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Urbanization in Transition: Building A Future-Ready Framework for Malaysia's Sustainable Tiered City System

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ABSTRACT

Malaysia's urban transformation has entered a critical transitional phase characterized by rapid metropolitan expansion, uneven regional development, and evolving governance challenges. Although the national urbanization rate reached 75.8% in 2024, urban growth remains heavily concentrated within major conurbations, widening disparities between metropolitan centers and secondary cities. This study critically examines Malaysia's tiered city system as a strategic framework for achieving more balanced, resilient, and sustainable urban development. The research adopts a mixed-method approach integrating spatial analysis, policy review, and expert-based validation. Spatial and demographic data from the Department of Statistics Malaysia (DOSM) and PLANMalaysia's BMGN database were analyzed alongside key national planning policies, including the Fourth National Physical Plan (RFN4) and the Second National Urbanization Policy (DPN2). The study also incorporates comparative insights from international urban governance models and systems-based urban planning perspectives. The findings reveal persistent structural asymmetries within Malaysia's urban hierarchy, reflected in fragmented governance, uneven spatial intensity, limited functional specialization, and weak integration between urban tiers. In response, the study proposes the Future-Ready Tiered City Framework (FRTCF), which integrates functional hierarchy, spatial intensity optimization, governance synchronization, digital intelligence systems, and resilience-oriented planning principles. This paper introduces a future-ready, adaptive framework that bridges hierarchical planning and network-based urban governance in the Global South, supporting more inclusive, data-driven, and sustainable urban transformation.

Keywords: Future-Ready Tiered City Framework (FRTCF); Spatial Sustainability; Tiered City System; Urban Governance; Urban Transition;

1. Introduction

Urbanization has become a defining feature of Malaysia's contemporary development trajectory. Over the past five decades, the country has transitioned from an agrarian-based economy into a predominantly urban society, with urban regions functioning as major drivers of national economic growth (Hasan & Nair, 2014; World Bank, 2021). However, this transformation has also generated significant spatial disparities. While economic

dynamism continues to concentrate within major metropolitan regions such as the Klang Valley, Penang, and Johor Bahru, many secondary and peripheral cities remain constrained by limited economic diversification, uneven infrastructure development, and weaker institutional capacity.

This imbalance reflects the continuing challenges in implementing Malaysia's tiered city system, a national spatial planning approach institutionalized through the National Urbanization Policy 2 (DPN2) and the Fourth National Physical Plan (RFN4) (PLANMalaysia, 2016; PLANMalaysia, 2021). These policy frameworks envision an integrated, functionally connected urban system comprising global, regional, state, major, and local urban centers, aimed at promoting balanced spatial development. Nevertheless, persistent coordination gaps, fragmented governance structures, and inconsistencies in spatial data management continue to hinder effective integration across different urban tiers.

Urbanization in Malaysia, therefore, operates at the intersection of hierarchical planning and adaptive urban complexity. Traditional urban models derived from Christaller and Baskin's (1966) Central Place Theory are increasingly challenged by contemporary realities shaped by digital economies, global connectivity, and polycentric metropolitan expansion. Consequently, the issue is no longer solely about how cities grow, but about how urban centers interact, adapt, and co-evolve within increasingly interconnected spatial and governance systems.

Within this context, the present study positions Malaysia's urban transition within broader debates on adaptive governance, spatial sustainability, and network-based urban development. The paper argues that the Future-Ready Tiered City Framework (FRTCF) can reconcile the structural logic of hierarchical planning with the flexibility required in contemporary urban governance systems.

The paper pursues three interrelated objectives. First, it critically examines the evolution and contemporary dynamics of Malaysia's tiered city system, with particular attention to spatial, functional, and economic disparities across urban tiers. Second, it analyses spatial intensity, land-use efficiency, and governance integration to assess how current urban development patterns align with national sustainability aspirations and emerging urban challenges. Third, the paper advances a future-ready conceptual framework intended to strengthen adaptive governance, spatial resilience, and policy coherence within Malaysia's evolving urban system. This paper introduces a future-ready, adaptive, tiered city framework that bridges hierarchical planning and network-based urban governance in the Global South.

2. Literature Review and Conceptual Framework

2.1 Global Urban Transition

Globally, urbanization has become one of the defining transformations of the twenty-first century, with the United Nations estimating that nearly two-thirds of the world's population will reside in urban areas by 2050 (Oginga Martins et al., 2022). Urbanization is closely associated with demographic mobility, economic restructuring, and the spatial concentration of infrastructure and resources, as reflected in Zelinsky's (1971) mobility transition hypothesis. However, the rapid expansion of urban populations has also intensified pressures on land availability, infrastructure systems, environmental sustainability, and governance capacity.

As urban systems become increasingly complex, urban scholarship has shifted from descriptive models of city growth toward more systemic, relational, and network-based interpretations of urban development (Batty, 2018; Healey, 2007). In response to these challenges, international frameworks such as the New Urban Agenda emphasize inclusive, resilient, and sustainable urban governance as a foundation for managing future urban transitions (UN-Habitat, 2016).

Within this context, the tiered city system has re-emerged as an important mechanism for structuring and coordinating urban networks. Japan's Comprehensive National Development Plan and China's National New-Type Urbanization Plan (2014–2020) illustrate institutional approaches that integrate functional specialization, regional connectivity, and territorial equity through multi-tier coordination and data-driven governance systems (Chen et al., 2022).

2.2 Urban Hierarchy and Spatial Efficiency

The tiered city system has historically been influenced by Central Place Theory, which conceptualizes urban centers as functionally differentiated nodes organized by Contemporary urban systems. However, they have evolved beyond rigid hierarchical structures into increasingly polycentric and networked configurations in which cities interact through flows of information, people, capital, and infrastructure (Fujita & Thisse, 2011).

In Malaysia, the Federal Department of Town and Country Planning (PLANMalaysia, 2021) classifies 288 urban centers across five hierarchical tiers. Nevertheless, empirical evidence indicates that functional integration between urban tiers remains uneven, particularly between metropolitan regions and secondary cities. Spatial efficiency, commonly reflected through indicators such as density, plot ratio, accessibility, and land-use diversity, is often constrained by fragmented planning jurisdictions and conservative zoning practices (BMGN, 2023).

2.3 Governance and Urban Policy Integration

Urban governance refers to the institutional structures, decision-making processes, and regulatory mechanisms that shape how cities are planned, managed, and financed (OECD, 2022). Malaysia's urban governance architecture involves multiple administrative levels, including federal agencies, state planning committees, and local authorities. While decentralization may improve policy responsiveness at the local level, it also poses challenges in coordination, data interoperability, regulatory consistency, and long-term spatial planning (Hamdan et al., 2020).

Comparative experiences from countries such as Japan and South Korea demonstrate that institutionalized inter-tier coordination mechanisms, integrated spatial data systems, and stronger regional governance frameworks often support balanced urban development. In contrast, Malaysia's continued reliance on fragmented and largely non-statutory coordination mechanisms limits the effectiveness of cross-tier urban integration and adaptive governance.

2.4 Conceptual Framework

The conceptual framework for this study integrates three interrelated dimensions:

1. Urban Hierarchy – The functional and administrative structuring of cities.
2. Spatial Intensity – The measurable density and land-use efficiency of urban form; and
3. Governance Integration – The institutional mechanisms linking national, state, and local planning.

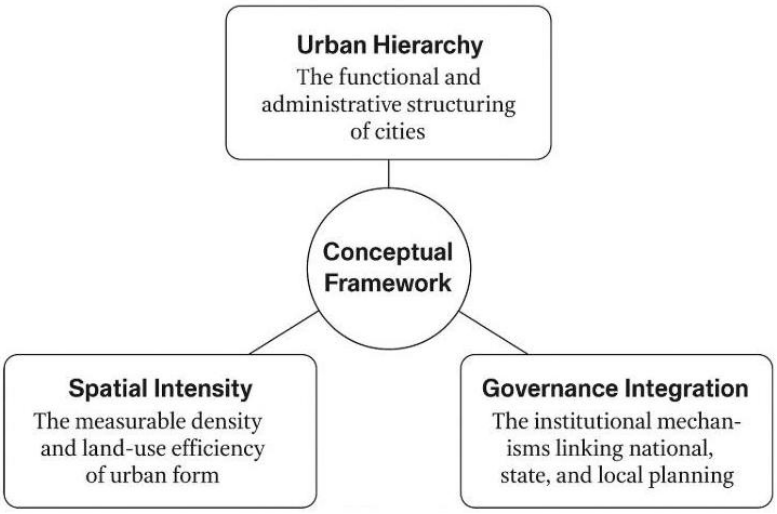

Figure 1. Conceptual Framework

Together, these elements form the Future-Ready Tiered City Framework (FRTCF), which seeks to harmonize structure (hierarchy), function (intensity), and process (governance) into a coherent urban system.

2.5 Theoretical Foundation of the FRTCF

Urban theory has long examined the tension between structural order and urban complexity. This study draws upon three complementary perspectives: pragmatism, systems theory, and complex adaptive systems (CAS) thinking. Pragmatism emphasizes learning through experience and adaptive problem-solving, encouraging urban planning approaches that remain responsive to evolving spatial and societal conditions (Dewey, 2018).

Systems theory conceptualizes cities as interconnected social, economic, environmental, and institutional systems shaped by dynamic feedback relationships (Forrester, 1971; Checkland, 1981). Building on this perspective, CAS theory reframes cities as adaptive, continuously evolving systems that respond to uncertainty, technological transformation, and environmental change (McEvoy et al., 2012; Batty, 2018).

Together, these perspectives provide the theoretical foundation for the Future-Ready Tiered City Framework (FRTCF), which positions urban governance not as a rigid administrative hierarchy but as a more adaptive, interconnected, and data-responsive urban system.

Urban theory has long grappled with the balance between order and complexity. Thephilosophical foundation of this paper is built upon three interlocking paradigms: pragmatism, systems theory, and complex adaptive systems (CAS) thinking.

3. Methodology

This study adopts a mixed-method research design that integrates quantitative spatial analysis with qualitative policy evaluation to develop a comprehensive understanding of Malaysia's contemporary urban transition (Creswell & Plano Clark, 2017). The quantitative component draws on spatial and demographic datasets from the Department of Statistics Malaysia (DOSM, 2024) and PLANMalaysia's BMGN database (2023), covering 288 classified urban centers distributed across five hierarchical tiers, ranging from global to local centers.

Using ArcGIS Pro and SPSS, the analysis examines spatial intensity using key indicators, including built-up density, plot ratio, and land-use diversity. Pearson correlation analysis was employed to examine the relationship between land-use intensity and transport accessibility. At the same time, spatial autocorrelation (Moran's I) was used to identify regional clustering patterns associated with high-intensity urban development.

Complementing the quantitative analysis, a qualitative policy review was conducted using thematic content analysis of major national and state-level planning documents, including the National Urbanization Policy 2 (DPN2), the Fourth National Physical Plan (RFN4), and selected state structure plans. The review focused on identifying policy narratives and institutional mechanisms related to governance integration, urban intensity regulation, and the operationalization of Malaysia's tiered city system. Particular attention was given to how these policy documents frame sustainability, resilience, digital governance, and future-ready urban development within the Malaysian planning context.

To strengthen the analytical robustness and practical relevance of the study, a Delphi panel comprising 12 experts from government agencies, academia, and professional planning practice was convened to validate the preliminary conceptual framework. The selected panel size was considered sufficient to capture diverse expert perspectives while maintaining the depth and manageability required for iterative policy-oriented validation. The expert discussions primarily addressed institutional feasibility, data governance requirements, and systemic challenges associated with cross-tier urban integration. This iterative consultation process ensured that the proposed framework reflects both analytical rigor and practical applicability within Malaysia's evolving urban governance landscape.

4. Results and Discussions

4.1 Result

4.1.1 Urbanization Patterns and Hierarchical Disparities

Malaysia's urbanization rate has plateaued 75.8%, indicating a gradual transition from rapid urban expansion toward a more consolidated phase of urban development (DOSM, 2024). Spatial analysis shows that the Central Region (Selangor–Kuala Lumpur–Putrajaya) maintains urbanization levels exceeding 90%, whereas

the East Coast and Sabah–Sarawak corridors remain below 65%. The observed spatial autocorrelation (Moran's I = 0.61) demonstrates a statistically significant clustering of urban intensity within major metropolitan conurbations.

These findings suggest that Malaysia's urban growth remains heavily concentrated within a limited number of metropolitan centers. Hierarchically, the tiered city system continues to exhibit a top-heavy structure, with Kuala Lumpur and George Town exerting disproportionate influence over national economic activity. In contrast, many secondary cities have yet to achieve sufficient functional specialization or economic autonomy. This pattern reflects what Davoudi et al. (2012) describe as the "structural inertia of spatial hierarchies," where inherited administrative structures constrain adaptive spatial transformation and balanced regional integration.

4.1.2 Urban Intensity and Spatial Efficiency

Between 2017 and 2023, built-up urban expansion increased by 0.17% (BMGN, 2023), reflecting continued urban growth across major development corridors. However, the spatial distribution of this growth indicates sub-optimal land utilization and uneven development intensity. Only 14 cities recorded plot ratios above 5.0, covering approximately 43,370 hectares or 19% of developed urban land.

The correlation between transport accessibility and urban density ($r = 0.73$, $p < 0.01$) supports the effectiveness of Transit-Oriented Development (TOD) principles in promoting compact urban form and spatial efficiency (Cervero & Sullivan, 2011). Nevertheless, zoning rigidity, fragmented planning standards, and limited vertical intensification continue to constrain efficient urban land use beyond metropolitan regions.

These conditions suggest that urban intensity in Malaysia remains unevenly distributed and poorly aligned with broader sustainability, infrastructure efficiency, and environmental carrying capacity goals. In several secondary urban areas, dispersed development patterns contribute to inefficient infrastructure provision and increasing pressure on peri-urban land resources.

4.1.3 Governance and Policy Alignment

The policy review reveals persistent fragmentation within Malaysia's urban governance system. Although RFN4 and DPN2 share a common vision of balanced and integrated urban development, implementation across administrative levels remains inconsistent. Several structural challenges were identified, including overlapping jurisdictions between federal and state agencies, the lack of a standardized operational definition of "city," and limited interoperability between national and subnational spatial data systems.

These governance gaps continue to limit effective coordination across urban tiers and hinder the integration of spatial planning, infrastructure management, and data-driven decision-making. The Delphi panel further emphasized the need for a National Urban Observatory (NUO) under PLANMalaysia to institutionalize cross-tier data governance, spatial intelligence systems, and integrated urban monitoring mechanisms.

4.1.4 Emerging Trends: Digitalization and Urban Resilience

The findings indicate the early emergence of digital transformation within Malaysia's urban governance landscape, particularly in metropolitan regions such as Kuala Lumpur, Iskandar Malaysia, and Penang. Several local authorities have begun integrating GIS-based systems, digital planning tools, and data-driven monitoring mechanisms into urban management practices.

However, only 22% of surveyed local authorities reported using integrated GIS or AI-assisted planning systems. This disparity highlights the growing divide between digitally mature and digitally lagging urban jurisdictions. Such inequalities may weaken institutional responsiveness, reduce planning efficiency, and limit the inclusivity of Malaysia's broader urban transformation process. The uneven adoption of digital governance systems also underscores the importance of strengthening spatial intelligence infrastructure and institutional data capacity as part of future-ready urban governance strategies.

4.2 Discussions

4.2.1 Reframing the Tiered City System

The findings reaffirm the continuing relevance of Malaysia's tiered city system while simultaneously exposing its structural and operational limitations. In practice, the current urban hierarchy continues to function largely as an administrative classification system rather than as a dynamic and interconnected urban network. This condition contributes to uneven regional development, fragmented governance coordination, and limited functional integration between metropolitan and secondary urban centers.

Drawing upon systems theory (Forrester, 1971) and complexity perspectives in urban studies (Batty, 2018), the Future-Ready Tiered City Framework (FRTCF) reconceptualizes urban tiers as adaptive and relational nodes capable of learning, reconfiguring, and interacting through multidirectional flows of information, infrastructure, and governance coordination. Within this perspective, urban hierarchy is no longer understood as a rigid spatial order but as a more flexible, interconnected system that evolves alongside economic, technological, and environmental change.

4.2.2 Comparative Perspective

International experiences provide important insights into how tiered urban systems can evolve toward more integrated and adaptive forms of governance. China's New-Type Urbanization Plan (2014–2020), for example, institutionalized multi-tier urban coordination through fiscal restructuring, spatial reform, and regional integration strategies. Similarly, Japan's Comprehensive National Development Plan strengthened functional connectivity between metropolitan and regional cities through infrastructure corridors, high-speed rail systems, and innovation-based regional development.

At the European level, the Urban Agenda of the European Union emphasizes functional urban areas rather than strictly administrative boundaries, encouraging more polycentric, collaborative regional development approaches. These international experiences suggest that Malaysia's tiered city system could evolve beyond administrative categorization toward a more functionally integrated model that strengthens secondary cities through infrastructure connectivity, innovation networks, and coordinated regional planning mechanisms.

4.2.3 Intensity, Compactness, and equity

The findings indicate that urban intensity contributes positively to sustainability only when managed through equitable, integrated planning. As argued by Jenks and Jones (2010), compact urban development becomes more sustainable when density is balanced with accessibility, environmental quality, and social inclusiveness. Similarly, Burton (2000) emphasizes that compactness should not be pursued solely for efficiency, but also for broader social and environmental outcomes.

In Malaysia, high-density urban centers such as Kuala Lumpur demonstrate significant economic efficiency and infrastructure concentration. However, they also face increasing challenges related to housing affordability, uneven accessibility, and environmental stress. These findings suggest that future urban strategies should prioritize intensity optimization rather than uncontrolled densification.

Beyond spatial efficiency, urban intensity also carries important implications for land consumption, infrastructure demand, and environmental carrying capacity. Dispersed urban expansion increases pressure on peri-urban ecosystems and agricultural land. In contrast, more compact, integrated urban forms can support more efficient resource use and sustainable infrastructure provision when governed through inclusive planning frameworks.

4.2.4 Governance as the Missing Link

Governance fragmentation is one of the most persistent barriers to achieving an integrated, adaptive tiered city system in Malaysia. Following Healey (2007) and Basta and Moroni (2013), contemporary urban governance increasingly requires relational forms of coordination built upon negotiation, transparency, institutional trust, and shared data systems rather than purely hierarchical administrative control.

Within this context, the FRTCF introduces the principle of institutional interoperability, referring to the procedural and digital alignment between national, state, and local governance systems. The proposed National Urban Observatory (NUO) would function as an integrative platform for consolidating geospatial, demographic, environmental, and economic data across urban tiers.

Such a mechanism could strengthen evidence-based decision-making, improve policy synchronization, and support more responsive urban governance. More importantly, integrated spatial intelligence systems may help Malaysia transition from reactive planning practices toward a more anticipatory and adaptive model of urban governance.

4.2.5 Philosophical Implications

At a broader conceptual level, the FRTCF reflects the continuing tension between structural coordination and urban adaptability within contemporary urban systems. It asserts that sustainable urban futures demand structured adaptability, a balance between Christallerian order and Lefebvrian fluidity (Christaller & Baskin, 1966; Lefebvre, 2014). The framework, therefore, emphasizes the need to reconcile the structured logic of traditional urban hierarchy with the increasingly fluid, interconnected, and adaptive nature of modern urban development.

Cities should not be understood merely as physical or administrative entities, but also as social and ethical constructs shaped by governance choices, political priorities, and technological capacities. As argued by Fainstein (2014), urban development must ultimately engage with broader questions of justice, inclusivity, and the public good. Consequently, Malaysia's urban transition should move beyond purely administrative rationality toward a more reflexive, human-centered approach to urban governance that integrates resilience, inclusivity, and ecological stewardship into long-term spatial planning.

4.2.6 The Future-Ready Tiered City Framework (FRTCF)

The proposed FRTCF synthesizes findings into a multi-dimensional framework comprising five key components:

Table 1. Components of the Future-Ready Tiered City Framework (FRTCF)

No	Framework Component	Description	Strategic Objective
1	Functional Hierarchy Integration	Aligning city tiers through differentiated roles and interdependent linkages	Foster more balanced and interconnected regional development.
2	Spatial Intensity Optimization	Establishing density and plot ratio benchmarks according to urban hierarchy.	Improve land-use efficiency and compact urban form.
3	Governance Synchronization	Formalizing cross-tier coordination protocols and interoperable governance systems	Enhance institutional coherence
4	Digital Intelligence Systems	Establishing a National Urban Observatory for real-time urban analytics	Enable more responsive and evidence-based urban governance
5	Resilience and Inclusivity Metrics	Embedding equity and environmental indicators into urban evaluation systems	Support the development of more resilient, equitable, and people-centered urban systems.

The Future-Ready Tiered City Framework (FRTCF) synthesizes the study's empirical findings, theoretical perspectives, and governance considerations into an integrated urban development framework. The framework is designed to support a more adaptive, connected, and sustainable tiered city system capable of responding to contemporary urban challenges in Malaysia.

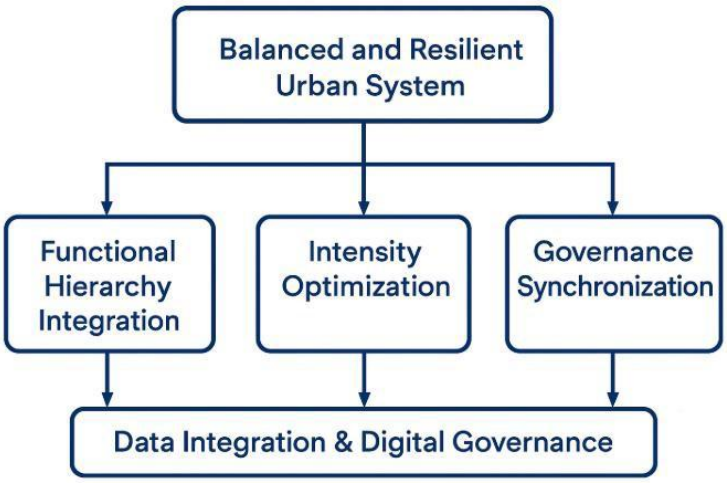

Figure 2. Structural Architecture of the Future-Ready Tiered City Framework (FRTCF)

Collectively, these components form an adaptive and integrated urban governance framework capable of responding to the increasing complexity of Malaysia's urban transition. Rather than treating urban hierarchy as a rigid administrative structure, the FRTCF repositions cities as interconnected and evolving systems shaped by spatial dynamics, institutional coordination, and digital transformation. The framework, therefore, provides not only a conceptual model for balanced urban development but also a practical foundation for strengthening resilience, inclusivity, and long-term sustainability across different tiers of cities.

Despite its conceptual and policy contributions, this study remains subject to several limitations. The analysis relies primarily on aggregated spatial and policy data, which restricts deeper examination of inter-city fiscal flows, informal urban dynamics, and longitudinal governance performance across urban tiers. In addition, variations in data availability between regions may affect the consistency of comparative spatial analysis. Future research could expand the framework by integrating real-time geospatial analytics, urban big data, and comparative regional case studies to further the operational applicability of the FRTCF in rapidly evolving urban environments.

5. Conclusion

Malaysia's urbanization is no longer defined primarily by spatial expansion, but by the need to transform how cities function, interact, and evolve within an increasingly interconnected urban system. The findings of this study demonstrate that the existing tiered city structure continues to face challenges related to governance fragmentation, uneven spatial intensity, and limited functional integration between metropolitan and secondary urban centers.

In response to these challenges, the Future-Ready Tiered City Framework (FRTCF) offers both a conceptual and operational foundation for strengthening adaptive urban governance in Malaysia. The framework seeks to reconcile the tension between hierarchical coordination and urban adaptability by integrating spatial efficiency, governance synchronization, digital intelligence systems, and resilience-oriented planning into a more interconnected and responsive urban model. Through this integrated approach, the FRTCF positions urban development not merely as a process of physical growth, but as a continuous effort to balance institutional coherence, social inclusivity, environmental sustainability, and long-term spatial resilience. In doing so, the framework provides a strategic pathway for Malaysia to move toward a more balanced, resilient, and future-ready urban system aligned with the broader aspirations of SDG 11 and the New Urban Agenda.

The study further argues that urban intensity should not be interpreted solely through the lens of economic efficiency, but also through broader considerations of livability, environmental sustainability, social inclusivity, and long-term spatial resilience. Equally important is the need for governance reform that moves beyond fragmented administrative coordination toward more integrated, data-driven, and interoperable urban management systems.

Ultimately, the FRTCF positions Malaysia's urban transition as an opportunity to move from hierarchical rigidity toward a more adaptive, resilient tiered urbanism. By strengthening institutional coordination, spatial intelligence, and sustainable planning practices, Malaysia has the potential to emerge as a model for future-ready urban governance within the broader Global South context.

6. Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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