difference in human development index and infrastructure sector. In parallel to that, another study argues that due to decline in public investment and globalization have made disparity in the level of amenities more pronounced [62].

These studies summarise, that regional disparities continue to be a significant challenge in India. This indicates a complex scenario with variations across different dimensions of development. The continuous perseverance of these disparities underscores the need for targeted policies, institutional innovations, community participation, and equitable resource distribution. This will help to address these imbalances and enhance the quality of life in underdeveloped regions. There should be a balanced regional development, taking into account both inter-state and intra-state inequalities.

Worldwide

Socio-economic and spatial differences are on a global level manifested by constant and enlarging inequalities across regions and countries. In this aspect, convergence actually

recruits growing divergence across regions between old member states and within new member states of the European Union. Where within-country differences are more prominent due to numerous socio-economic factors, moreover, innovations also lead to develop disparities among regions [63]. A similar study analysed inequality across 161 countries. Middle-income regions experienced the highest growth post-Great Recession [64]. The study also showed, 'how developed regions lagged, reflecting an "elephant curve" in global regional inequality?'.

Globalization and liberalization have spurred growth and many countries have achieved higher GDP growth rates. Sub-Saharan Africa and South Asia region have witnessed the progress in education and health but significant disparity still exists [65]. A strong impact of globalization and institutional dynamic is observed in Asian countries [66]. Asia continues to confront issues related to economic restructuring and uneven regional growth. In a study authors analysed the relationship between regional inequality and economic globalization among 47 countries from 1990 to 2007 [67]. The authors found a positive correlation between economic integration and regional disparities, particularly pronounced in low- and middle-income nations. Their study indicate that greater chance of regional inequality exhibits in the countries with higher globalization. This suggests that globalization leads to spatial inequality in regions within countries, with low-income regions often being the losers.

In spite of development in certain regions, socio-economic and spatial inequalities still prevail, which is a matter of concern for all around the world. Even sustained economic growth and globalization have failed to reduce regional disparity. This highlights the necessity for focused policies and initiatives to tackle regional inequalities and foster more equitable development.

Conclusion

The study indicates that both developed and developing economies faces regional disparity. It shapes socio-economic outcomes and influences policy frameworks worldwide. The conceptual foundations of regional disparity, its various typologies, and the theoretical evolution of regional development has been systematically examined in this research article. Regional disparity as a concept has evolved into a multi-dimensional phenomenon shifting beyond its primarily economic focus. This study also finds that inclusion of factors like quality of life, terrestrial, socio-economic conditions and digital transformation have made its assessment comprehensive yet more complex. It implicates how understanding of this phenomenon has evolved with shifts in policy priorities and theoretical frameworks. The classification of disparities into vertical and horizontal forms, along with approaches underscores the complexity of addressing unequal development. The evolution of regional development theories from the early works of Myrdal and Hirschman to the emergence of New Economic Geography provides a comprehensive framework for analysing spatial imbalances. Evidence from India and other parts of the world shows that the regional disparity still poses a significant challenge. Implementing policies aimed at wealth distribution necessitates to address these disparities. It requires the improvement in access to education and healthcare services. It is also needed to create equitable economic opportunities for all section of society. Thus, strategic policy interventions that support sustainable and innovative development pathways are imperative.

Author Contributions

Urooj Fatima conceptualized the research, and drafted the manuscript. Dr. Vinita Yadav reviewed the manuscript and made the editing.

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Clinical trial number

Not applicable.

Ethics approval

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Consent to participant

Not applicable.

Consent for publication

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Competing interests

The authors declare no competing interests.

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