

Research Trends in Housing Shortages and Road Network Efficiency Within Urban Master Planning: A Bibliometric Review

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Received:	29/1/2026	Accepted:	30/3/2026	Published:	31/3/2026
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Abstract

Urban inadequacies, such as the lack of proper housing systems and the declining road network efficiency, represent significant challenges for cities globally, particularly in developing nations. These shortcomings exert a negative effect on social equity, economic development, and urban sustainability, directly impacting the quality of life of urban inhabitants. Given that housing is an essential human need and road networks are fundamental for mobility, commerce, and social interaction, addressing these deficiencies is critical. Consequently, this study investigates these issues by incorporating planning strategies that integrate housing units and transportation systems into urban master plans. This research provides a comprehensive review of the pertinent literature regarding housing shortages, urban deficit analysis, and urban planning trends. Using the Scopus database for the period from 2001 to 2025, this study performs a bibliometric analysis supported by VOSviewer to demonstrate research trends, collaboration networks, and thematic clusters. Furthermore, the paper evaluates various methodological tools utilized in these studies, specifically Geographic Information Systems (GIS), Multi-Criteria Decision Analysis (MCDA), network analysis, and scientometrics. Finally, this research reviews diverse practices and identified the core difficulties faced by developing countries struggling to achieve sustainable urbanization.

Keywords: Bibliometric analysis; Urban Deficit Analysis; Urban planning; Housing Shortage; Road Network Efficiency.

1. Introduction

Planning of cities can be a very important tool that can help them deal with the problem of growing populations and the resulting rise in economic activities and needs in infrastructure. Studies have shown that urban planning systems have a long-term effect on the structure of urban environments [1]. Being a part of urban sustainability, good urban planning involves the development of a vision that takes into consideration the present needs, while protecting future needs, which leads to the establishment of a balance between urban development and environmental protection. Urban planning is strongly concerned with transport systems [2]. Due to rapid urbanization, traffic jams have been a common problem in many cities. Furthermore, the nature of transportation usage, as well as the variety of vehicles in use, also greatly influences the land use patterns and their overall effectiveness [3].

Within the context of the rest of the world, urbanization is referred to one of the main causes of numerous serious problems, especially in developing countries. These problems can occur in the course of population formation, and not just in the case of population growth, thus affecting the evolution of other critical areas and operations. This disproportion undermines the ability of urban management to respond effectively to the elements of the built environment, making it one of the most urgent modern and future issues of major cities. To understand these problems, past and present trends of population and activity inside urban places are analyzed, which fall within the domain of urban planning. Moreover, terms similar to the master plan are also used in the field [4].

Iraq is no exception, and its road system is believed to be incredibly dangerous; this is mostly due to the fact that the road network has poor surfaces and is improperly maintained on a daily basis. This condition has a negative impact on the functioning and stability of the vehicles. These shortcomings increase the likelihood and severity of road accidents, especially with the ongoing poor state of the roads. Studies have shown that road traffic accidents are among the major causes of high mortality rate that has been experienced in Iraq [5]. Recent years have seen a significant spike in the number of vehicles purchased, which has not been accompanied by corresponding improvements in the transportation infrastructure to accommodate this increase. This imbalance has led to increased traffic congestion and high accident rates. Therefore, effective traffic safety management should be implemented in the transport system, and the main aim of reducing the number of road accidents and traffic-related injuries is paramount on Iraqi roads [6],[7].

According to the World Health Organization's estimates, the rates of road-related deaths in Europe and North America have decreased significantly in the past, whereas there are no similar positive shifts associated with other parts of the world (World Health Organization, 2018, Global Status Report on Road Safety 2018). The statistics classify Iraq as a middle-income country with an incidence of 20.7 deaths per 100,000 people, recorded in 2016. Moreover, the annual statistical reports prepared by the Iraqi Ministry of Health show that the deaths caused by road accidents were the 8th leading cause of deaths in Iraq in 2017 and 2019, respectively, accounting for 3.47% and 4.9% of total deaths [8].

Despite the extensive literature on urban expansion, a critical research gap persists in the fragmented treatment of the housing and transportation sectors. Traditionally, these are addressed as isolated challenges, overlooking the systemic "Urban Deficit" that arises when housing growth is decoupled from road network efficiency. The innovation of this article lies in its integrated bibliometric approach, which synthesizes two decades of global research to redefine "Urban Deficit" not merely as a lack of assets, but as a strategic misalignment with the city master plans. By identifying the intersectional failures between residential demand and infrastructure supply, this study provides a novel theoretical framework to harmonize housing and transport planning within more resilient urban master plans. The current research paper attempts to summarize and demarcate the available literature in the body of knowledge, including academic and practical views, which examine (a) how housing and road network deficits are conceptualized and measured and (b) how these deficits can be compared and reconciled with the provisions of urban master plans. The study will use the methods of scientometrics and systematic review to determine the publication trends, theoretical

foundations, research methodologies (geographic information systems, network analysis, and multi-criteria decision analysis), geographical orientation, and current gaps in the knowledge. The general purpose is to scan the terrain of knowledge and propose possible research avenues and approaches that will enable the integration of housing and transportation concerns into how master planning is conducted.

2. Literature Review

2.1. Conceptualizing “Urban Deficit.”

The absence of adequate spaces in urban areas, infrastructure, and amenities that improve the living conditions in residential areas is called urban deficit. This concept creates a methodological and conceptual problem because of its complexity and heterogeneity of its aspects [9]. This global complexity is further evidenced by reports indicating that poor infrastructure development and a lack of sufficient public space are recurring consequences of housing policies worldwide [10]. To operationalize this concept, governmental and international bodies have attempted to institutionalize its definition; for instance, in 2009, the Chilean Ministry of Urban and Rural Development, working with the Commission of Housing and Urban Studies (CeHU), established a definition of urban housing shortage, which was characterized as a series of urban and housing deficiencies that had a strong influence on housing progression and quality of life. Complementing this view, the Inter-American Development Bank (IDB) recognized in 2018 that the qualitative issues are tied to the urban features available to the population [11]. Nevertheless, the reality of urban problems remains subjective in the minds of inhabitants, primarily through low accessibility and insecurity a gap that highlights why the issue is complicated and often assessed with an insufficient set of variables [12]. In order to consider the efficacy of those policies, a set of indicators has been proposed, one of which is access to housing and urban facilities (see Table 1).

Table 1: Dimensions of the housing deficit and indicators (Source: [13])

Housing Deficit	Definition	Indicators
Quantitative	The number of housing units that need to be produced to satisfy the housing needs of the current population	<ul style="list-style-type: none"> – Availability of exclusive homes – Affordability – Allegamiento – Overcrowding
Qualitative	Lack of quality of construction material and availability of basic services such as drinking water, sewage, and electricity	<ul style="list-style-type: none"> – Habitability – Availability of services – Quality of construction – Availability of bathroom and kitchen inside the house – Privacy
Urban	Lack of the availability of urban spaces, infrastructure, and access to facilities or amenities, such as hospitals, schools, and parks, that	<ul style="list-style-type: none"> – Availability of urban spaces and infrastructure – Quality of the urban spaces – Accessibility and availability of

	contribute to the quality of life in residential areas	homes to amenities and facilities – Safety
Social	Lack of non-physical or intangible aspects, such as a sense of integration and social cohesion at the local level of the neighbourhood or building	– Social networking – Social interaction – Sense of community – Sense of belonging – Bonding social capital – Interpersonal trust – Solidarity – Neighbourhood attachment – Neighbourhood social cohesion

2.2. Housing Shortage: Measurement and Spatial Analysis

The housing shortage is described as the difference between the number of dwellings that are available without supply constraints and the actual number of dwellings. The concept of the scale of this shortage is essential to policymakers, who can calculate the degree of the housing supply problem and the efficiency of solutions. However, this has been overly discounted in earlier studies that assume that the housing shortage is less than it would have been without historical construction rates or family formation rates continuing into the current period. This assumption does not consider how supply constraints have contributed to historical trends.

To address these limitations, recent empirical models have shifted toward integrating spatial and economic variables. In 2021, a supply and demand framework was used in an applied study in the United States to evaluate the real national housing shortage. The study exploited county data regarding land allocation with reference to housing prices, and it was one of the first instances of such a broad-based analytical model that is applied in this case. The results of the research study showed that the national housing crunch was estimated at 20.1 million units, which amounted to 14.1 percent of the total national housing stock. It was estimated to be four to five times higher than previous estimates and 13 times higher than the White House estimate, thus creating a more realistic picture of the housing gap and a sophisticated strategy of dealing with it. Moreover, the findings of the study showed that the extent of the housing shortage was lower in areas with less rigid urban planning and higher in areas with strict regulations and high demand for housing, which is in line with the theoretical forecasts in the field of economics on the interrelation between regulation, demand, and shortage of housing supply [14].

While the US study emphasizes regulatory and market constraints, the challenge of housing accessibility in developing contexts often involves deeper socio-economic disparities. Access to housing, which is a fundamental human necessity, helps improve the quality of life. Housing is a reliable and vital asset for generation and investment opportunity worldwide. Income disparity has resulted in housing shortages and unequal economic growth among various races and ethnicities from around the world. A study was done based on the TG-12 Technical Group report issued by the Government of India. The research was limited to the National Capital Region (Delhi), and the period 2001 to 2011, and its focus was on the living conditions through indicators such as housing aging, overcrowding, and household homelessness. Based on TG-12 data, the study estimated that about 18.78 million urban households in India did not have

adequate housing, i.e., there was a high level of overcrowding and a shortage of housing units. It also showed that mismanagement of financial resources was contributing to the poor condition of existing housing, and it rendered it unlivable for some. An attempt was made to measure the composite parameter of housing scarcity using a composite index in nine districts of Delhi, and the analysis findings showed an asymmetrical pattern of distribution of housing scarcity across districts. Researchers also concluded that the housing deficit became significantly worse between 2001 and 2011, especially in the northern and central districts and New Delhi. The results also demonstrated that six out of the nine counties saw an increase in housing scarcity, in addition to homelessness rates rose in all nine counties, while rental units increased in seven counties, indicating an increase in pressure on the region's housing market in that period [15].

Further extending this spatial complexity to other developing regions, one of the studies conducted in urban centers in sub-Saharan Africa, South Asia, and Southeast Asia examined the current issues of homelessness and rapid urbanization. Scholars were interested in the question of how fast urbanization, in fact, more than economic growth, is impacting living conditions and the suitability of housing in these neighborhoods. It employed multilevel econometric analysis of both cross-sectional data on households and aggregate data at the regional level. This analysis cross-tabulated both demographic and health survey data with population-related data of functional urban areas, which are simply defined as densely populated areas and those functionally linked with surrounding suburbs. These findings demonstrated that, on average, increased urbanization was linked to improved living conditions and reduced regional rates of housing shortages. Interestingly, the research also discovered a non-linear trend, specifically a U-shaped correlation between suburban urbanization rates and housing shortage rates, whereby, suburban development is initially beneficial to housing conditions until a threshold, after which it reverses and exacerbates the housing crisis. The researchers concluded that the understanding of the dynamics of areas surrounding the cities is necessary to create policies that can help reduce housing shortages and enhance the living conditions in fast-growing urban regions [16].

These diverse geographic findings converge on the conclusion that the reason this is so complex is that there were housing issues before the crisis, and it is very hard to isolate their consequences. Housing shortages have been building up over many years of underproduction, and prices have risen, making affordability more of a problem. Moos et al. (2018) revealed that these problems have been made worse by demographic changes, in particular due to the increased number of millennials seeking urban housing [17].

2.3. Road Network Efficiency: Indicators and Methods

The increase in the number of automobiles on the roadways, especially in cities, has caused traffic congestion. While vehicles are meant to improve the lives of people, their application can sometimes have negative implications, degrading them. Traffic difficulties in metropolitan settings are brought about by inconsistencies between street capacity and traffic load, as well as poor management of traffic and pedestrian movements. The street and road network are a very important part of the urban transportation system and guarantees the efficiency of a city in general. The urban transport, as represented by the street and road network, is part of the dynamic system of each city, unique and integral. The urban road network is a

complex technical system that serves the needs of drivers, passengers, and pedestrians in terms of traffic and services.

To bridge the gap between these theoretical systemic requirements and practical urban challenges, empirical evidence from specific metropolitan contexts is essential. A study carried out in Kyiv, Ukraine, in 2022 set out to tackle the problem of inefficient operation of street/road networks in large cities, and the related problems of congestion, time costs, and economic impacts. Researchers based their findings on a scientific analysis of urban roads and field observations of traffic flow in Kyiv. They were able to categorize the factors that impact network performance and create a hierarchical model of their impact priorities. They were also able to determine that 75-85% of traffic jams occur daily at the same locations, and they concluded that the result of intelligent traffic management and optimum bottleneck design contribute to reducing delays, lowering the rate of fuel consumption, and having positive economic and environmental impacts [18]. Furthermore, addressing road network efficiency necessitates a shift toward sustainable transport paradigms. This includes integrating public transportation systems as a viable alternative to reduce private vehicle dependency, thereby mitigating chronic congestion and enhancing the overall urban mobility framework.

Building on this hierarchical understanding of network performance, the literature suggests that assessing is essential. The evaluation of transport network functioning has been widely explored. Studies usually utilize key performance indicators to evaluate the operation of urban road networks. Some studies focus on traffic flow quality, using some indicators, like trip duration, delay at junctions, and traffic flow, to guarantee quality flow [19].

In contrast, other scholars shift the focus from flow quality to public safety, analyzing road accident and fatality statistics [20]. Others measure performance in terms of network accessibility, which in turn is the ease of reaching desired places. Other assessments may include pollution levels and road maintenance, among others. The working of the urban road network is dependent on several factors [21].

Ultimately, the multidimensional nature of these indicators reflects how network connectivity has been found to have effects on road users, delay [22], tourism [23], and economic growth [24].

From the perspective of highway authorities, various road authorities, and international development organizations such as the World Bank and the Asian Development Bank, transportation connectivity remains an important measure of network performance [25].

2.4. Integrating housing and transport analyses

Decisions about where to live and work are an important influence that determines the final shape of the new urban fabric and play a key role in determining travel movement, related greenhouse gas emissions, and energy use. Furthermore, the ability to understand and predict residential and work site selection processes is extremely important for long-term sustainable urban land use and transportation strategies. Therefore, in order to understand residential and work site selection processes, the interaction between different site-specific characteristics observable at several spatial scales and the heterogeneous characteristics of decision-makers need to be analyzed.

To explore these interactions empirically, research has investigated the sequential nature of household decision-making in developing urban contexts. A pilot study was carried out in the second largest city of Ghana, Kumasi, West Africa, to understand housing and work choice mechanisms at the household and individual level within an urban context. The study used data from a cross-sectional study of 665 households and 1,158 workers, and it focused on analyzing the interaction between housing and work decisions over time. The results showed clear differences in spatial preferences between households and individuals, whether in terms of urban area type, housing type, or rental arrangements. The analysis also showed that housing choice decisions are made before work location choices, suggesting that there is a sequential choice process between first home choices and later job choices. The study concluded that knowledge of the interrelationship is contributory to informed planning support systems development and integration of site choice in sustainable urban development and transport management policies [26].

This sequential logic underscores why residential development is perceived to be one of the most noticeable factors that influence the dynamics of land use, and residential development represents the largest share of overall land use in urban areas [27], [28].

Consequently, monitoring and simulating people's residential and work site selection behavior have been the subject of research in a multidisciplinary field of study known as Land Use-Transport Interaction (LUTI) modelling. This field is concerned with the development of advanced dynamic simulation models that are applied as decision support systems for the integrated land use development policies and travel demand management [29], [30]. LUTI models contribute to explaining and predict how the urban site selection processes are shaped at the micro level of emerging urban structures and their co-evolution with mobility patterns [31], [32].

While traditional LUTI models provide a snapshot of these interactions, contemporary research emphasizes the necessity of incorporating temporal dynamics to capture long-term shifts. Another study conducted in Germany by the Technical University of Munich (TUM) suggested a dynamic model of the integration of transport and land use interaction to comprehend the influence of the transport system on residential decision-making. The scholars applied a multi-year simulation model in order to explain time lags between city mechanisms, including shifts in travel patterns and population movement, as well as the development of infrastructures. The findings showed that this dynamic approach offers a higher capacity for assessing transport policies and city planning than traditional models, which fail to capture temporal development [33].

2.5. Master plans and alignment studies

Basically, master plans are organizational and administrative tools formulated and implemented by local urban authorities, based on the principle that "most planning responsibilities fall under the local level". These plans serve as the basic tool for the guidance and control of the urban development process. Population density is not dealt with directly but indirectly via zoning of land use and urban development rules [34]. Master plans, also known as comprehensive city plans, cover the state's institutional vision for regulating urban development at the local level. They are legally binding, and they are the prime reference when addressing

urban growth and expansion. They include predefined sustainable objectives in order to mitigate the adverse effects of urban sprawl and contribute to urban development management by promoting equilibrium between economic and social components of development. Master plans are an integrated system that is developed, implemented, evaluated, reviewed, and re-approved by municipalities as a way to achieve effective management of urban growth pathways. The process of preparing, modifying, and reviewing these plans, as well as formulating new ones, is a systematic, iterative, and exploratory cycle that expresses the dynamics of urban planning and requirements of sustainable development [35].

Despite their comprehensive design, the practical efficacy of master plans is often challenged by rapid urban shifts. Although master plans are futuristic and involve the establishment of long-term strategic measures, in certain cases, the plan may become ineffective in its potential to be effective and also may become outdated in a lesser span of time than needed as per the set time scale by the state, and hence lose its potential to guide urban development procedures efficiently. Hence, it is important to conduct a systematic evaluation of the level of correspondence between the planning theory and the applied practices and their results, together with the analysis of the effectiveness of the current planning system in the regulation and control of the path of urban development [36], [37].

Case studies across different geopolitical contexts illustrate this varying degree of alignment. A study was conducted in Mashhad, Iran, in 2021 titled "On the Master Plan Conformance with Urban Reality: A Comparative Assessment" to assess the conformity of the Third Master Plan with urban reality. It was based on demographic and spatial indicators using Delphi technology and Geographic Information Systems (GIS). The results showed that in the second alternative of population projections, the conformity rate reached 83.52% with a northwest-oriented growth trend in accordance with the plan. The study also showed that the inconsistency of land use occurred at 24%, and the implementation rate reached 94.7%, despite uncontrolled urban expansion and delay in the construction of some roads. The study concluded that the plan was successful in predicting the population and spatial trends, but had shortcomings in controlling the urban boundaries and implementation rate of certain land uses. It noted the importance of ongoing evaluation as well as institutional cooperation to ensure that plans are kept in line with the changing urban landscape [38]. In contrast to the relatively high demographic conformity in Iran, other regions exhibit a deeper disconnect due to rapid economic transitions. In Nanjing, China, the main objective of a study in 2013 was to evaluate the consistency between the master plan in the period 1991-2010 and the actual urban development situation after economic transformation. It was based on institutional and political analysis using spatial and economic indicators. The results showed that the plan foresaw the growth trend in the city and overlooked the control scope of expansion and land use. Local alliances helped in speeding development, but were always vulnerable to stronger influences. The study concluded that there was a need for more flexible mechanisms and institutional coordination in ensuring that plans are relevant to the changing realities [35].

To move beyond qualitative institutional analysis, recent literature has prioritized objective spatial quantification methods to detect these misalignments. Another study, conducted in Mutare, Zimbabwe, in 2015, aimed to test the effectiveness of the city's master plan "in guiding the city's urban development and regulating land use to achieve environmental

sustainability". Researchers used a superposition analysis with the help of Geographic Information Systems (GIS) to compare the land use proposals formulated in the master plan with the existing land use pattern within the city. They also applied an error matrix and the kappa coefficient to quantify the level of conformity between the urban plan and existing development. The results showed a high degree of conformity overall, although deviations were found in certain land use categories. The study concluded that the use of GIS -based methods of monitoring urban compliance is an objective, fast, and effective approach to detect nonconformities at an early stage and it contributes to promoting sustainable urban management [36].

2.6. Methods Used in the Field: Spatial Tools, MCDA, and Scientometrics

Previous studies have adopted a variety of sophisticated analytical tools in order to fully analyze aesthetic urban deficits in correlation with city master plans. Geographic Information Systems (GIS) have been identified as a key tool in spatial studies, enabling a spatial framework for complete spatial analysis and visualization of data. This has helped decision-makers gain an understanding of urban problems and achieve a more comprehensive and accurate evaluation of alternatives [37].

Complementing these spatial visualizations, network analysis has also been applied to determine the efficiency of road networks, including accessibility, connectivity, and compatibility with projected urban growth. These techniques have proven to be powerful tools in urban studies, making it possible to represent system components and map relationships between them, thereby providing a paradigm for understanding the spatial and functional structure of the city. Such approaches contribute to recognizing a more holistic state of urban systems by pointing out levels of connectivity, efficiency, and accessibility of urban areas, which improves precision in analysis and supports scientific and engineering-based planning decisions [38].

While spatial tools address the "where" of urban deficit, the "how" of decision-making often requires robust evaluative frameworks. The multi-criteria decision analysis (MCDA) has been a popular general framework that comprises a number of alternative evaluation and comparison methods based on several criteria. Among the most well-known approaches is the Analytical Hierarchy Process (AHP) [39], [40], which breaks down complex problems into smaller and more manageable sub-problems. It has a simple methodology, based on the intuitive capacity of decision-makers to make dichotomous comparisons of elements of a problem. This renders it one of the most popular and much-utilized MCDA methods in engineering and management. AHP may also be categorized as a compensatory model, as it gives the chance of balancing different criteria; it is highly flexible in circumstances that require trade-offs between competing goals[41].

The evolution of these methodologies has recently expanded to include large-scale data synthesis and temporal monitoring. Research has used remote sensing in determining land-use changes, and economic models have been used to estimate affordability. Advanced methodological measures such as bibliometric and scientometric analyses (scientific mapping, perceptual visualization) were also used to investigate the dynamics of scientific knowledge formation and trace its evolution over time. Such approaches facilitated the discovery of intellectual frameworks and social systems that come with scientific research and demonstrate

patterns of interrelatedness and overlap of thousands and even millions of published articles and studies [42]. Crucially, the literature of the time indicated a significant methodological separation; the transportation literature failed to apply similar indicators to the housing literature, and the syncretic treatment of the concept of urban deficit as a holistic subject matter did not exist.

Recent empirical applications demonstrate a trend toward overcoming this separation by combining Remote Sensing and econometric modeling. A study was conducted in Rajasthan, India (1988-2018) using the Landsat 5, LISS-3, and Sentinel-2A MSI satellite images to estimate landscape change as well as to evaluate ground-truth-based land cover maps. The review showed that the agricultural land, barren land, built-up land, and tree cover had significant changes, where agricultural land declined by 4.75 per cent during the period 2008 to 2018. The forecasts of 2031 and 2041 indicated further decline in the cropland and a rise in uncultivated areas. The paper has highlighted the application of government land management practices in order to reduce the amount of agricultural and forest land transferred to degraded land, which will enable the use of resources in a sustainable manner[43].

Similarly, addressing the socio-economic dimension, a different study in Ankara, Turkey (2016-2018) examined the demand dynamics and housing affordability through the use of econometric models. Using the figures obtained in the previous housing projects, the researchers used the Johansen cointegration test, analysis of variance (ANOVA), and impulse response testing to determine the causality between the macroeconomic variables and the housing demand. It was found that the level of homes sold as a measure of demand had a direct correlation with mortgage interest rates, building and occupancy permits, and household expenditure. The research has concluded that a stable macroeconomic condition means that consumers are likely to invest in housing as a residential place as well as a social status-generating mode. The paper introduced a housing demand model that can assist both real estate developers and policymakers in comprehending the impact of supply and income on housing transactions and provide viable indicators for future housing strategies [44].

Ultimately, the most recent literature points toward a hybrid synthesis of these methodologies to achieve sustainable governance. In addition to a study in the coastal regions (2025), a sustainable framework for planning urban settlements was created with the help of GIS and MCDA when the AHP and TOPSIS methods were used. It involved 16 objective data layers such as land use, slope, population density, drainage, elevation, and closeness to infrastructure and services. The findings showed 16% highly suitable, 32% suitable, 26% moderately suitable, 20 % low suitability, and 6 percent very low suitability. Sensitivity analysis revealed that land use, slope, and population density were the most significant factors. The AUC value of 0.89 showed high predictive power, validated using the ROC curve. This research has demonstrated that the AHP plus TOPSIS in GIS is a relevant mechanism to support evidence-based urban planning and assist in adaptable land and infrastructure management plans in high-risk regions [45].

Similarly, research in urban planning in 2025 aimed at improving sustainability and governance by applying GIS and MCDA together. The scholars applied economic, environmental, social, and governance standards to find the best areas to urbanize. Results

indicated that the GIS-based and MCDA-based site selections are a powerful tool to solve the issue of sustainable urban land use. The resulting paper presented the integration of these superior methods of analysis and how they facilitate holistic and smart city planning, support sustainable and robust city development, and improve intelligent decision-making in city governance [46].

2.7. Geographic and thematic coverage

In urban and social studies, naming both geographic and thematic coverage is an important part of setting the scope and boundaries of the study. Geographical coverage means the scale of the research, either a single city, a group of cities, or the urban areas in different countries, while thematic coverage describes the issues or domains of interest considered, i.e., transportation, housing, and informal settlements. Combining these two dimensions enables the researchers to have a more thorough grasp of the problems of the cities and uncovers research gaps caused by an over-focus on certain aspects or issues in the city while completely ignoring others.

Demonstrating this multi-city geographic approach, recent literature has utilized high-resolution data to expose infrastructure disparities across diverse urban landscapes. A recent study in 2025 found, across 16 African cities, that constrained and frequently informal public transport networks limit residents' accessibility to essential urban opportunities. Integrating the General Transit Feed Specification (GTFS) and OpenStreetMap (OSM) data from the Conveyal platform and assuming a 45-minute time constraint, the researchers identified disparities in terms of accessibility: cities like Kampala and Addis Ababa were relatively more accessible, whereas cities like Bamako and Freetown were characterized by significant gaps. Population density, location of services, and transport performance mismatch have been concluded as a systemic problem indicating the need for datadriven planning and route optimization requirements and increased coordination of land use and transport policies to provide equitable urban mobility [47].

While the aforementioned study focuses on transport accessibility, the thematic coverage in other regional reviews extends to the socio-institutional drivers of urban informality. A sub-Saharan Africa systematic review in 2025 presented an ordered analysis of issues related to informal settlements and growth in peri-urban areas. This review was based on ten studies that were conducted in various spatial and social units, which examined socio-economic, environmental, and governance factors that result in the establishment and survival of these settlements. It was found that socioeconomic marginalization, poor institutional coordination, and duplication of the land governance systems contribute to aggravation of the informal settlements problems, and that the customary and religious institutions can play a part in land access and conflict resolution. Another aspect of the environment that was identified in the review is that the environmental risks in the form of poor sanitation, water pollution, and waste management are not properly considered. Importantly, the review identified a critical gap in the inadequate use of architectural and spatial planning strategies to develop informal settlements and integrate them into the official urban fabric. It prescribed multi-disciplinary solutions that included policy, governance, and architectural solutions on inclusive and sustainable urban development [48].

Expanding to a global scale, the need for thematic integration becomes even more pronounced, particularly regarding the synthesis of sustainability and master planning. A global systematic review (2025) examined the literature on the sustainable development of cities, city master-plans, and smart cities. Researchers used content analysis of various research papers to trace the projects for sustainable urban development and the integration with the master plan, especially for smart cities. Consistent with the findings of this current paper, the results indicated an obvious absence of studies combining these three themes with one another in a discussion because these themes are often dealt with separately. The study concluded that bridging this literature gap was an important and original step, and proposed replicating a framework for future smart city master plan development and the integration of sustainability and innovation in urban planning [49].

Finally, to ground these global trends in a specific spatial context, local studies have applied advanced simulation tools to evaluate the direct impact of master plans on connectivity. A study comparing the Yas Island master plans for 2020 and 2030 in Abu Dhabi, United Arab Emirates (2024), was conducted using the spatial syntax and computer simulation methods through the software DepthmapX. Researchers used street network analysis and spatial integration to measure walkability and urban connectivity across different areas of the island. The findings showed limited walkable space to walk around in the most congested areas, as well as limited pedestrian access to internal street networks. The study also identified that there was a dominant highway (Sheikh Khalifa Bin Zayed Street) running through the center of the island, which further limits the urban connectivity. The study recommended reconsidering the use of vacant land and turning highly connected areas into public and social spaces, as well as reviewing road design in future development projects in order to improve sustainability and walkability [50].

3. Data Collection

Scopus was chosen to achieve the aims of the study. Scopus is the most comprehensive abstract and citation database of peer-reviewed literature from a wide range of disciplines [51]. It gives comprehensive perspective in the world's research output in science, technology, health, social science, and the arts and humanities. The Scopus database contains all of the journals in the MEDLINE and allows for citation analysis [52], [53]. The Scopus database provides various operating functions that make the bibliometrics easier. Operating features comprise the journal name, kind of document, year of publication, authors and affiliations, number of citations, and document h-index metrics [54], [55]. Many researchers have utilized the Scopus database with VOSviewer software, as it is employed for visualization and analysis in order to produce bibliometric maps [56],[57],[58]. "Only peer-reviewed journal articles and review papers published in English between 2001 and 2025 were included; conference papers, book chapters, and non-English publications were excluded." The selection of this 25-year timeframe (2001–2025) was strategically determined to capture a comprehensive longitudinal trend, aligning with the global transition toward digital academic archiving and the evolution of urban sustainability agendas since the inception of the Millennium Development Goals (MDGs). This ensures a robust and up-to-date dataset that reflects the current state of the art in urban planning research. and was based on the following keywords: urban planning, master plan, land use planning, residential areas, housing planning, urban housing, housing deficit, road network, transportation

planning, urban roads, infrastructure planning, infrastructure gap, urban deficit, planning deficiency, and Iraq, Middle East, or developing countries. The received results were uploaded in the form of CSV format for processing using VOSviewer software to visualize and analyze the trends in a bibliometric model. to find studies and research on applying Urban Deficit Analysis: Integrating Housing Shortage and Road Network Efficiency Relative to City Master Plans. In VOSviewer, a minimum threshold of five keyword occurrences was applied using full counting, and the association strength normalization method was used.

4. Analytical Methods

The Scopus database was used in the bibliometric analysis. TITLE-ABS-KEY fields were used to search for predetermined keywords on the topics of urban planning, housing shortage, road network efficiency, and master plans. Peer-reviewed articles and review papers concerning the subject published between 2001 and 2025 in English were included. Before analysis, duplicate records were eliminated, and standardization of keywords was done. The resultant data in CSV format were then exported, and VOSviewer was used to analyze the data. Full counting and association strength normalization were used for keyword co-occurrence analysis, with a minimum occurrence threshold of five, was used. It is also a method that allows researchers to learn about the development of a topic and mark out the emerging spheres of a topic [59]. Bibliometric analysis has become widely used in business research in recent years due to the improvement of software (e.g., Gephi, Leximancer, and VOSviewer) and in the databases of scientific literature (e.g., Scopus and Web of Science), not to mention the cross-disciplinary application of information science to business research [60], [61]. The bibliometric study is based on data obtained from Scopus. The results were downloaded in CSV format and examined with VOSviewer in order to learn the bibliometric trends. VOSviewer can utilize network-based nation maps, keyword maps, and multiple-item maps. [62], [63], [64], [65], [66]. Visualization of Similarities (VOS), a tool that attempts to enable the easy generation of bibliometric maps and map visualization, is gaining popularity in bibliometric research. The method enables rapid literature collection and discover interconnections of the chosen articles within the choices. VOSviewer software allows mining of data, plotting of articles, and categorizing articles retrieved in the database [67].

4.1. Top contributions

Table 2 gives a comprehensive description of the ten leading contributions, putting them in the context of who has written, the country, and the organization, and underscores how various scholars and institutions have made a tremendous contribution in this area. Among the authors in terms of total link strength, the three most prominent are Ding, Zhiming (25 publications), Wang, Wei (24 publications), and Cai, Zhi (23 publications). China is the undisputed leader when considering national contribution, as it has a fantastic number of 412 publications. This is far ahead of the United States, which makes a total contribution of 294 publications, which places it in second place. The UK ranks number three with a commendable 131 publications, which indicates that the country continues to make contributions to the academic fraternity in the field. Regarding organizational contributions, the Southeast University now has the first place with the most publications, at 44 in total. Next, there is the Key Laboratory of Road and Traffic

Engineering of the State Ministry of Education with a commendable second place, and the Beijing Jiaotong University with the noteworthy third place, having 28 publications in total.

Table 2: Top 10 Contributions by Authors, Countries, and Organizations.

No	Authors	F	Countries	F	Organizations	F
01	Ding, Zhiming.	25	China	412	Southeast U.	44
02	Wang, Wei.	24	United States	294	Key Laboratory of road and traffic engineering of the state ministry of education.	29
03	Cai, Zhi.	23	United Kingdom	131	Beijing Jiaotong U.	28
04	Gao, Ziyou.	22	Hong Kong	124	Wuhan U.	25
05	Guo, Limin.	21	Australia	91	U of Chinese Academy of Sciences.	24
06	Ibeas, Angel.	20	Canada	82	Wuhan U.	23
07	Moura B, Jose L.	18	Germany	61	Aerospace Information Research Institute.	22
08	Vitetta, Antonino .	17	Singapore	61	Southeast U.	20
09	Tsigdinos, Stefanos.	16	India	59	Southwest Jiaotong U.	18
10	Kepaptsoglou, Konstantinos I.	15	Saudi Arabia	55	The U of Hong Kong.	17

Note: F= Frequency, U= University

4.2. Co-authorship measures

4.2.1. Author map

As presented in Figure 1, the interdependence among authors is intricate and aims at examining different deficits in urban areas. Specifically, such a pictorial presentation particularly brings out the structural interdependence that exists between the issues of housing shortages and the effectiveness of transportation systems in general. These are explored along with city master plans that direct the development of cities. This holistic network representation is not only a simplistic visualization of a collection of interrelated components, but also complex visualization in that it includes different line thicknesses, which are relevant in communicating significant information regarding relationships and interactions. In this complex figure, each node is illustrated differently in the form of circles of different sizes and colors to show the different authors and their contributions that are unique to the discipline. These nodes are linked to each other by a multi-colored network of lines in which the colors of the line represent different identities and organizational belonging of this complicated network of professionals. Moreover, the difference in the thickness of these lines and the spacing between them is also important evidence of the robustness of the relations and the extent of cooperation of the authors engaged in this study. These visual components are useful in conveying the collaborative aspect of the academic discourse of urban deficits, and it is therefore easy to see how the visual links play out in providing solutions to problems of urban planning. It consists of 491 single nodes, and each of them is well structured in 38 specific clusters that demonstrate interdisciplinary connectivity. These nodes have dimensions that are designed to depict the scientific influence and impact of

the authors who created them and serve as a visual indicator of their contribution to science. Overall, the number of authors who have worked successfully and have contributed to at least two publications is 1,174, which is a vivid and active research community. Among them, they have a number of authors who are prominent at this high-impact domain, with some of them being well known, like Wang Wei, Gao Ziyou, Yang Chao, Liu Chang, and Zhang Lei. Their research has largely influenced the course of the studies on the topic. The fact that authors tend to form small groups or stay in the same cluster is a significant measure of how effective and powerful their interaction in the field of collaboration research is. This clustering effect is seen to be synergetic in the continuous growth of scientific knowledge that is assisted by these well-accomplished researchers. Their community work is an example of how successful a partnership is in promoting knowledge and leading to discoveries in their fields.

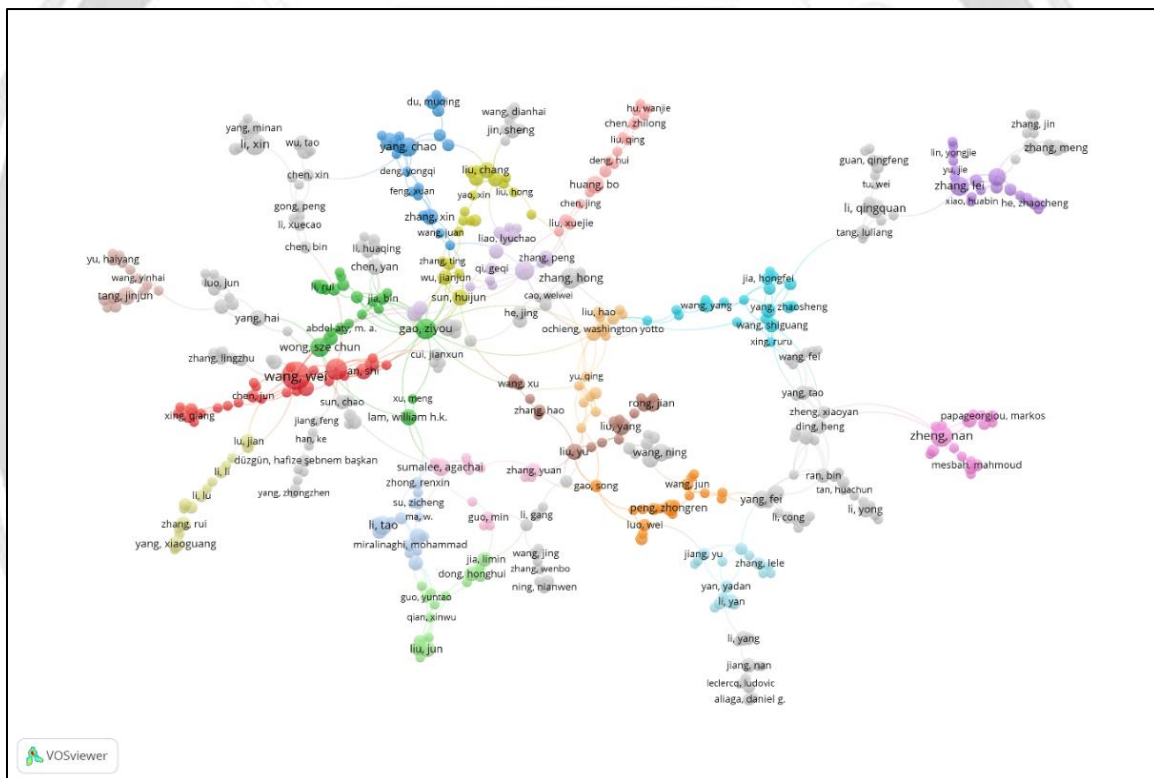


Figure 1: A network visualization map representing the author.

4.2.2. Institutes map

The bibliometric diagram presented in Figure 2 is a full-scale demonstration of the collaborative network of scientists who have made great contributions through the authorship of two or more academic articles. The given complex analytical tool is skillful enough to explain collaborative relationships among authors across a wide range of institutions. The academic

4.2.3. Country map

A network diagram provided in Figure 3 shows a closer look at the different countries with the largest number of research publications relevant to the given research topic that is under discussion. This educational scheme is composed of a total of 81 separate items, which are carefully grouped into 10 different sets, and which reflect specific contributions to the body of work in this field. The visual illustration is effective in bringing out the world picture of research output regarding the issue in question. Within the framework of an in-depth analysis of the multifaceted problem of the urban deficit, including the large lack of a sufficient number of proper houses, the efficiency and effectiveness of the city road systems, it is possible to note a certain impressive concentration of research publications on the burning problems in several main countries of the world. This involves, in particular, China with its fast urbanization struggles, the United States with its different urban landscapes, the United Kingdom with its unique city planning struggles, Australia with its own unique housing requirements, Italy with its historical city planning troubles, and Canada with its urban development. The network map is a vivid representation of the complicated linkages and cooperative interactions between these different countries in the necessary sphere of the city deficit analysis. It provides inestimable information on the different global efforts that are specifically directed towards the solution of the acute gaps in urban settings and the growing lack of proper housing. Moreover, the Urban Science project not only supports the sharing of innovative ideas but also supports the implementation of scientific research and provides numerous opportunities for significant collaboration and cooperation among various stakeholders engaged in urban development.

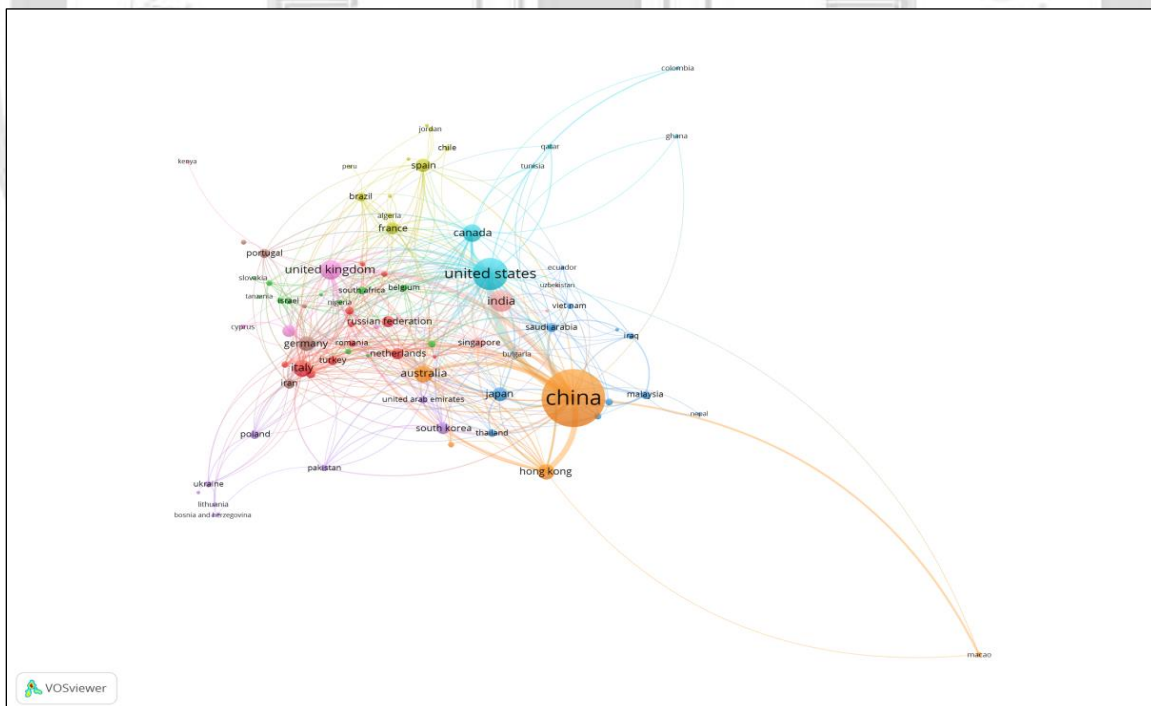


Figure 3: Network visualization map of the Country.

planning frameworks have a great disparity between their practical and theoretical perspectives, which reduces their ability to effective urban challenges.

Fifth, there is a large gap between informal settlement management and peri-urban growth, which are mostly left out of formal planning procedures and are poorly included in general urban planning.

Sixth, there are a number of long-term dynamic models in the literature that are aimed at tracking changes in housing and transportation patterns with regard to master plans, but most research is often done in a short-term context or involving a case study.

6. Conclusions

Rapid urbanization and unpredictable population growth have intensified the housing supply shortage and degraded transport connectivity in modern cities. This study demonstrates that housing deficits and road network inefficiencies are intrinsically linked; an imbalance in one often discourages investment or reduces functionality in the other, leading to systemic urban surpluses or deficits. Through bibliometric analysis and scientific mapping, this research establishes that poor housing and inadequate road infrastructure are inseparable facets that profoundly impact urban sustainability, equity, and municipal governance.

The findings indicate that while city master plans are intended to guide development, they often fail to adapt to the rapid proliferation of informal settlements and endemic infrastructural inequality. However, the integration of advanced analytical tools such as Multi-Criteria Decision Analysis (MCDA), Geographic Information Systems (GIS), and network analysis provides a robust framework for coordinating housing with transport planning. The analysis of global research trends reveals a significant concentration of scholarly output in developed regions, highlighting the need for more localized strategic planning in developing contexts.

In conclusion, housing and transportation must be treated as two complementary pillars of sustainable urban development. Bridging the gap between these sectors requires a transition toward evidence-based decision-making and a strategic roadmap that integrates infrastructure efficiency with residential needs to improve the overall quality of urban life.

References:

- [1] M. Carlucci and L. Salvati, "Assessing path-dependent urban growth with geographically weighted regressions," *Environ. Impact Assess. Rev.*, vol. 98, p. 106920, Jan. 2023, [doi: 10.1016/j.eiar.2022.106920](https://doi.org/10.1016/j.eiar.2022.106920).
- [2] H. Srivastava and D. Kakkar, "Reliable Transportation Solution for Urban Planning: VANET," in *Autonomous Vehicles Volume 2*, 1st ed., R. Rawat, P. Bhardwaj, U. Kaur, S. Telang, M. Chouhan, and K. S. Sankaran, Eds., Wiley, 2022, pp. 275–301. [doi: 10.1002/9781394152636.ch14](https://doi.org/10.1002/9781394152636.ch14).

- [3] W. Alkhadour, J. Zraqou, A. Al-Helali, and S. Al-Ghananeem, "Traffic Accidents Detection using Geographic Information Systems (GIS)," *Int. J. Adv. Comput. Sci. Appl.*, vol. 12, no. 4, 2021, doi: [10.14569/IJACSA.2021.0120462](https://doi.org/10.14569/IJACSA.2021.0120462).
- [4] Shadhan, "Spatial assessment of urban growth in Diwaniyah city, Iraq and its impact on sustainability development," *Int. J. Sci. Eng. Res.*, vol. 6, no. 7, p. 8, Jul. 2015.
- [5] E. Leidman, M. Maliniak, A.-S. S. Sultan, A. Hassan, S. J. Hussain, and O. O. Bilukha, "Road traffic fatalities in selected governorates of Iraq from 2010 to 2013: prospective surveillance," *Confl. Health*, vol. 10, no. 1, p. 2, Dec. 2016, doi: [10.1186/s13031-016-0070-0](https://doi.org/10.1186/s13031-016-0070-0).
- [6] M. Al-Zubaidi, H. Zubaidi, and B. H. Al-Humeidawi, "A review into studies related to the effect of the pavement surface condition on traffic safety: A scientometric analysis," *Al-Qadisiyah J. Eng. Sci.*, vol. 16, no. 3, pp. 169–179, 2023, Accessed: Jan. 29, 2026. [Online]. Available: <https://iasj.rdd.edu.iq/journals/uploads/2024/12/03/87042ac977c4a438e4e903c81f5c6ee0.pdf>
- [7] A. Hussien Mahdi, H. Zubaidi, and S. Das, "A scientometric analysis and bibliometric review of driver injury severity crashes studies," *Al-Qadisiyah J. Eng. Sci.*, vol. 16, no. 1, pp. 47–52, 2023, Accessed: Jan. 29, 2026. [Online]. Available: [https://www.safetylit.org/citations/index.php?fuseaction=citations.viewdetails&citationIds\[\]=citjournalarticle_764785_13](https://www.safetylit.org/citations/index.php?fuseaction=citations.viewdetails&citationIds[]=citjournalarticle_764785_13)
- [8] A. Aldhalemi and F. Abidi, "Evaluation of the Iraqi Road Safety System in Light of Crash Severity Indicators," in *Proceedings of 2nd International Multi-Disciplinary Conference Theme: Integrated Sciences and Technologies, IMDC-IST 2021, 7-9 September 2021, Sakarya, Turkey, Sakarya, Turkey: EAI, 2022*. doi: [10.4108/eai.7-9-2021.2314895](https://doi.org/10.4108/eai.7-9-2021.2314895).
- [9] MINVU y CEHU, "DÉFICIT URBANO-HABITACIONAL: UNA MIRADA INTEGRAL A LA CALIDAD DE VIDA Y EL HÁBITAT RESIDENCIAL EN CHILE," 2009.
- [10] P. Monkkonen, "Do we need innovation in housing policy? Mass production, community-based upgrading, and the politics of urban land in the Global South," *Int. J. Hous. Policy*, vol. 18, no. 2, pp. 167–176, Apr. 2018, doi: [10.1080/19491247.2017.1417767](https://doi.org/10.1080/19491247.2017.1417767).
- [11] V. Adler et al., *Housing What's Next?: From Thinking The Unit to Building The City*. Inter-American Development Bank, 2018. doi: [10.18235/0001594](https://doi.org/10.18235/0001594).
- [12] R. Garay, Y. Contreras, J. Díaz, R. Herrera y R. Tapia, "Propuesta para repensar las viviendas y el habitar Chile," 2020, doi: [10.34720/2NV4-0G09](https://doi.org/10.34720/2NV4-0G09).

- [13] V. Cortés-Urra, D. Czischke, and V. Gruis, "Addressing housing deficits from a multi-dimensional perspective: a review of Chilean housing policy," *Int. J. Hous. Policy*, vol. 24, no. 3, pp. 546–560, Jul. 2024, [doi: 10.1080/19491247.2022.2159123](https://doi.org/10.1080/19491247.2022.2159123).
- [14] K. Corinth and H. Dante, "The Understated Housing Shortage in the United States," *SSRN Electron. J.*, 2022, [doi: 10.2139/ssrn.4178923](https://doi.org/10.2139/ssrn.4178923).
- [15] R. K. Abhay and M. Sharma, "Housing shortage in a mega city: a spatio-temporal analysis of NCT-Delhi, 2001–2011," *GeoJournal*, vol. 88, no. 1, pp. 261–278, Feb. 2022, [doi: 10.1007/s10708-022-10597-5](https://doi.org/10.1007/s10708-022-10597-5).
- [16] D. Granda, L. Mateo-Peinado, M. Obaco, and J. Urrutia-Mosquera, "Housing deprivation in rapidly urbanizing regions: evidence from functional urban areas in Sub-Saharan Africa, South Asia, and Southeast Asia," *Glob. Chall. Reg. Sci.*, vol. 4, p. 100021, Dec. 2025, [doi: 10.1016/j.gcrs.2025.100021](https://doi.org/10.1016/j.gcrs.2025.100021).
- [17] M. Moos, D. Pfeiffer, and T. Vinodrai, "The Millennial City," 2018.
- [18] S. Yang, O. Stepanchuk, O. Pylypenko, J. Ji, and A. Bieliatynskiy, "Scientific basis for improving the efficiency of urban street and road network operation," *J. Navig.*, vol. 76, no. 6, pp. 685–708, Nov. 2023, [doi: 10.1017/S037346332400002X](https://doi.org/10.1017/S037346332400002X).
- [19] "HCM," in *HIGHWAY CAPACITY MANUAL*, Washington, D.C., 2010.
- [20] C. Tingvall, H. Stigson, L. Eriksson, R. Johansson, M. Krafft, and A. Lie, "The properties of Safety Performance Indicators in target setting, projections and safety design of the road transport system," *Accid. Anal. Prev.*, vol. 42, no. 2, pp. 372–376, Mar. 2010, [doi: 10.1016/j.aap.2009.08.015](https://doi.org/10.1016/j.aap.2009.08.015).
- [21] A. Cerdá, "Accessibility: a performance measure for land-use and transportation planning in the Montréal Metropolitan Region," McGill University School of Urban Planning, 2009.
- [22] R. Kumar, Dr. P. Parida, Dr. E. Madhu, and A. V. A. B. Kumar, "Does Connectivity Index Of Transport Network Have Impact On Delay For Driver?" *Transp. Res. Procedia*, vol. 25, pp. 4988–5002, 2017, [doi: 10.1016/j.trpro.2017.05.377](https://doi.org/10.1016/j.trpro.2017.05.377).
- [23] T. N. Olawale and K. I. Adesina, "An Assessment of the Relationship between Road Network Connectivity and Tourists' Patronage in Lokoja Metropolis, Kogi State," *J. Nat. Sci. Res.*, vol. 3, p. 11, 2013.
- [24] B. Alstadt, G. Weisbrod, and D. Cutler, "Relationship of Transportation Access and Connectivity to Local Economic Outcomes: Statistical Analysis," *Transp. Res. Rec. J. Transp. Res. Board*, vol. 2297, no. 1, pp. 154–162, Jan. 2012, [doi: 10.3141/2297-19](https://doi.org/10.3141/2297-19).

- [25] A. Ceder, Y. Le Net, and C. Coriat, "Measuring Public Transport Connectivity Performance Applied in Auckland, New Zealand," *Transp. Res. Rec. J. Transp. Res. Board*, vol. 2111, no. 1, pp. 139–147, Jan. 2009, [doi: 10.3141/2111-16](https://doi.org/10.3141/2111-16).
- [26] R. A. Acheampong, "Towards incorporating location choice into integrated land use and transport planning and policy: A multi-scale analysis of residential and job location choice behaviour," *Land Use Policy*, vol. 78, pp. 397–409, Nov. 2018, [doi: 10.1016/j.landusepol.2018.07.007](https://doi.org/10.1016/j.landusepol.2018.07.007).
- [27] Z. Liu and G. M. Robinson, "Residential development in the peri-urban fringe: The example of Adelaide, South Australia," *Land Use Policy*, vol. 57, pp. 179–192, Nov. 2016, [doi: 10.1016/j.landusepol.2016.05.026](https://doi.org/10.1016/j.landusepol.2016.05.026).
- [28] P. B. Cobbinah and C. Amoako, "Urban Sprawl and the Loss of Peri-Urban Land in Kumasi, Ghana," *Int. J. Soc. Hum. Sci.*, p. 10, 2012.
- [29] R. A. Acheampong and E. Silva, "Land use–transport interaction modeling: A review of the literature and future research directions," *J. Transp. Land Use*, Jul. 2015, [doi: 10.5198/jtlu.2015.806](https://doi.org/10.5198/jtlu.2015.806).
- [30] L. Yang, G. Zheng, and X. Zhu, "Cross-nested logit model for the joint choice of residential location, travel mode, and departure time," *Habitat Int.*, vol. 38, pp. 157–166, Apr. 2013, [doi: 10.1016/j.habitatint.2012.06.002](https://doi.org/10.1016/j.habitatint.2012.06.002).
- [31] M. Batty, *The New Science of Cities*. MIT Press, 2013.
- [32] R. A. Acheampong, "Understanding the Co-emergence of Urban Location Choice and Mobility Patterns: Empirical Studies and an Integrated Geospatial and Agent-based Model," *Apollo - University of Cambridge Repository*, 2017. [doi: 10.17863/CAM.13849](https://doi.org/10.17863/CAM.13849).
- [33] N. Rezvany, F. Docquier, T. Hillel, and M. Bierlaire, "Integrating housing and transport interactions: A strategic dynamic approach," In: *Proceedings of hEART 2025: 13th Symposium of the European Association for Research in Transportation*. European Association for Research in Transportation (HEART): Munich, Germany. (2025). Accessed: Nov. 22, 2025. [Online]. Available: <https://transp-or.epfl.ch/heart/2025.php>
- [34] R. Rocco, L. Royer, and F. Mariz Gonçalves, "Characterization of Spatial Planning in Brazil: The Right to the City in Theory and Practice," *Plan. Pract. Res.*, vol. 34, no. 4, pp. 419–437, Aug. 2019, [doi: 10.1080/02697459.2019.1636552](https://doi.org/10.1080/02697459.2019.1636552).
- [35] Z. Qian, "Master plan, plan adjustment and urban development reality under China's market transition: A case study of Nanjing," *Cities*, vol. 30, pp. 77–88, Feb. 2013, [doi: 10.1016/j.cities.2011.12.010](https://doi.org/10.1016/j.cities.2011.12.010).

- [36] A. Mabaso, M. D. Shekede, I. Chirisa, L. Zanamwe, I. Gwitira, and E. Bandaiko, "Urban physical development and master planning in Zimbabwe: An assessment of conformance in the City of Mutare," *J. Stud. Humanit. Soc. Sci.*, vol. 4, p. 17, 2015.
- [37] C. G. Loh, "Assessing and Interpreting Non-conformance in Land-use Planning Implementation," *Plan. Pract. Res.*, vol. 26, no. 3, pp. 271–287, Jun. 2011, [doi: 10.1080/02697459.2011.580111](https://doi.org/10.1080/02697459.2011.580111).
- [38] M. Jahanbani and E. Lashkari, "On the master plan conformance with urban reality: A comparative assessment," *Int. J. Hum. Cap. Urban Manag.*, no. Online First, Oct. 2024, [doi: 10.22034/IJHCUM.2025.01.02](https://doi.org/10.22034/IJHCUM.2025.01.02).
- [39] M. P. Basílio, V. Pereira, H. G. Costa, M. Santos, and A. Ghosh, "A Systematic Review of the Applications of Multi-Criteria Decision Aid Methods (1977–2022)," *Electronics*, vol. 11, no. 11, p. 1720, May 2022, [doi: 10.3390/electronics11111720](https://doi.org/10.3390/electronics11111720).
- [40] E. Asadi, A. M. Salman, and Y. Li, "Multi-criteria decision-making for seismic resilience and sustainability assessment of diagrid buildings," *Eng. Struct.*, vol. 191, pp. 229–246, Jul. 2019, [doi: 10.1016/j.engstruct.2019.04.049](https://doi.org/10.1016/j.engstruct.2019.04.049).
- [41] S. Abu Dabous, W. Zeiada, T. Zayed, and R. Al-Ruzouq, "Sustainability-informed multi-criteria decision support framework for ranking and prioritization of pavement sections," *J. Clean. Prod.*, vol. 244, p. 118755, Jan. 2020, [doi: 10.1016/j.jclepro.2019.118755](https://doi.org/10.1016/j.jclepro.2019.118755).
- [42] O. S. Vaidya and S. Kumar, "Analytic hierarchy process: An overview of applications," *Eur. J. Oper. Res.*, vol. 169, no. 1, pp. 1–29, Feb. 2006, [doi: 10.1016/j.ejor.2004.04.028](https://doi.org/10.1016/j.ejor.2004.04.028).
- [43] P. Pradhan, "Science Mapping and Visualization Tools used in Bibliometric & Scientometric Studies: An Overview," vol. 23, p. 15, 2016.
- [44] B. Bairwa et al., "Predicting changes in land use and land cover using remote sensing and land change modeler," *Front. Environ. Sci.*, vol. 13, p. 1540140, Jun. 2025, [doi: 10.3389/fenvs.2025.1540140](https://doi.org/10.3389/fenvs.2025.1540140).
- [45] A. Öztürk, Y. E. Kapusuz, and H. Tanrıvermiş, "The dynamics of housing affordability and housing demand analysis in Ankara," *Int. J. Hous. Mark. Anal.*, vol. 11, no. 5, pp. 828–851, Oct. 2018, [doi: 10.1108/IJHMA-08-2017-0079](https://doi.org/10.1108/IJHMA-08-2017-0079).
- [46] S. K. Ray et al., "A framework for sustainable urban settlement planning: Integrating geographic information system and multi-criteria decision analysis," *Environ. Dev. Sustain.*, Jun. 2025, [doi: 10.1007/s10668-025-06442-7](https://doi.org/10.1007/s10668-025-06442-7).
- [47] H. Setfane and N. O. Touhami, "GIS and Multi-criteria Decision Analysis for Sustainable Urban Planning and Governance," in *Smart Business and Technologies*, vol. 1330, S. N.

- Lagmiri, M. Lazaar, and F. M. Amine, Eds., in *Lecture Notes in Networks and Systems*, vol. 1330. , Cham: Springer Nature Switzerland, 2025, pp. 537–550. [doi: 10.1007/978-3-031-86698-2_47](https://doi.org/10.1007/978-3-031-86698-2_47).
- [48] A. A. Beshir and S. T. Mosissa, “A Comparative Study on Access to Urban Opportunities with Public Transport Systems in 16 African Cities,” Jun. 24, 2025, In Review. [doi: 10.21203/rs.3.rs-6954059/v1](https://doi.org/10.21203/rs.3.rs-6954059/v1).
- [49] T. O. Olaniran and T. T. Aule, “Systematic approach to sustainable urban development: reviewing challenges of informal settlements and peri-urban growth in sub-Saharan Africa,” *Urban Plan. Transp. Res.*, vol. 13, no. 1, p. 2495660, Dec. 2025, [doi: 10.1080/21650020.2025.2495660](https://doi.org/10.1080/21650020.2025.2495660).
- [50] A. L. Przybysz, A. D. Lima, C. P. D. Sá, D. N. Resende, and R. N. Pagani, “Integrating City Master Plans with Sustainable and Smart Urban Development: A Systematic Literature Review,” *Sustainability*, vol. 16, no. 17, p. 7692, Sep. 2024, [doi: 10.3390/su16177692](https://doi.org/10.3390/su16177692).
- [51] R. Meziani and D. AlRifai, “Comparative Analysis of Yas Island Master Plans between 2020 and 2030 using Space Syntax,” *Int. Rev. Spat. Plan. Sustain. Dev.*, vol. 11, no. 3, pp. 44–62, Jul. 2023, [doi: 10.14246/irspsd.11.3_44](https://doi.org/10.14246/irspsd.11.3_44).
- [52] B. Tjahjadi, N. Soewarno, E. Astri, and H. Hariyati, “Does intellectual capital matter in the performance management system-organizational performance relationship? Experience of higher education institutions in Indonesia,” *J. Intellect. Cap.*, vol. 20, no. 4, pp. 533–554, Oct. 2019, [doi: 10.1108/JIC-12-2018-0209](https://doi.org/10.1108/JIC-12-2018-0209).
- [53] M. E. Falagas, E. I. Pitsouni, G. A. Malietzis, and G. Pappas, “Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses,” *FASEB J.*, vol. 22, no. 2, pp. 338–342, Feb. 2008, [doi: 10.1096/fj.07-9492LSF](https://doi.org/10.1096/fj.07-9492LSF).
- [54] A. V. Kulkarni, “Comparisons of Citations in Web of Science, Scopus, and Google Scholar for Articles Published in General Medical Journals,” *JAMA*, vol. 302, no. 10, p. 1092, Sep. 2009, [doi: 10.1001/jama.2009.1307](https://doi.org/10.1001/jama.2009.1307).
- [55] J. E. Hirsch, “An index to quantify an individual’s scientific research output,” *Proc. Natl. Acad. Sci.*, vol. 102, no. 46, pp. 16569–16572, Nov. 2005, [doi: 10.1073/pnas.0507655102](https://doi.org/10.1073/pnas.0507655102).
- [56] A. Agarwal et al., “Bibliometrics: tracking research impact by selecting the appropriate metrics,” *Asian J. Androl.*, vol. 18, no. 2, p. 296, 2016, [doi: 10.4103/1008-682X.171582](https://doi.org/10.4103/1008-682X.171582).
- [57] Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam, Universitas Pendidikan Indonesia, Bandung, Indonesia., A. B. D. Nandiyanto, D. F. Al Husaeni, and Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam, Universitas Pendidikan Indonesia,

- Bandung, Indonesia., "A bibliometric analysis of materials research in Indonesian journals using VOSviewer," J. Eng. Res., Dec. 2021, [doi: 10.36909/jer.ASSEEE.16037](https://doi.org/10.36909/jer.ASSEEE.16037).
- [58] H. Zubaidi and S. Abd Al, "A Scientometric Analysis and Review for Studies Related to Applying Road Safety Data to Transportation Planning," 2024, Accessed: Jan. 29, 2026. [Online]. Available: <https://iasj.rdd.edu.iq/journals/uploads/2025/03/09/f54e769c470b26a0642f66932322d2e8.pdf>
- [59] S. Das and H. Zubaidi, "Last Forty Years of ITE Journal Articles: A Scientometric Overview," ITE J. Online Excl. Httpswww Ite Orgpublicationsite-Journallast-Forty-Years-Ite-J.-Artic. --Scientometr. -Overv. Accessed July, vol. 11, 2021, Accessed: Jan. 29, 2026. [Online]. Available: [https://subasish.github.io/ait_lab/pdfs/2021%20\(A\)%20Das%20ITE%20Last%20Forty%20Years.pdf](https://subasish.github.io/ait_lab/pdfs/2021%20(A)%20Das%20ITE%20Last%20Forty%20Years.pdf)
- [60] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines," J. Bus. Res., vol. 133, pp. 285–296, Sep. 2021, [doi: 10.1016/j.jbusres.2021.04.070](https://doi.org/10.1016/j.jbusres.2021.04.070).
- [61] N. Donthu, S. Kumar, D. Pattnaik, and W. M. Lim, "A bibliometric retrospection of marketing from the lens of psychology: Insights from Psychology & Marketing," Psychol. Mark, vol. 38, no. 5, pp. 834–865, May 2021, [doi: 10.1002/mar.21472](https://doi.org/10.1002/mar.21472).
- [62] M. A. Khan, D. Pattnaik, R. Ashraf, I. Ali, S. Kumar, and N. Donthu, "Value of special issues in the Journal of Business Research: A bibliometric analysis," J. Bus. Res., vol. 125, pp. 295–313, Mar. 2021, [doi: 10.1016/j.jbusres.2020.12.015](https://doi.org/10.1016/j.jbusres.2020.12.015).
- [63] M. ika Rahmawati and A. subardjo, "A Bibliometric Analysis of Accounting in the Blockchain Era," J. Account. Invest., vol. 23, p. 12, 2022.
- [64] J. Taskinsoy, "Blockchain: A Misunderstood Digital Revolution. Things You Need to Know about Blockchain," SSRN Electron. J., 2019, [doi: 10.2139/ssrn.3466480](https://doi.org/10.2139/ssrn.3466480).
- [65] M. Andoni et al., "Blockchain technology in the energy sector: A systematic review of challenges and opportunities," Renew. Sustain. Energy Rev., vol. 100, pp. 143–174, Feb. 2019, [doi: 10.1016/j.rser.2018.10.014](https://doi.org/10.1016/j.rser.2018.10.014).
- [66] X. Li, P. Jiang, T. Chen, X. Luo, and Q. Wen, "A survey on the security of blockchain systems," Future Gener. Comput. Syst., vol. 107, pp. 841–853, Jun. 2020, [doi: 10.1016/j.future.2017.08.020](https://doi.org/10.1016/j.future.2017.08.020).

- [67] A. Dorri, M. Steger, S. S. Kanhere, and R. Jurdak, "Blockchain: A Distributed Solution to Automotive Security and Privacy," IEEE Commun. Mag., vol. 55, no. 12, pp. 119–125, Dec. 2017, [doi: 10.1109/MCOM.2017.1700879](https://doi.org/10.1109/MCOM.2017.1700879).
- [68] D. N. Effendi et al., "Bibliometric analysis of scientific literacy using VOS viewer: Analysis of science education," J. Phys. Conf. Ser., vol. 1796, no. 1, p. 012096, Feb. 2021, [doi: 10.1088/1742-6596/1796/1/012096](https://doi.org/10.1088/1742-6596/1796/1/012096).



اتجاهات البحث في نقص الإسكان وكفاءة شبكة الطرق ضمن المخططات الحضرية الأساسية: مراجعة بيبليومترية

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الخلاصة:

تمثل النواقص الحضرية، مثل غياب أنظمة الإسكان الملائمة وتراجع كفاءة شبكات الطرق، تحديات جسيمة تواجه المدن عالمياً، ولا سيما في الدول النامية. تؤثر هذه الإخفاقات سلباً على العدالة الاجتماعية، والتنمية الاقتصادية، والاستدامة الحضرية، مما ينعكس بشكل مباشر على جودة حياة سكان المدن. ونظراً لأن السكن يمثل حاجة إنسانية أساسية، ولأن شبكات الطرق هي الركيزة الجوهرية للتنقل والتجارة والتفاعل الاجتماعي؛ فإن معالجة هذه النواقص تعد أمراً حيوياً. بناءً على ذلك، تبحث هذه الدراسة في هذه القضايا من خلال إدراج استراتيجيات تخطيطية تدمج الوحدات السكنية وأنظمة النقل ضمن المخططات الحضرية الأساسية (Master Plans).

يقدم هذا البحث مراجعة شاملة للأدبيات ذات الصلة بنقص الإسكان، وتحليل العجز الحضري، وتوجهات التخطيط العمراني. وباستخدام قاعدة بيانات (Scopus) للفترة من 2001 إلى 2025، أُجري تحليل بيبليومتري مدعوم ببرنامج (VOSviewer) لتوضيح اتجاهات البحث، وشبكات التعاون، والعناقيد الموضوعية. علاوة على ذلك، تقيم الورقة الأدوات المنهجية المختلفة المستخدمة في هذه الدراسات، وتحديدًا نظم المعلومات الجغرافية (GIS)، وتحليل القرار متعدد المعايير (MCDA)، وتحليل الشبكات، وعلم القياسات العلمية (Scientometrics). وأخيراً، يستعرض البحث الممارسات المتنوعة ويحدد الصعوبات الجوهرية التي تواجهها البلدان النامية التي تسعى جاهدة لتحقيق تمدن مستدام.

الكلمات الدالة: التحليل البيبليومتري؛ تحليل العجز الحضري؛ التخطيط الحضري؛ نقص الإسكان؛ كفاءة شبكة الطرق.