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THE ELEMENTS OF THE COMPACT CITY ON SUSTAINABLE URBAN DEVELOPMENT IN PETALING JAYA, SELANGOR, MALAYSIA

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Abstract

Urbanization is an ongoing global phenomenon that demands innovative approaches to balance economic growth with environmental sustainability. This study investigates the elements contributing to the development of a compact city and their impact on sustainable urban development in the context of Petaling Jaya, Selangor. The study aims to identify the elements of compact cities that contribute to sustainable urban development in Petaling Jaya and explore the elements that contribute to sustainable urban development in Petaling Jaya. The research employs a qualitative approach, combining interviews with experts and document analysis of compact cities. Through thematic analysis, the study identifies the core elements of compact cities in Petaling Jaya, exploring their influence on sustainability. Preliminary findings reveal that the compact city is shaped by population density, mixed land use, and transportation infrastructure. Stakeholder perspectives shed light on these compact city elements' perceived benefits and challenges. Additionally, the document analysis examines the elements of the compact city that may influence sustainable urban development. This study contributes to the existing body of knowledge by providing a nuanced understanding of the elements contributing to the compact city characteristics and their role in fostering sustainable urban development.

Keywords: Compact City, Elements of Compact City, Sustainable Urban Development, Urban Sustainability

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INTRODUCTION

Over the past 30 years, compact city design and development have been the preferred solution for addressing sustainable development challenges. Both global and local policies strongly support this approach due to its benefits in advancing the economic, environmental, and social sustainability goals (Bibri et al., 2020). The compact city is considered one of the most recommended sustainable urbanism paradigms for tackling these challenges effectively (Bibri, 2020). However, urbanization processes worldwide consume significant portions of limited but essential natural land resources (Liu, 2018; Yang et al., 2018), leading to detrimental effects such as ecosystem and land degradation (Liu et al., 2014, 2018a; Zhang et al., 2020), loss of fertile agricultural land, and food security issues (Gao et al., 2019; Salvati, 2014).

According to Bibri (2020), the compact city is the foremost paradigm of sustainable urbanism for addressing the multifaceted challenges of sustainable development. Despite the numerous studies conducted on compact cities, there is a lack of research in the context of Malaysia. Bibri et al. (2020) discuss how two Swedish cities implement and justify the compact city model in urban planning and development. Additionally, Mouratidis (2017) focuses on a compact city survey within the European context, specifically in the metropolitan area of Oslo. However, there are contradictions in studies regarding the advantages of compact cities.

The objective of this study is twofold: (i) to identify the elements of compact cities that contribute to sustainable urban development in Petaling Jaya and (ii) to explore how these elements contribute to sustainable urban development in Petaling Jaya. This study's outcome highlights the compact city's elements contributing to sustainable urban development.

LITERATURE REVIEW

Compact City

Bibri et al. (2020) stated that the compact city is one of the most influential models of sustainable urbanism. Over the past 30 years or more, compact city design and development have been the go-to solution to problems related to sustainable development. Due to its benefits in advancing sustainability's economic, environmental, and social aims, it is vigorously supported by global and local policies (Azmi et al., 2021). The three sustainability pillars are examined in relation to the compact city model's application and justification in urban planning and development and any advancements made in this area (Bibri, S. E., Krogstie, J., & Kärrholm, M., 2020).

Elements of Compact City

According to Bibri et al. (2020), the elements of a compact city, including the reduction of travel distances and commute times, a decrease in reliance on private

vehicles, a decrease in per capita energy consumption, a reduction in the consumption of building materials and infrastructure, the mitigation of pollution, the preservation of diversity in workplaces, service facilities, as well as social connections and the preservation of green and natural areas. These elements promote sustainability through several means. This is supported by the principles of compact city development, which emphasise intensified development and activities, set limits on urban expansion, encourage mixed land use and social integration, and prioritise the importance of public transportation and high-quality urban design (Fahmi et al., 2023). These factors collectively contribute to promoting sustainability within the compact city framework. (Bibri, S. E., Krogstie, J., & Kärrholm, M. 2020).

Sustainable Urban Development

According to Bibri, S. E., Krogstie, J., & Kärrholm, M. (2020), the compact city is the primary planning strategy employed by the two cities, and it tries to combine social, economic, and environmental aspects to promote more sustainable urban growth. Bibri et al. (2020) stated that it is grounded in the examination of the correlation between urban planning and sustainable development within the context of rapid urbanization, and sustainable urbanism focuses on the study of cities and the methodologies employed to design and develop them, with an emphasis on enhancing their long-term resilience and viability. This is achieved by reducing material consumption, decreasing energy usage, mitigating pollution, minimising waste, and promoting social equity and well-being. The compact city concept is at the core of sustainable urbanism, serving as its central paradigm. Won and Jung (2023) stated that fostering urban development conducive to sustainable communities is paramount in contemporary urban planning.

Consequently, there is a growing discourse on the concept of "compact urban form" among environmentalists, urban planners, policymakers, and private developers. This discourse seeks to counteract the adverse impacts of rapid urbanization, particularly the escalation of Land Surface Temperature (LST). Compact development, at its core, signifies a commitment to high-density development, the integration of land uses, enhanced accessibility, and the repurposing of existing urban areas. Simultaneously, it emphasises the preservation of natural landscapes on the urban periphery (De Roo, 2000). Generally, the compact city model is perceived as more environmentally sustainable than sprawled cities as it strives to minimise energy consumption and land utilisation.

Urban Sustainability

Bibri et al. (2020) claim that the key design principles of compact city planning and development are compactness, density, diversity, mixed land use, sustainable

transportation, and green space, with the latter contextually linked to the idea of green structure, an institutional framework under which the two cities function. The compact city model also clearly demonstrates the synergy between the underlying methods in terms of how they work together to produce combined results that are greater than the sum of their impacts concerning the advantages of sustainability as it relates to its tripartite composition. Furthermore, this study shows that the compact city concept, as implemented in the two cities, is justified by its capacity to advance sustainability's economic, environmental, and social objectives.

Wang (2022) stated in the study stated that sustainable urban forms have been advocated by scholars such as Jenks (2009) as a means to foster low-carbon and green societies. In pursuit of this goal, urban planning and design often aim to increase the density of built environments (Yang, 2013). This entails promoting compact built forms, higher population densities, diverse housing options, and well-connected spatial arrangements (Davoudi & Sturzaker, 2017; Kaza, 2010; Makido et al., 2012). Compact development is considered an urban spatial policy that is believed to contribute to economic prosperity and prevent environmental degradation (Jenks, 2019; OECD, 2012). Western scholars have encouraged cities to embrace compact development principles and translate them into practical implementation (Burton, 2000; Ewing, 1997).

Despite the widespread endorsement of compact development, there is a need for a new study that evaluates its suitability while considering the quality of life (QOL). Quality of life has been recognised as a crucial aspect of the contemporary sustainable urbanism movement (De Vries, 2012; Farr, 2008). Therefore, this study aims to review the compatibility of compact development with a specific focus on enhancing the overall quality of life.

RESEARCH METHODOLOGY

Through qualitative methods such as document analysis and semi-structured interviews, the goal is to gather and analyse relevant data using thematic and content analysis. By employing purposive sampling, the study ensures data relevancy. The methodology aims to interpret patterns and dynamics related to compact city elements, emphasizing meticulous interview preparation and execution for data quality. Semi-structured interviews consist of several key questions to define the areas of exploration; they also allow for divergence to pursue ideas or responses in more detail, providing flexibility and depth.

The data analysis involves using thematic and content analysis methods to interpret the collected data. Thematic analysis helps identify and interpret the underlying meanings within the data, while content analysis focuses on examining the explicit content of the interview data. By systematically coding and categorizing the information, these methods provide a comprehensive

understanding of the compact city elements and their implications for sustainable urban development in Petaling Jaya.

Overall, the aim is to provide a systematic and thorough approach to gaining a deep understanding of the compact city elements and their contributions to sustainable urban development. This approach ensures that the data collected is relevant and rich in detail, offering valuable insights into the dynamics of compact city planning and its sustainability impacts.

ANALYSIS AND DISCUSSION

Table 1 presents a comprehensive overview of the findings regarding compact city elements obtained from various sources, including journals, articles, official reports, and semi-structured interviews. The table outlines the elements identified through these sources and highlights any observed similarities. The table provides insights into the consistency and convergence of information regarding compact city elements by comparing the findings across different sources.

Table 1: Elements of Compact City

Findings	**Journal and Article**	**Official Report**	**Interview Method**
Public Transport	✓	✓	✓
Accessibility to the city centre	✓	✓	✓
Mixed land use	✓	✓	✓
Reduce the amount of traveling	✓	✓	✓
Shorten commute time	✓		✓
Decrease car dependency	✓	✓	✓
Lower per capita rates of energy use	✓		✓
Limit the consumption of building and infrastructure materials	✓		
Mitigate pollution	✓		✓
Maintain the diversity of choice among workplaces, service facilities and social contacts	✓		
Limit the loss of garden and natural area	✓		
Low green space impacts	✓		
Reduce energy consumption and carbon emissions	✓	✓	✓
Provide housing and accessibility	✓		✓
Reduce low efficiency consumption of land resources	✓		
Higher neighbourhood density	✓		
Reliance on public transport	✓	✓	✓

Findings	Journal and Article	Official Report	Interview Method
Smaller dwellings	✓		
Less green space	✓		
High density	✓	✓	✓
High public transport accessibility	✓	✓	✓
Diversity	✓		
Sustainable transportation	✓	✓	
Comprehensive service facility	✓		
Short distances	✓		✓
Reduce pollution	✓	✓	✓
Encourage cycling	✓		✓
Social interactions	✓		✓
High population density	✓		✓
Proximity	✓		✓
Efficient use of energy	✓		✓
Green space	✓		✓
Public amenities	✓	✓	✓
Inclusivity			✓
Reduce urban sprawl			✓
Encouraging walking	✓		✓
Well-organised urban infrastructure	✓		
Centralised activities	✓		✓
Dense and proximate	✓		
Access to public transit and street connectivity	✓		
Reduce congestion	✓	✓	✓

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Experts across the board underscore the pivotal role of efficient transportation and mixed land use in driving sustainable urban development within compact cities. Expert 1 highlights their significance in emission reduction, land optimization, investment attraction, and community cohesion while noting the importance of infrastructure resilience and active transportation for public health. Expert 2 echoes this sentiment, emphasizing their contribution to carbon reduction, accessibility enhancement, and economic diversity, exemplified by the PJ City Food Valley project. However, challenges persist, including obtaining community consent amidst diverse viewpoints and addressing communication issues and economic disparities. Similarly, Experts 3 and 4 stress these elements' environmental, economic, and social benefits yet acknowledge hurdles in gaining community approval and trust. Expert 5

underscores the importance of proximity, space optimization, and mixed land use in curbing urban sprawl and promoting resource efficiency, albeit with challenges in shifting traditional land use practices. Lastly, Expert 6 singles out public transportation as paramount, advocating for transit-oriented development and active commuting options despite coordination challenges between rail line alignment and land use planning agencies. These elements promise sustainable urban development, overcoming community resistance, communication barriers, and coordination issues remains imperative for their effective implementation.

Table 2: Elements of Compact City on Sustainable Urban Development

Findings	Document Analysis Method	Interview Expert 1	Interview Expert 2	Interview Expert 3	Interview Expert 4	Interview Expert 5	Interview Expert 6
Public Transport	✓	✓	✓	✓	✓	✓	✓
Accessibility to the city centre	✓					✓	✓
Mixed land use	✓	✓	✓	✓	✓	✓	✓
Reduce the amount of traveling	✓	✓					✓
Shorten commute time	✓						
Decrease car dependency	✓	✓	✓	✓	✓	✓	✓
Lower per capita rates of energy use	✓						
Limit the consumption of building and infrastructure materials	✓						
Mitigate pollution	✓	✓	✓	✓	✓	✓	✓
Maintain the diversity of choice among workplaces, service facilities and social contacts	✓						✓
Low green space impacts	✓						
Reduce energy consumption	✓	✓					✓

Findings	Document Analysis Method	Interview Expert 1	Interview Expert 2	Interview Expert 3	Interview Expert 4	Interview Expert 5	Interview Expert 6
and carbon emissions							
Provide housing and accessibility	✓						✓
Reduce low efficiency consumption of land resources	✓						
Higher neighbourhood density	✓	✓	✓			✓	✓
Reliance on public transport	✓	✓	✓	✓	✓	✓	✓
Smaller dwellings	✓						
Less green space	✓						
High density	✓	✓	✓	✓	✓		✓
High public transport accessibility	✓	✓	✓	✓	✓	✓	✓
Diversity	✓						
Sustainable transportation	✓						
Comprehensive service facility	✓						
Short distances	✓	✓	✓			✓	✓
Reduce pollution	✓	✓	✓	✓	✓	✓	✓
Encourage cycling	✓	✓	✓				✓
Social interactions	✓					✓	✓
High population density	✓						
Proximity	✓						
Efficient use of energy	✓					✓	✓
Green space	✓						

Findings	Document Analysis Method	Interview Expert 1	Interview Expert 2	Interview Expert 3	Interview Expert 4	Interview Expert 5	Interview Expert 6
Public amenities	✓	✓	✓	✓	✓		
Inclusivity				✓	✓		✓
Reduce urban sprawl							✓
Encouraging walking	✓	✓	✓	✓	✓		✓
Well-organised urban infrastructure	✓						✓
Centralised activities	✓						✓
Dense and proximate	✓					✓	
Access to public transit and street connectivity	✓	✓	✓			✓	✓
Reduce congestion	✓	✓	✓	✓	✓	✓	✓

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The elements listed in Table 2 are essential components for achieving sustainable development in compact cities. These include public transportation, mixed land use, accessibility to the city centre, low car dependency, high density, green space, and diversity. Each element contributes to environmental sustainability, economic vibrancy, and social connectivity within urban environments. Overall, they form the backbone of compact, liveable, and sustainable cities, supporting the well-being of residents and ensuring the efficient use of resources.

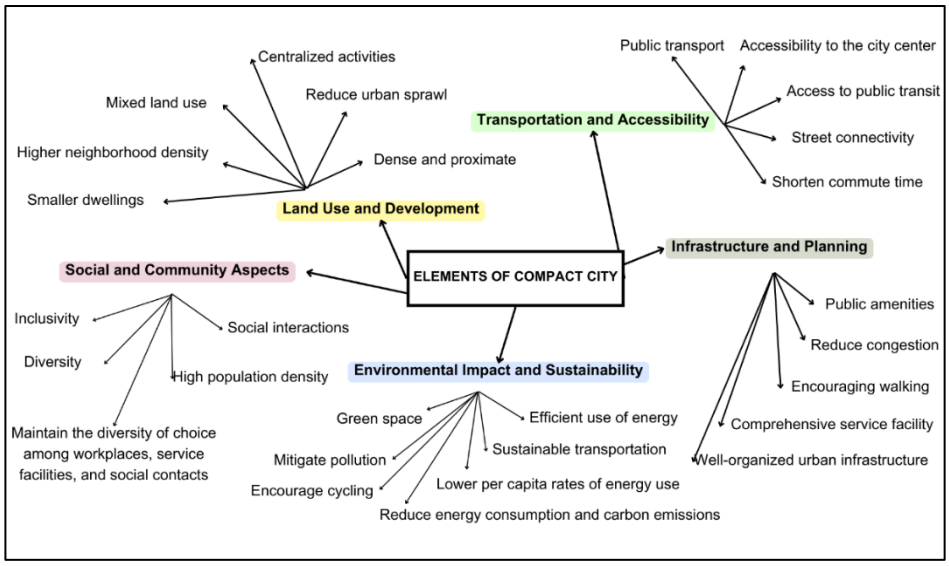

Figure 1: Elements of Compact City

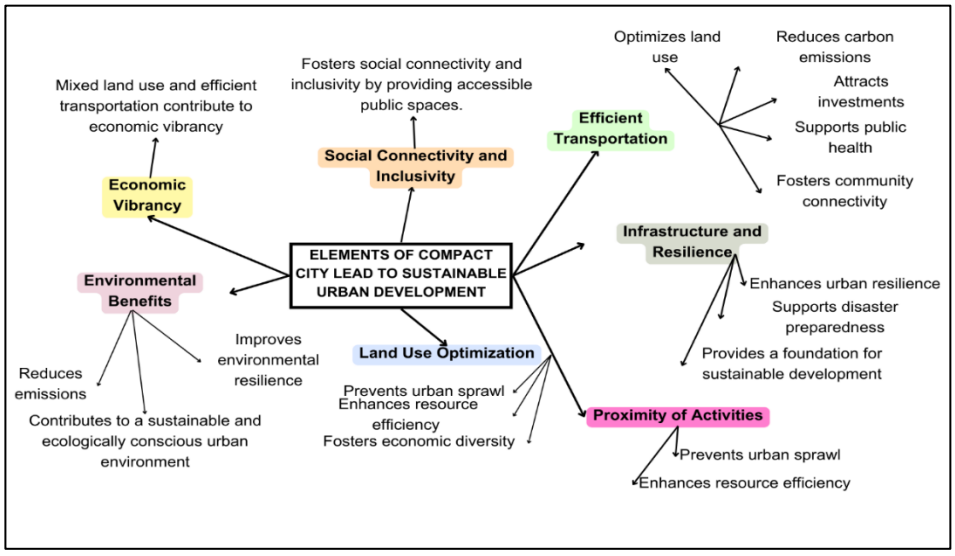

Figure 2: Elements of Compact City towards Sustainable Urban Development

In exploring the understanding of compact cities, the experts collectively outlined vital attributes essential for sustainable urban development. High population density, efficient transportation, mixed land use, and intentional spatial design emerged as defining features. The strategies proposed by the experts included minimizing land consumption, promoting resource efficiency,

and optimizing transportation for cleaner, healthier, and more sustainable urban environments.

Transitioning to the Petaling Jaya context, Experts 1 and 2 aligned compact city principles with the Petaling Jaya Smart, Sustainable & Resilient 2030 initiative. Both recognised the seamless integration of compact city attributes, such as high-density living, mixed land use, and efficient transportation, with the initiative's overarching goals. Despite alignment, challenges related to community disagreements were acknowledged by Experts 3 and 4, emphasizing the need for an intricate weaving of compact city principles into PJSSR 2030 to achieve a sustainable, resilient, and forward-thinking urban future.

Examining the key elements of a compact city, all experts emphasised the pivotal role of efficient transportation and mixed land use. Challenges were acknowledged, including diverse community perspectives, communication hurdles, economic disparities, environmental concerns, and mistrust. Despite these challenges, the experts collectively stressed the importance of integrating these elements for environmental benefits, economic vibrancy, and social connectivity.

Regarding the future outlook and recommendations, Experts 1, 2, and 3 highlighted efficient transportation, particularly public transportation, as crucial for sustainable urban development. They proposed solutions such as one-way systems, Bus Rapid Transit (BRT), and the adoption of electric vehicles. Meanwhile, Expert 4 emphasised the integration of public transport, mixed land use, and public facilities, recommending electric vehicles as a transformative technology. Expert 5 stressed the importance of proximity and mixed land use, emphasizing the need for low-carbon and climate-resilient cities. Expert 6 identified public transportation as the key, proposing transit-oriented development (TOD) and the 20-minute city concept. These forward-thinking recommendations align with a collective vision for a cleaner, more sustainable urban environment.

CONCLUSION

The comprehensive exploration of the elements of a compact city and their implications for sustainable urban development in Petaling Jaya has yielded valuable insights that collectively shape the overall conclusion of this study. The investigation, spanning document analysis, expert interviews, and meticulously examining compact city elements, has contributed to a nuanced understanding of how urban planning principles can foster sustainability. As we synthesise the key findings, several overarching conclusions emerge.

The identification and analysis of compact city elements, including mixed land use, public transportation, proximity, and community inclusivity, reveal their interconnectedness and collective impact on creating a sustainable

urban environment. When strategically integrated, these elements reduce environmental impact, enhance resource efficiency, and improve social connectivity.

The role of expert insights and perspectives in shaping our understanding of compact city elements cannot be understated. Expert opinions have provided valuable guidance, emphasizing the importance of longitudinal studies, comparative analyses, community engagement, technological integration, and economic impact assessments for a holistic examination of sustainable urban development.

Furthermore, the study underscores the significance of future research directions in advancing the field of urban planning. Recommendations for longitudinal studies will contribute to tracking the lasting impact of compact city elements, while comparative analyses with other cities will offer insights into contextual variations and successful strategies. Exploring community engagement, technological integration, and economic impact studies are vital for fostering inclusivity, staying abreast of technological advancements, and achieving a balanced approach to sustainability. In conclusion, this study comprehensively examines compact city elements and their implications for sustainable urban development in Petaling Jaya. By blending expert insights with rigorous research methodologies, the study provides a foundation for future investigations.

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