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Modelling the effects of green building incentives and green building skills on supply factors affecting green commercial property investment

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ABSTRACT

The aim of this study is to identify and model the motivating factors that influence developers' and investors' decisions to invest in green commercial properties using structural equation modelling methods. Precisely, the study modelled the effects of monetary green tax incentives and green building skills on supply factors affecting green commercial property investment. The study was based on a survey of 350 real estate developers, and investors in Malaysia and the model was validated for reliability and validity. The structural equation modelling indicated that monetary green tax incentives and green skills have significant causal effects on supply. Among these factors, life cost saving motivations, government policies, green certification, developers' expected rate of return motivations, and market strategy benefit motivations were significant. Monetary green tax incentives were, however, found to have the most significant effect on green commercial property supply and investment.

1. Introduction

In the current debate on global climate change, green building investment is increasingly considered by experts and institutional investors to act as vehicle for environmental impact mitigation and for achieving energy efficiency, carbon reduction, and corporate social responsibility [1–4]. The pressure to shift to green building is anchored by the rising evidence that the building sector is a major consumer of resources and energy, taking about 44% of the society's total material use and a large proportion of more than 50% of primary resources [5]. For example, energy consumption by buildings in Canada, UK, and the US is placed between 30% and 50% of the country's total energy demand [5]. Commercial properties contribute significantly to this problem. Commercial buildings (offices, retail, and industrial) consume close to 20% of the total energy consumption [6]. In Malaysia, commercial buildings alone account for about 32% of the total energy consumption [7]. There are also increasing body of studies indicating that green buildings could contribute to 30–50% reduction of total energy use,35% reduction of carbon dioxide (CO_2) emission,40% reduction of water usage, and 70% savings on waste output [8,9].

Malaysia has joined in the green building chase as increasing evidence emerge that green buildings are environmentally sustainable and can enhance productivity, lower market risk, and save cost over their operational life. To realise these benefits, Malaysia has developed some pro-green building policy measures. Among such measures are Malaysia green building rating system known as Green Building Index (GBI), National Green Technology Policy (NGTP), Low Carbon Cities Framework and Assessment System (LCCF), Malaysian Carbon Reduction and Sustainability Tool (MyCREST), and Minimum Energy Performance Standards. Moreover, to demonstrate leadership and commitment to green building, Malaysian government has retrofitted four of her iconic public buildings (the Diamond Building in Putrajaya, the Kuala Lumpur Securities Commission building, Low Energy Office (LEO), Green Energy Office (GEO) Building, GreenTech Malaysia, Green Technology and Water Building) into green buildings [3]. Malaysia has also provided some corporate green tax incentives for companies, but the incentives are insufficient to attract investors [11].

Despite these policies and measures, the market for green building in Malaysia and Southeast Asia is still overcast and uncertain; as a result, potential investors are still holding back. Consequently, Malaysian building developers have been cautioned to take a respite and think deeply before investing in green buildings [12]. This sentiment was also echoed by Eichholtz et al. [13] who noted that real estate developers and institutional investors are justifiably not sure on how far to go in the green building investments. This is mainly due to the fact that existing economic justifications for the development of sustainable buildings rely mostly on anecdotal evidence.

It may be under this cloud of uncertainty that causes, among nations, Malaysia to not yet be in the forefront of green building leadership. In an international comparative study on 'Green Investment Gap'

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to determine the countries that invest heavily in energy innovation and green investment, Japan and Finland were ranked the highest, sequentially followed by Korea, France, Demark, Norway, Sweden, US, Italy, Germany, UK, Spain, and Ireland. While the neighbouring country Singapore was on the list, Malaysia did not make the ranking. Consequently, green building supply and investment are still low in Malaysia despite the availability of the market [3,14,15].

Green building cost, availability of green building incentives, and green building skills are fundamental barriers to green building development particularly in the developing countries, including Malaysia. Research relating green building development and investment to these areas is very limited. Leading countries and cities in green building are those who are reducing green building cost through the significant provision of green building incentives and have developed high green building skills in designs, construction, maintenance, and technologies in energy efficiency, water efficiency, and material use efficiency. As the International Labour Organization [16] pointed out, there are shortages of skills in the green building sector due to the changing requirements. Skills that were previously satisfactory are no longer meeting the present requirements in green building. For instance, a study by Aliagha et al. [17] discovered a huge green building skill gap between the current and future skill requirement for energy-buildings in Malaysia. Specifically, Aliagha et al. [17] found a wide gap between the current and future green building skill requirements for (1) efficient light system design with controls; (2) efficient passive wall, roof, and floor design; (3) efficient passive wall, roof, and floor insulation installation; (4) efficient passive window glazing design and installation; (5) efficient solar photovoltaic panel design and installation; (6) energy-efficient HVAC system design; (7) energy-efficiency diagnosing and auditing; (8) carbon capture and storage; and (9) energy-efficient maintenance, especially HVAC system maintenance. In many respects, the insufficient availability of green building skills represent a major obstacle to what can be achieved in green building. In the absence of sufficient professional skills in green building, the performance of a building planned to be green may be severely compromised.

There appears to be no empirical evidence evaluating the motivating factors of green commercial property investment in relation to green building incentives and green building skills, especially in the developing nations. Current studies on green building seem to focus on green residential buildings [18] government and institutional green buildings [19], and energy efficiency [20]. Even though green commercial properties are gradually becoming areas of research interest, available studies focusing on green commercial properties [2,21-23] seem to focus mainly on green building certification, energy efficiency, eco-labelling, green building, and productivity, without specific attention to the interdependent factors that underlie the supply for green commercial property investment. Moreover, existing studies on the commercial green property and green building at large seem to be predominantly descriptive and qualitative and therefore lack rigorous quantitative empirical utility. There appear to be a few authors who have attempted to examine the correlations among the green building drivers [24,25]. Investors and developers are not only interested in correlations but also which variables, such as monetary green tax incentives and available green skills, have the most causal effects on the nature of supply for green commercial building factors.

There is a lack of theoretical context and explanations due to the limited studies in this subject area. It is also hard to find studies in commercial green property supply that are based on structural equation modelling (SEM), which are popular in explaining causal relationships among constructs and variables as well as testing the reliability and validity of the model's instruments. In this study, Social Cognitive Theory (SCT) was used to provide context to the developers' motivational drivers for green building and explain structural relationships among the constituent constructs or factors. SEM was used to test the structural relationships in terms of causal effects as well as to test and validate the research instruments and model as a whole.

Thus, the objectives of this study are to (1) develop and validate a model of factors affecting the supply of green commercial property investment and (2) determine the causal effect of monetary green tax incentives and available green skills on life cost saving motivations, government policies and green certification, developers' expected rate of return motivations, and market strategy benefit motivations in relation to green building supply and investment.

It is hoped that the findings and model resulting from this study will have a strong empirical utility for researchers, developers, investors, and governments involved in green building who are seeking practicable explanations for significant empirical evidence of causal relationships between factors of green commercial property investment, green building incentives and green building skills.

2. Related theory and literature

2.1. Related theory of decision to supply green commercial building

Social Cognitive Theory (SCT) is a popular behavioural theory that can be used to explain the decision and motivation to invest in the green building. SCT is a psychological model that explains the motivations, expectations, forethought, desires, and responsibility which could prompt and direct an individual's activity. In relation to the green commercial building supply and investment, SCT hypothesis holds that before investors commit to green building for any reason or purpose, certain motivational factors are required. Motivation is dependent on the aim and benefits identified through the forethought process, particularly when the knowledge of green building is an emerging concept [27]. For instance, investors may imagine the probable after-effects of an impending environmental disaster; they set objectives and plan a strategy that is likely to protect their immediate surroundings. Nevertheless, the reality of climate change has increasingly dominated the campaign and motivation for more investment in green building. Thus, investors with the right motivations and expectations are attracted to green commercial building concept based on life cost saving motivations, government policies and green certification, developers' expected rate of return motivations, market strategy benefit motivations, availability of green skills, and tax incentives. Moreover, SCT scholars have always argued that incentives to investors such as tax credits, loans or grants and subsidies, tax abatement, property tax credits, low capital gains, and low stamp duties could motivate investors to invest in green buildings. Government capacities to incentivize green products woo investors to supply green buildings [27]. Thus, within the context of social cognitive theory, it is the developers' and investors' expectation that commercial green property will not only provide environmental sustainability, but also that the availability of green building incentives and skills will further enhance their life cost saving.

3. Literature review

3.1. Factors affecting green building supply

3.1.1. Life cycle cost savings motivations

The cost debate in green buildings is far from settled and it is perhaps the biggest drawback in green building development and investment. As a result, "green building costs premium" is a popular phraseology in green building literature and used by the higher cost school of thought(relative to the conventional building), and "holding back investors" to present and defend their case. This side of the argument may not be completely untenable especially when examined through the lens of initial cost or as Kats et al. [28] observed when advanced technologies and higher levels of LEED are incorporated. In Australia, studies by Morris and Matthiesen [29] using Green Star rating and certification system for sustainable building showed that construction costs increased about 3–5% for a 5-Star level solution and additional 5% rise when a 6-Star non iconic design solution was deployed. In