

THE IMPACT OF SMART SUSTAINABLE CITY DEVELOPMENT ON PROJECT MANAGEMENT AND COMMERCIAL PROPERTY VALUES

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ABSTRACT

This paper investigated the impact of smart, sustainable city development on project management and commercial property values since this aspect of our profession is gaining currency both in terms of discourse and practice. The objectives include to: discuss societal characteristics influencing smart, sustainable city development, discuss sustainability factors on commercial property values and also what influence sustainability has as a value factor for commercial property as well as whether a sustainable commercial building is worth more than a conventional one. This paper is purely a literature review on earlier publications in this area and not empirical research. Some researchers' works were reviewed. It was found out and recommended that smart, sustainable city development impact project management in terms of terminology such as projectification of society and societal issues and transformation of the socialization of project management. Triple bottom line concept affects project deliverable and also the process of project management. The ownership of sustainable and environmentally friendly buildings results in multiple benefits. It was also found that link exists between the market value of a building, its sustainable features and its performance. Estate valuers are yet to formulate rules because the research relating to the value and cost of sustainable buildings is not extensive enough for such generalization.

KEYWORDS: *Smart Sustainable City Development, Project Management, Commercial Property, Values, Population Growth, Population Characteristics, Urbanization*

Article History

Received: 03 Mar 2021 | Revised: 18 Mar 2021 | Accepted: 24 Mar 2021

INTRODUCTION

To adequately understand this topic, let us kick start this discussion by defining specific critical terms, what is a smart city? According to Amayaevbo, (2018) and United Nations report (2016) “smart cities are defined as those which seek to address public issues through ICT-based solutions involving multi-stakeholder partnerships. Smart cities have the potential to improve the quality of life: they are innovative, making traditional networks and services more efficient through social innovation and the use of digital technologies, creating more inclusive, sustainable and connected cities for the potential benefit of their inhabitants’ public administrations and business”.

Schumann (2010) said that sustainability is to guarantee that all businesses, public services, natural resources, the economy, and communities can continue in the future. According to the RICS (2007), research report sustainability is an end state in which all human activities can be sustained within the planet's existing capacity. Sustainable development is, however, the process of moving towards the goal. The most generally accepted definition of sustainable development is the one given by the 1987 UN Brundtland Commission Report as the development that “accommodates the desires of the present without necessarily compromising the future generations’ ability in meeting their needs (Schumann, 2010).

Population growth and characteristics and rapid urbanization, are societal issues that affect cities positively and negatively. These societal issues can make a city to be smart and sustainable or to decay. Silvius and Schipper (2018) identified some major societal issues that can influence a smart, sustainable city, namely quality of life, new business models, smart and sustainable city success criteria are related to stakeholders and long term effects as well as extensive connection to the digital world and another one is the consideration for privacy and ethics. According to them, a comprehensive understanding of societal issues' impact is relevant to build new definitions, competencies and supporting processes.

Investment in sustainable commercial buildings can be justified on an economic basis. Monetary considerations mainly drive investors. Sustainable buildings are seen as those which are environmentally friendly, save energy and reduce running costs. Users should benefit from positive working environments.

The research paper aimed at examining the impact of smart, sustainable city development on project management and commercial property values. The objectives to achieve the aim are identifying and discussing societal characteristics influencing smart, sustainable city development and discussing sustainability factors on commercial property values. Another objective is to investigate what influence sustainability has as a value factor for commercial properties and whether a sustainable commercial building is worth more than a conventional one.

The study’s significance is its immense impact on the whole of the built environment. Public and private users of this work will realize that a city is a continuum, as the city will continue to improve in applying technology to urban governance.

REVIEW OF LITERATURE

Origin of Smart Sustainable Cities

Silvius and Schipper (2018) stated clearly that the Smart Growth movement of the late 1990s marks the beginning of the concept of smart cities. Hojer & Wangel (2015) observed that its emergence became more pronounced from 2010, but the term became broader in its conceptualization and was initially fueled by the application of technology in an urban situation. However, Silvius and Schipper (2018) and Arroud, Zahi, Sabir, and Sadik (2016) argued that a city could be considered a system consisting of various interconnected objects. Bibri and Krogstie (2017) and Angelidou (2015) further postulated that the smartification of the system is about the suffusion of sensor technologies to gather data and identify objects, communication capabilities to connect and distributed data and information processing systems and computational analytics to improve urban functions and save resources to improve environmental performance. Consequently, digitization places a new digital layer between the city infrastructure and city services layer conceptualization. Smart, sustainable cities (SSC) as a term connects the smart city and sustainable cities concept. According to them, it is a new phenomenon that became widespread during the mid-2010s. The concept emerged from six different developmental concepts, which are;

urban ICT, sustainable cities, smart cities, sustainable urban development, sustainability and urbanization and urban growth and environmental issues

Smart, sustainable city development is an intricate, multidimensional process through which variations are applied at all city stages, aiming to augment city sustainability by providing a high-quality life for her citizenry through the adoption of ICTs and other means.

Smart Sustainable Cities, Green Buildings and Sustainable Buildings

Smart and sustainable cities arise due to trying to find solutions to population growth, characteristics and urbanization in significant settlements. According to Silvius and Schipper (2018), social relevance is an essential condition for becoming an honourable profession. According to them, our overwhelming consumption and waste patterns, destructive use of scarce resources, climate problems due to pollution and social issues, large emissions are vital societal matters. For the fact that humans are exclusively responsible for this, a sustainable development tactic has emerged to put the social, economic and environmental aspects at equilibrium. It therefore aim at providing present and future generations with basic needs for a good quality of life. Sustainability is now both on the governmental and organized private sectors agenda stated Silvius and Schipper (2018). According to Al-Nasrawi; Adams and El-Zaart (2015), the improved quality of life and economic perspectives urge many people to migrate to cities worldwide. They defined a city as a larger or more important place than a town where people live and work.

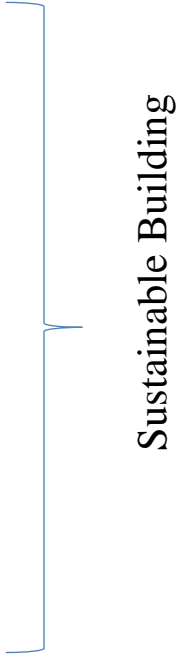
Consequently, most resources are consumed in cities, implying their economic importance on the one land and low environmental and social performance on the other hand. It questions the present and future livability for the people on earth. Cities must play a significant role in the regional, national and global sustainable development. Chourabi, Nam, Walker, Gil-Garcia, Mellouli, Nahon, Pardo and Scholl (2012) stated that making a city smart and sustainable is becoming a strategy to mitigate the problems generated by the urban population growth, characteristics and rapid urbanization.

Schumann (2010) opined that green building and sustainable building are often used synonymously and interchangeably, but these expressions have to be separated as they have different meanings. Green buildings are expected to deliver lower energy consumption and lower carbon dioxide (CO₂) emissions.

According to Lutzendorf and Lorenz (2007 & 2008) and Schumann (2010), the definition of sustainable buildings goes far beyond the narrower concept of lowering a building's energy consumption, as sustainable buildings are constructed with a higher urban planning, creative, functional and technical quality.

Table 1: Differentiation of Sustainable and Green Buildings

Ecological	Use of Resources	
Ecological	Emissions	Green Building
	Waste Accumulation	
Socio-Cultural	Well-beings, comfort	
	User Satisfaction	
	Functionality	
Economic	Life-cycle costs	
	Value Growth	
	Flexible use	
Technical	Durability of Materials	
	The ability of Deconstruction/ Recycling	
	Ease of Maintenance	
Process	Planning	
	Building Construction	
	Maintenance	
Location	Micro Location	
	Utilities	
	Infrastructure Provision	



Source: Schumann illustration, after Horster, Herman (2009).

Benefits of Sustainable Properties

According to RICS (2005), the ownership of sustainable buildings result in multiple benefits to investors due to the various characteristics of such properties, ranging from lower operating costs to improved marketability, longer useful life spans increased occupant productivity and well-being, as well as more stable cash-flows which in turn have economically quantifiable benefits.

Eichholtz, Kok and Quigley (2009) identified at least four types of economic benefits resulting from investing in sustainable buildings: saving resources on energy, reducing water and waste disposal and reductions in other operating costs, saving against future energy price increase and reducing greenhouse gas emissions. Some studies in the USA (2003) have identified a link between the market value of a building, its sustainable features and its performance.

These studies' outcomes indicate that financial benefits are accruing to sustainable properties compared to non-certified assets, resulting in higher achievable rents and sales prices and that real estate investors will be rewarded for the additional costs of providing sustainable buildings.

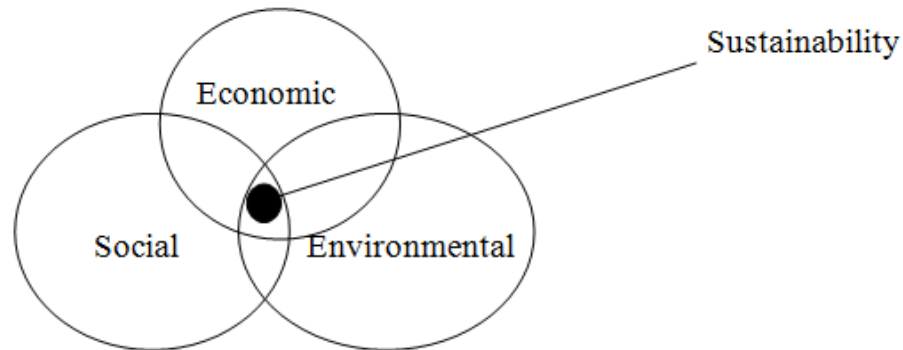
METHODOLOGY

This research is not an empirical one. It is a review of literature based on the past works on the objective of this research. Materials were sourced online, and hard copies of past research. This compilation was our efforts.

SUSTAINABLE DEVELOPMENT AND PROPERTY VALUES

The environmental, economic and social issues, which is the Triple Bottom Line Concept was considered in sustainable development, according to Reed and Richard (2009) and RICS (2007). The two commonly accepted sustainable development models based on the Triple Bottom Line methodology were first developed by Elkington & John (1994) and also mentioned Lutzkendorf and Lovenz (2005).

The Three Pillars Model of sustainability shows the merging of economic enterprise and growth, as social well-being and minimizing environmental impact. Terence and Boya (2005) add that sustainability will balance economic and social performance measures with environmental protection.



Source: Schumann (2010), after RICS (2007)

Figure 1: Three Pillars Model of Sustainable Development.

According to Lorenz and David (2007), the three pillars of sustainable development following the Triple Bottom Line concept are characterized as follows:

- Ecological sustainability is dependent on material, energy, noise emission, amount of waste products, amount of traffic, old building material separation and disposal, land use/pollution, climate change and biodiversity and means the reduction of the area used, conserving resources and avoidance of harmful materials and emissions.
- Social sustainability is based on the social aspects such as the feeling of well-being, aesthetics, health comfort, security and user satisfaction, appropriate living environment and social integration.
- Economic sustainability minimises life-cycle costs (construction cost, operating costs and cost of deconstruction and disposal), and value retention (material, goods and capital). Functional – aesthetic aspects such as maximizing functionality, adaptability, serviceability and design should also be considered.

Financial sustainability depends on the fulfilment of the economic, social and ecological sustainability criteria. The three dimensions are underpinned by a fourth dimension, comprising the institutional and governance structures needed to make sustainability work.

Dimension of Smart Cities

According to Caragliu, Del BO, & Nijkamp (2011) and Mosannenzadeh & Vettorato (2014) Vienna University of Technology centre of Regional Science identified six dimensioning of smart city namely smart economy; smart mobility; smart environment; smart people; smart (human) living and smart governance.

International Telecommunications Union (ITU) (2014) defined five pillars for the smart, sustainable city which have certain similarities with the smart city dimensioning: Economy, Governance, Environment, Society, Technology and Infrastructure.

It was Dameri and Rosenthal-Sabroux (2014) that most definitions are not specific enough to guide implementation.

DISCUSSION AND CONCLUSION

- According to Bierwolf, Romero, Pelk and Stettina (2017), the penetration of project management into every industry and function is called society's projectification. Societal changes should influence the project management discipline and smart, sustainable city development. The smart, sustainable city development developments affect project management discipline and societal issues and transformation of the socialization of project management (Silvius & Schipper, 2018).
- They also recommended that an entrepreneurial project be self-reliant in the economic crisis of finance setback and necessitates innovative business models beyond the traditional investment model to function adequately. Kramers, Hojer and Wangel (2014) point to the presence of a skilled workforce with a forward-thinking attitude that is motivated to adapt and drive change.
- Silvius and Schipper (2018) embrace the triple bottom line, not only in the project deliverable but also in the process of project management as an additional element.
- According to RICS (2017); Luzendorf and Lorenz (2008), sustainable buildings affect property-specific risks (commercial property):
 - Reduced vacancy risk due to higher attractiveness from an occupiers perspective.
 - Reduced risk of tariff changes for energy, water supply and disposal.
 - Reduced appearance of sick-Building syndromes
 - Lower legislation and liability risk
 - Lower risk changes in the market
 - Schumann (2010) stated that reflecting sustainability issues in the sales comparison method works best when a sufficient amount of comparable sales prices is available and when the characteristics and attributes of these sales prices and the subject property can be appropriately specified to avoid comparing apples with oranges. He also stated that the significant valuation input parameters are market rent, operating costs, and discount rate, which can all be affected by sustainable features when using the income method. Sustainable design reduces operating costs, but most sustainable features affect operating expenses usually attributed to the tenant, such as costs for water, heating, cooling, and electricity. It can also reduce the costs for repair and maintenance and management, which are often attributable to the property owner. He further stated that in a Discounted cash flow (DCF) approach sustainable characteristics are explicitly reflected by adjusting valuation input parameters such as market rental level, Rental Growth, Expenses, Tenant Renewal probability, vacancy assumptions, Discount Rate and exit value.
 - To appreciate the effect of sustainability on property values, it requires an initial profound understanding of the concept of sustainability and sustainability development. In considering the triple bottom line concept, sustainable properties have various economic, social and environmental merits. These include operational cost savings and also intangible benefits such as improved comfort and health of occupants.

- Minimal upfront costs are necessary to incorporate sustainable design, resulting in life-cycle cost savings and increased rental and asset value; others indicated significant cost premiums attributable to sustainable buildings' design and construction. Schumann (2010) views some empirical studies conducted in the literature concerning the value and cost of sustainable buildings but are not numerous enough for valuers to generalize rules from them.
- Schumann (2010) summarized his work by stating that quantification of the advantages in monetary terms and evidence of the risk reduction potentials are however not yet possible due to lack of data, and the novelty of sustainable buildings means that there is limited post-occupation data to confirm the findings over time. We agree with him that there is a need for more research on the cost and benefit analysis, life-cycle costing for (different levels of) sustainability in buildings.

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