

UNIVERSITI TEKNOLOGI MARA

**DEVELOPING BIOPHILIC
WALKABILITY FRAMEWORK FOR
SUSTAINABLE DEVELOPMENT IN
MALAYSIA**

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ABSTRACT

Existing pedestrian often lacks essential features such as connectivity, cover, and shade, which are crucial for creating comfortable and enjoyable walking experiences. Poor sanitation, inadequate street maintenance, and insufficient accommodations for individuals with special needs further exacerbate these issues, making walking an unattractive and inconvenient option for many. The tropical climate, characterized by high temperatures and humidity, also discourages walking by adding discomfort and exhaustion to the experience. Consequently, reliance on motorized transport has increased, leading to greater greenhouse gas emissions, traffic congestion, reduced physical activity levels, and diminished opportunities for social interaction. Amidst these concerns, biophilic design is increasingly recognized as a crucial strategy for sustainable urban development. By integrating natural elements into the built environment, biophilic emphasizes the human need to connect with nature, while walkability fosters physical activity, social interaction, and improved urban accessibility. Therefore, developing a comprehensive framework of biophilic walkability and its indicators are urgently needed. Such indicators will provide practical tools for designing nature-integrated, walkable urban environments that promote environmental sustainability, social inclusivity, and economic resilience. In achieving this, a quantitative research methodology was adopted involving surveys from 162 stakeholders. This including representatives from government agencies, private consultants, and academics specializing in biophilic walkability. The survey technique was used to identify the key sustainability indicators relevant to Malaysia's urban context. In addition, reliability tests, descriptive analysis, and multiple regression techniques were used to analyse the data gathered. The findings yielded a comprehensive set of indicators and sub-indicators across three sustainability dimensions: environmental, social, and economic. The environmental dimension includes seven indicators, such as environmental features, nature in space, direct experiences of nature, biodiversity management, natural analog pattern, delight, and landscape architectural elements. The social dimension encompasses five indicators, emphasizing safety, inclusivity, experience of space and place, comfort, and convenience. The economic dimension consists of four indicators, focusing on tourism, property values, local economy, and recreation. Notably, the environmental and social dimensions were found to have a more significant impact on biophilic walkability in Malaysia over the economic dimension. As a result, this research provides actionable insights and a robust framework for policymakers, urban planners, and developers to design urban spaces that prioritize sustainability through walkability and biophilic design. By integrating nature into urban environments, the framework supports pedestrian-friendly spaces while promoting environmental preservation, social inclusivity, and economic resilience. In addition, these findings also have contributed substantially to both academic discourse and practical urban planning, aligning with Malaysia's Sustainable Development Goals (SDGs) and broader global sustainability objectives. This study highlights the transformative potential of biophilic walkability in creating inclusive, resilient, and ecologically sustainable urban landscapes in Malaysia. Furthermore, the framework serves as a replicable model for other developing countries aiming to integrate sustainability into urban planning practices

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Urbanization is one of the defining trends of the 21st century, demanding innovative approaches to how we conceive and organize urban landscapes spatially, physically, culturally, economically, and environmentally (Joan Clos, 2016). In Malaysia, rapid urban growth has generated significant economic benefits and development opportunities (Samat et al., 2019). However, this growth has also driven car-oriented urban development, resulting in inefficient, unhealthy, and unsustainable urban systems (Cavoli, 2021). Addressing these issues necessitates a paradigm shift toward sustainable urban development, balancing environmental preservation, social equity, and economic resilience (UN-Habitat, 2020).

In response, walkability have become increasingly important in urban planning, fueled by public demand and the need for sustainable urban expansion (Baobeid, 2021). Efforts to reduce air pollution and carbon emissions, alleviate traffic congestion in metropolitan areas, and foster greater environmental consciousness have amplified support for nonmotorized, active transportation (Baobeid et al., 2020). Walkability is closely linked to community liveability and sustainability, encompassing economic, social, and environmental dimensions (Baobeid, 2021). Despite these benefits, most Malaysians spend less time walking due to factors such as lack of enjoyment, safety concerns, poor sanitation and street maintenance, and inadequate walkability design for people with special needs (Teng et al., 2022). These limitations have reduced opportunities for walking, contributing to sedentary lifestyles, social isolation, and increased environmental pressures.

While research on biophilic walkability concepts is relatively new in Malaysia and predominantly focused on buildings and residential areas, biophilic urbanism offers transformative potential. It integrates nature into roadways to connect buildings and create community spaces (Croeser et al., 2020). Streets, a critical part of urban infrastructure, serve not only as transit corridors but also as key elements for environmental sustainability and connectivity (Asim & Shree, 2019). Incorporating biophilic elements into pedestrian infrastructure can address environmental, social, and