

A CONCEPTUAL MODEL FOR THE ADOPTION OF GREEN BUILDING TECHNOLOGY IN THE CONSTRUCTION INDUSTRY

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Abstract: The construction industry is a significant contributor to the economy in most countries, and it plays a vital role in every country's economic growth worldwide. The adoption of building technology plays a critical role in providing a healthy environment in the construction industry. Developing nations embrace Green Building Technology (GBT) more slowly than developed nations. This study aims to systematically evaluate the existing literature on the intention to adopt GBTs in terms of theories, contexts, and methodology to analyse the development of research on adopting GBTs over time. Furthermore, based on the synthesis, we have developed a conceptual framework that shows the antecedents and consequences of the adoption of GBTs. In response, this study integrates the Theory of Planned Behaviour (TPB) and the Technology-Organisation-Environment (TOE) framework to identify some overlooked influential determinants of GBT and propose insightful research directions in the construction sector. The integrated conceptual framework offers clear justifications for comprehending the behaviour of developers to incorporate GBT in their ongoing and upcoming projects. This study has implications for scholars, policymakers, practitioners, and market researchers seeking answers for the elements that might increase global demand for Green Buildings (GB). This review contributes to the body of knowledge in the green building literature.

Keywords: Sustainable development, sustainable buildings, green building technology, awareness of environmental issues, top management leadership.

Abbreviations: Green Building (GB), Green Building Technology (GBT), Construction Industry (CI), Awareness of Environmental Issues (AEI), Top Management Leadership (TML), Carbon dioxide (CO₂).

Introduction

Green Buildings (GB) are one of the ways to promote sustainable living because they can minimise the negative effects on the environment and human health (Casey *et al.*, 2020). Developing energy-efficient and low-carbon buildings is becoming popular in the construction industry daily. According to the World Green Building Council (WGBC, 2017), "a green building is a building that in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment." Adopting energy-efficient buildings, sustainable buildings, GBs, smart buildings, or Green Building Technology (GBT) has received significant attention worldwide

because it could reduce the negative impacts of construction on the environment and contribute to sustainable development (Liu *et al.*, 2022). Previous studies showed that most developed countries have already adopted GBT, the initial stage in developing countries (Addy *et al.*, 2021). Therefore, developing nations, such as those in Southeast Asia, and Asia are noted to be still struggling with the fundamentals of GB adoption and are primarily distinguished by the absence of mandatory GB laws, policies, incentives, and tested rating systems for GBs (Anzagira *et al.*, 2019). Also, Wang *et al.* (2019) stated that transitional energy consumption and deforestation creates a significant global sustainable development problem. In addition,

Shi Q. *et al.* (2017) found that construction activities produce considerable quantities of dust, noise, solid waste, smoke, and wastewater; as a result, they directly impact human health. Moreover, Shi, Y. and Liu (2019) stated that the construction industry is the most significant contributor to energy consumption (40%) and overall Greenhouse Gas (GHG) emissions (30%). Even though the construction industry is a key part of boosting economic growth and speeding up urbanisation, it also causes environmental problems and uses many resources. This shows how important it is for the construction industry to work toward and implement sustainable development. As a result, the GB concept was created.

The terms sustainable building, energy-saving building, eco-friendly building, high-performance buildings, GB, and sustainable construction are often used interchangeably within the construction industry (Anzagira *et al.*, 2019). Other than that, GBT has played a vital role in sustainable development, such as solar energy, rooftop technology, and energy-efficient heating, ventilation, and air conditioning (HVAC) systems, which work for overall sustainability performance (Alam *et al.*, 2021). As a result, some governments have ardently embraced GB and promoted it as a method for reducing the construction industry's negative environmental impacts (Chen *et al.*, 2021). Several scholars and organisations have demonstrated that the adoption of GBT considerably assists the building sector in achieving sustainable development (Darko *et al.*, 2018). GBTs are generally introduced and applied to obtain the saving target concerning electricity, water, soil, and material, as well as reduce the adverse effects on nature and improve human health and the whole life cycle of the building projects (Wang *et al.*, 2019).

Furthermore, the construction industry is the main contributor to greenhouse gases, and there is a lack of literature on adopting GBT in emerging countries. Bangladesh is the most polluted country in the world, according to IQAir (2022) report, and India is the 5th most

polluted country in the world. Nepal and China were the 10th and 12th most polluted countries, respectively. Therefore, there is a need for further research into the factors influencing the adoption of GBT in developing nations' construction industry to minimise the practical gaps.

Therefore, this study aims to improve the adoption of GBTs by developing a framework for the construction industry in developing countries from a theoretical point of view. Theories are viewed as a means to enhance academic knowledge because they provide academicians with a framework for responding to a research question (Lim *et al.*, 2021). This comprehensive literature evaluation, which adheres to the theories-contexts-characteristics-methods (TCCM) framework (Paul & Rosado-Serrano, 2019), offers various insights into the theoretical foundations of adopting GBT research. From the previous studies, several theories are used in the construction industry, and it seems that different theories can be used to determine GBT adoption in the future. Previous research shows that various theories utilised in green building adoption are derived from distinct perspectives. For example, the most used theories for technology adoption are as follows: The Technology Acceptance Model (TAM) (Davis, 1989), the Theory of Planned Behaviour (TPB) (Ajzen, 1985, 1991), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003), Diffusion of Innovation (DOI) (Rogers, 1995b), and the Technology-Organisation-Environment (TOE) framework (Tornatzky, L. G. *et al.*, 1990), Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1981) all come from different points of view. Therefore, this study aims to integrate two theories, the TPB and the TOE, in the context of GBT adoption in the construction industry from the developing country perspective. In conclusion, this industry has an imperative need for additional empirical research on the adoption of GBTs. This research proposes a conceptual framework for the construction industry in developing nations to facilitate the adoption of

GBTs. Based on the above discussion, this paper presents the following research questions:

1. Do attitude, Subjective Norms (SN), and Perceived Behavioural Control (PBC) affect construction developers' intention to adopt Green Building Technology (GBT)?
2. Do perceived Green Building Technology (GBT) advantages and Awareness of Environmental Issues (AEI) affect attitudes toward the construction developers' intention to adopt Green Building Technology (GBT)?
3. Does Top Management Leadership (TML) affect Subjective Norms (SN) toward the construction developers' intention to adopt Green Building Technology (GBT)?

This paper is organised as follows: First, it explains the literature search and selection method. Second is the conceptual framework's justification and the significance of GBT's adoption in the building sector. Third, the conceptual model includes the influencing factors of Top Management Leadership (TML), Awareness of Environmental Issues (AEI), and perceived GBT advantage regarding how they affect an organisation's decision to adopt GBTs. Fourth, explain the research implications. Fifth, limitations and future direction of the study. Lastly, conclusions of the study.

Literature Review and Theoretical Foundation

Academicians, researchers, and practitioners emphasise sustainable development, economic growth, sustainable green business, and sustainable green finance in their studies (Zheng *et al.*, 2021). Because the construction sector is considered a major contributor to global economic growth, this sector was identified as the primary contributor to Carbon Dioxide (CO₂) emissions and directly impacted the environment. Although sustainable or green construction is still evolving in developing nations, it has captured the public's and government's attention extensively by creating tools like the National Development Plan, Green

Building Council, and Green Financing (Addy *et al.*, 2021).

GBs aim to harmonise, improve environmental stability and ecological protection, and fulfil the Sustainable Development Goals (SDGs) by 2030 (Yousaf *et al.*, 2021). Through sustainable design, construction, and operations, green buildings decrease carbon emissions, energy, and trash, save water, favour safer materials, and minimise human exposure to contaminants (Liu *et al.*, 2022). GBT is a technological innovation, and it is the use of existing technology to create new products or services. According to Rogers (1995a), technological innovations enable new ideas, objects, or procedures to occur for alternative use. In this paper, the conceptual model proposed different environmental factors, thereby taking a behavioural model approach, particularly with technological innovations like GBT. Other theoretical frameworks, such as the TAM, might be used to describe an organisation's intention to embrace GBTs. Several theories have been put forward to explain behaviour related to sustainability. Among them, we have employed two theories, the TPB and the TOE framework, to explain construction developers' intention to adopt GBTs. Moreover, this study employs these two theories, TPB and TOE, as the most appropriate theory for the proposed model to examine the top management's perception of GBT practices in the construction industry. These theories are further explained in the following sections below.

Technology-Organisation-Environment (TOE) Framework

The theory of TOE (Figure 1) was developed by (Tornatzky, L. & Fleischer, 1990). It describes three aspects (technological context, organisational context, and environmental context) of the adoption and implementation of technological advancement: (a) Technological context refers to both the internal and external technical resources relevant to the organisation, (b) organisational context refers to descriptive measures about the organisation, and (c)

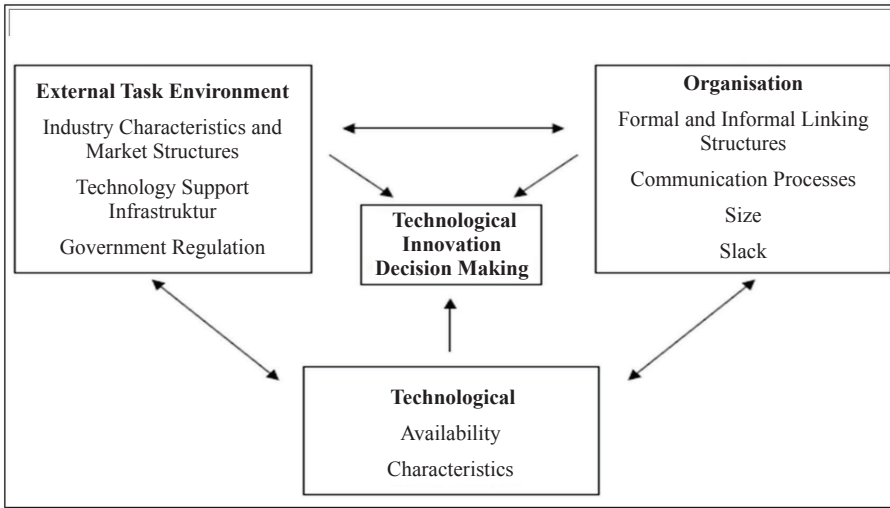


Figure 1: TOE model
 Source: (Tornatzky, L. & Fleischer, 1990)

environmental context refers to its business, its industry, competitors, and dealings with the government. The TOE framework has solid theoretical support and consistent empirical support.

The TOE model is used to predict innovation adoption. It can be applied to different types of innovation at an organisational level. In this study, technological innovation (TI) refers to adopting GBTs in the construction industry. This study defines technical context as perceived GBT advantages, TML as the organisational context, and AEI as the environmental context. According to (Awa, Hart O. *et al.*, 2017), the TOE framework is the most dominant, valid, and robust for studying organisational-level adoption. For example, this includes the adoption of GBT (Saleh *et al.*, 2020) and cybersecurity adoption (Wallace *et al.*, 2021). However, this framework lacks behavioural aspects, which is very significant for the decision-makers to adopt innovation. Hence, the TOE framework should integrate other adoption theories related to the organisational context. Thus, this study will integrate with the TPB, which will be discussed in the following sections.

Theory of Planned Behavior (TPB)

The TPB is an extension of the TRA (Figure 2). TRA was developed to explain the intention of behaviour leading to the actual performance. TPB considers non-voluntary factors, which are a function of control beliefs and perceived facilitation. Control beliefs refer to perceived ease or difficulty, while perceived facilitation refers to the factors that can facilitate the performance of a given behaviour.

TPB has been widely used in behavioural studies for individual beliefs and behaviour intentions across several disciplines of consumer behaviour, including Information Technology (IT), GBTs adoption practice (Saleh *et al.*, 2020), Tourism and hospitality, health management, marketing, and sports (Maqsoom *et al.*, 2023). TPB is arguably the most widely used behavioural perspective (Sussman & Gifford, 2019). Additionally, Mahat *et al.* (2019) applied it to adopting GBT in the Malaysian construction industry, while Zhang *et al.* (2018) used it to explore the behavioural intentions of young consumers’ purchasing intention of green housing in China. Previous studies have shown that the TPB adopted both individual-

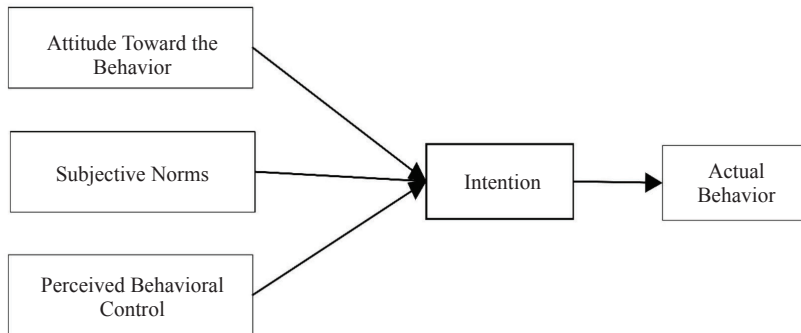


Figure 2: Theory of Planned Behaviour (TPB), Source: Ajzen (1991)

level and firm-level (Sarmah *et al.*, 2017; Heiny *et al.*, 2019). For instance, adopting green workplace behaviours (Francoeur *et al.*, 2021), implementing green building practices (Samson & Bernard, 2018), and planning to implement GB practices (Saleh *et al.*, 2020).

Based on the above discussion, this study applies the TPB in developing a theoretical framework to demonstrate the adoption and implementation of GB principles in the construction sector. The behavioural characteristics of attitude, Subjective Norms (SN), and Perceived Behavioural Control (PBC) from the TPB are custom-tailored for developing the conceptual framework.

Integration of TPB and TOE Theories

This study developed a conceptual framework to investigate the factors that influence the intention of construction developers in developing countries to employ GBTs. Several reasons for synthesising two theories, TPB and TOE, are appropriate for this study. Firstly, the synthesis of TOE in this study is suitable as it was widely used in organisational adoption decision studies. However, (Ibrahim & Jaafar, 2016) stated that this framework lacks behavioural aspects, which are the key factors for decision-makers to adopt innovation. Hence, the TOE framework should integrate other adoption theories related to individual/ firm context. Thus, the TOE framework is integrated into the TPB theory in this study.

Secondly, TPB was widely used based on consumer behavioural studies, and some studies used it from organisational perspectives (Maqsoom *et al.*, 2023). For example, adoption decisions related to e-business (Sarmah *et al.*, 2017), green workplace behaviour adoption, and adoption of green building practices (Samson & Bernard, 2018), TAM, TPB, and TOE are also used to the understanding of e-commerce adoption (Awa, Hart O *et al.*, 2015). Resource Dependence Theory (RDT), Resource-based View (RBV), and DOI also use the adoption of GBTs (Tran *et al.*, 2020). Since TOE and TPB have been widely used in organisational behavioural intention studies (Yusof *et al.*, 2018), it is appropriate to be applied in this study.

Methodology

This study utilised a systematic literature review to investigate the theories (TPB and TOE) and their construction industry applications. This article explores the conceptual meaning of GB via considerations of the advantages that result from its implementation, the drivers, and the barriers to the notion. This study provided a testable theoretical framework to encourage the adoption of GBT and its use in the construction sector. The previous literature was evaluated, including theoretical and empirical investigations published in reputable publications. This systematic search method ensures the objectivity of the research by collecting literature sources from reputed

Table 1: Name of electronic databases, descriptors, and key journals

Electronic Databases	Descriptors for Literature Search	Key Journals Accessed
Google Scholar Science Direct Scopus Web of Science (WoS)	Green construction Green building technology Sustainable construction Sustainable building Benefit Obstacles Strategies Theory of planned behavior Technology-Organisation-Environment	Buildings Earth and Environment Science Ecological and Economics Energy and Buildings International Journal of Low-Carbon Technologies International Journal of Advanced Scientific Research and Management International Journal of Building Pathology and Adaptation International Journal of Engineering and Management Research International Journal of Environment and Sustainable Development International Journal of Innovation Science International Journal of Management of Environmental Quality International Marketing Review. Journal Cleaner Production Journal of Business Research Journal of Enterprise Information Management Journal of Islamic Marketing Journal of Marketing Management Organisation and Environment Sage Scientific African Smart and Sustainable Built Environment Sustainability Sustainable Cities & Society

and renowned electronic research databases (Govindan *et al.*, 2021). The search engine databases included Google Scholar, Science Direct, Scopus, and Web of Science (WoS), to access mainly peer-reviewed journals.

The terms “green construction,” “green building,” “sustainable building,” “sustainable construction,” “green building implementation,” “benefits,” “obstacles,” and “the theory of planned behaviour,” as well as “technology-organisation-environment,” are among those used to describe the process (Table 1). It should be emphasised that the researcher did not intend for these descriptors to be complete or conclusive; rather, they merely provided access to a sufficient number of relevant research publications. In total, 263 articles were found and

put through a screening procedure. The filtering process resulted in the extraction of 50 full-text articles from the lot deemed relevant and used for this study. By looking at the abstracts and sometimes the whole articles that were first found, it was possible to decide if the papers were relevant or not. Several of the first-found articles were not relevant to the research since they just made passing reference to a few of the search terms. As a result, this research focuses on the analysis, selection, and drawing of conclusions from 50 filtered publications found throughout the literature search process that led to the creation of the conceptual framework. The entire procedure is summarised in Figure 3.

The procedure starts with selecting an appropriate electronic database, a preliminary

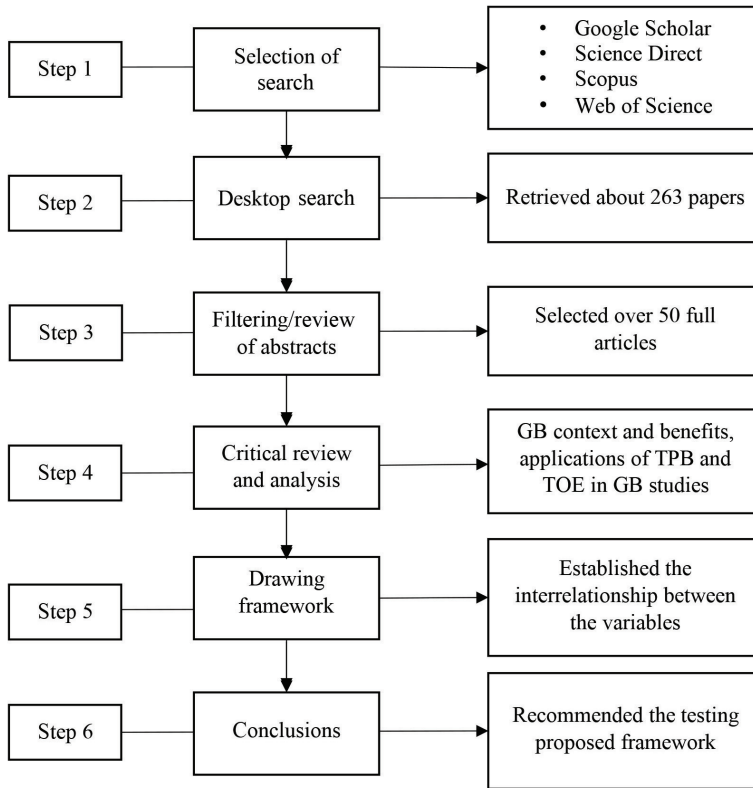


Figure 3: Articles selection procedure

desktop search to find related articles and a cursory look at the articles’ abstracts to find other related papers. Before putting together the framework and conclusion, the antecedents that had been found were evaluated and analysed critically. This included relevant publications, presentations, and debates on the GB status, its pros and cons, and relevant theories. Inclusion and exclusion criteria also defined the boundaries for our systematic review method. Several components of the evaluations were mainly concerned with organisational or management issues. Following that, a desktop search revealed the required articles from these publications. Finally, we have selected 50 papers for this study.

Conceptual Model and Proposition Development

Followed by the previous section, this section describes the proposed research framework (Figure 4) of the study. This conceptual

framework was developed based on the last section’s discussion. This framework demonstrates the developers’ conduct and purpose in embracing GBTs within the construction sector. The proposed research framework integrates the essential contributions of the two theories and models to establish a causal relationship. The framework for this study is adapted from the theories (TOE and TPB). It is considered that combining the TOE and TPB theories can better explain GBT adoption decisions in developing nations from technological, organisational, and environmental viewpoints.

According to the conceptual model, construction developers are driven by the primary drivers of technical innovation, TML, knowledge of environmental issues, and perceived GBT benefits to embracing GBTs. AEI and perceived GBTs advantage influence attitudes toward the developers’ behaviour, as

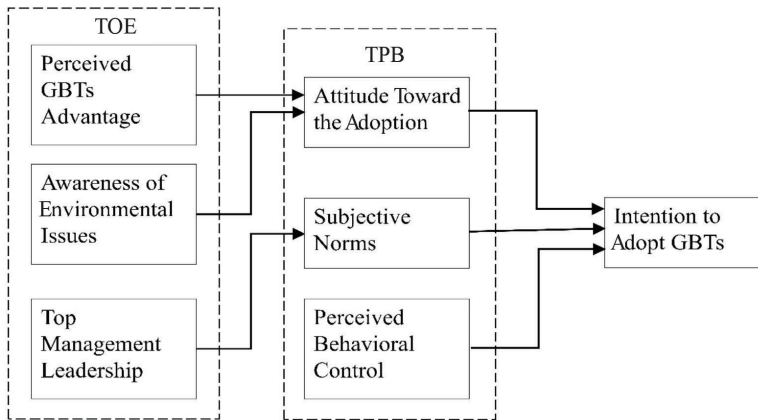


Figure 4: A proposed conceptual framework for this study

well as TML influence the SN, attitude, SN and PBC effect on the developer’s intention to adopt GBTs. The proposed constructs were proven both theoretically and empirically by previous studies. Hence, these constructs are reliable in understanding the developers’ intention to adopt GBTs within the construction industry. A total of seven constructs were involved in the conceptual framework, including attitude toward the behaviour, SN, PBC, intention to adopt GBTs, AEI, perceived GBT advantages, and TML. The next section will explain the seven constructs as follows.

Perceived GBTs Advantage (Ad)

The literature indicates that GBTs have several relative benefits, such as improved business profile and prestige, marketability, building value, better return on investment, and comparative advantages (Tran *et al.*, 2020). Adoption activities for GBTs cover the entire life cycle of the whole project, including concept, planning, installation, and service (Alkhalidi & Aljolani, 2020). They are building developers who deliberately promote GBTs in their construction projects because of their commitment to stress corporate social responsibility. The literature steadily acknowledged that marketing incentives are one of the most significant considerations in determining whether or not to use GBTs (Teng *et al.*, 2019). Additionally, property developers will have an immense opportunity to easily

open up their new market, generate more rental income, make greater investment returns, and gain more economic benefits by accepting and adding unique green elements to distinctive green products (Tran *et al.*, 2020).

Additionally, features of decision-making units, as indicated by overall organisational socio-economic status, individual characteristics, and internal communication behaviour, are significant elements influencing innovation strategy adoption decision-making at the initial stage of the process (Rogers, 2010). The TOE theory includes the perceived benefits of GBT) because many studies have shown how important the benefits of using GBTs (Islam *et al.*, 2023). Therefore, perceived GBT’s advantage is an essential factor in attitudes influencing the adoption of GBTs. This leads to the first proposition:

Proposition 1: More GBTs advantages directly affect attitudes toward the construction developers’ intention to adopt GBTs.

Awareness of Environmental Issues (AEI)

Environmental awareness can be defined as awareness of the concerns affecting the world’s limited natural resources. According to Sumanapala and Wolf (2020), ecological awareness refers to understanding the atmosphere’s fragility in the face of man-made problems and the necessity of preserving it. One of the most significant elements encouraging

individuals to participate in ecologically friendly behaviours is their awareness. In the previous study, AEI was one of the most powerful indicators of human intents and behaviours across a wide range of green goods and services, including green building uptake (Saleh *et al.*, 2020).

In addition, Rajaei *et al.* (2019) reported that environmental consciousness affects how people act and react to daily tasks; those with high levels of awareness are more likely to save water and electricity, buy local and environmentally friendly goods, and reduce waste. Environmental awareness is included in the TOE theory because various studies have concluded the importance of awareness issues in adopting GBTs. In the Qatar context, Saleh *et al.* (2020) found a positive direct and indirect effect of AEI on adopting green building practices along with the TOE variables. However, recognition can affect a company's decision to use GBTs in its business model (Ahmed, 2019). Therefore, environmental awareness is an important factor in attitudes that influence the adoption of GBTs. This leads to the second proposition:

Proposition 2: AEI impacts attitude toward the construction developers' intention to adopt GBTs.

Top Management Leadership (TML)

TML refers to the role of top management to manage, inspire, promote, and ensure the success of GBT adoption through awareness and positive attitude, knowledge, strategic commitments, policies, and rewards. TML is responsible for developing corporate strategy and daily operational activities. Regarding the context of GBT adoption, TML can be determined under key facets, including (1) managers' sound knowledge and awareness of green building, (2) managers' positive attitude towards sustainable construction, (3) managers' innovative leadership style, and (4) managers' sense of community belonging (Tran *et al.*, 2020). Commitments and leadership from senior management are key factors for guiding

and enhancing the ability of all employees to adopt and implement GBTs. This will improve employees' views of GBTs' position and create a collaborative working environment. Darko *et al.* (2018) empirically discovered that "resistance to change from the use of traditional technologies" and "attitudes and traditions" by top supervision are regarded as the most significant impediment to GBT adoption in the construction market. It will be impossible to implement if senior leaders do not prioritise the effective utilisation of GBTs. Therefore, TML is an important factor in SN influencing the adoption of GBTs. Therefore, the theoretical framework of the TOE model is based on the above arguments and the importance of TML. Based on the brief discussion above, this leads to the third proposition:

Proposition 3: TML impacts SN toward the construction developers' intention to adopt GBTs.

Attitude Toward the Behavior (ATT)

An individual's favourable or negative assessment of the execution of a certain behaviour is referred to as an attitude (Ajzen, 1991). In research from many nations, attitudes toward green behaviour are positively related to green behaviour intention across various green goods, including construction businesses. Saleh and Al-Swidi (2019) found that attitude toward adoption has a significant and positive relationship with managers' adoption intention. Rajaei *et al.* (2019) found a significant positive relationship between adopting GBT and proposing a psychological model. Dalila *et al.* (2020) found a significant positive association between attitude toward environmentally friendly food packaging and the intention to use the environmentally friendly food packaging (EFFP) model. Alam *et al.* (2020) stated that a positive relationship exists between attitude and intention of sustainable food consumption. In addition, people's attitudes toward sustainable living are the most important aspect of creating a low-carbon, green urban environment. On the other hand, Yadav and Pathak (2017)

found no significant relationship between green purchase intention and attitude toward environmental repercussions. Therefore, based on the theoretical framework of TPB and the brief discussion above, this leads to the fourth proposition:

Proposition 4: Attitude positively affects construction developers' intention to adopt GBTs.

Subjective Norms (SN)

SN are defined as a social factor that refers to perceived social pressure on an individual toward engaging in a particular behaviour (Ajzen, 1991). It results from Normative Belief (NB) and Motivation Compliance (MC). The encouragement to take the recommendations of knowledgeable individuals in a particular situation is referred to as MC (Ajzen, 1991). In contrast, NB refers to an individual's view of how others (those relevant to the person) would want one to act in a particular situation (Ajzen, 1991). According to Saleh and Al-Swidi (2019), the SN is one of the most powerful predictors of human intentions and behaviours in various green products and services, including green building adoption. For example, green purchase intention (Yadav & Pathak, 2017), adopting GBT (Rajae et al., 2019), and food packaging (Dalila et al., 2020). Rajae et al. (2019) found a significant relationship between SN and green purchase intention. Therefore, the theoretical framework of TPB and the brief discussion above lead to the fifth proposition:

Proposition 5: SN impact construction developers' intention to adopt GBTs.

Perceived Behavioural Control (PBC)

PBC refers to "the perception of ease or difficulty of performing a particular behaviour" (Ajzen, 1991, p. 183). When the concerning behaviour is outside an individual's volitional control, TPB emphasises the significance of PBC in anticipating intents and behaviours. PBC is key in forecasting behavioural purpose

and actions (Marmaya et al., 2019). Saleh and Al-Swidi (2019) reported that PBC is one of the most powerful predictors of human intents and behaviour across a wide range of green goods and services, including GB adoption. For example, green purchase intention (Yadav & Pathak, 2017), adopting GBT (Rajae et al., 2019), and green food packaging (Dalila et al., 2020). On the other hand, Saleh et al. (2020) failed to find any significant association between PBC and intention to adopt GB practices. Therefore, the theoretical framework of TPB and the brief discussion above lead to the sixth proposition:

Proposition 6: PBC affects construction developers' intention to adopt GBTs.

Research Implications

Theoretical Contributions

This research has made several contributions to the body of knowledge on Behavioural Intention (BI) in an environment with high air pollution levels. First, this model proposed the relationship between Ad, AEI, TML, ATT, SN, PBC, and IB. The findings of this study have provided valuable knowledge concerning various factors that influence developers' behaviour regarding GBT adoption globally. Hence, from the theoretical point of view, this study provided a clear understanding of how the factors studied influence the adoption of GBTs. Second, it is hoped that this framework could contribute as a reference to examine the applicability and validity of the TPB and TOE integrated model in the field construction industry. Third, the developed model was considered a valuable extension of the TPB and TOE model in the green construction context.

Finally, this study adds to the knowledge of sustainable development because it adopts GBTs and includes a framework for analysing the connections between key variables. This framework may aid decision-makers in considering these variables.

Practical Contributions

This study's results may be helpful to managers, consultants, contractors, and high-ranking government officials in developing countries and elsewhere in encouraging building projects to take a more green and sustainable approach. This paper serves as a valuable resource for academicians and industry professionals. Other than that, this framework could assist policymakers in regulating the development plans, which may stimulate GBT practices in their current and future projects.

Finally, it would improve the concept of GB acceptance and accomplishment among academicians and construction professionals while guiding the stakeholders toward a speedy adoption of GBT in the construction sector.

Limitations and Future Directions of the Study

This study has some flaws that could be fixed in future studies. To know how the model described in this article works in real life. In order to comprehend how the conceptual model presented in this article functions in practice, a longitudinal study on organisations adopting GBTs may be conducted. Lastly, this research concentrated on Ad, AEI, TML, ATT, SN, and PBC. Therefore, incorporating other variables (e.g., regulations, green technology, green management) may enhance understanding of the existing phenomena and the need for further empirical study. However, our research is limited by our inability to establish causal relationships between the variables.

Conclusions

This study looks at the construction developers' behavioural intention of adopting GBTs in the developing countries' context in the construction industry, focusing on the effect of awareness and TML issues. This review has analysed and synthesised the GB development research, acknowledging this issue's environmental impact. This study has reviewed six major GBT adoption and practice paradigms, including perceived GBT advantages, AEI, TML, attitudes,

SN, and PBC. The results have established the robust and predictive power of the proposed theoretical framework. The literature proved the suggested propositions by the researcher. The theoretical model presented in this article may be used in various technologies to investigate individuals' behavioural intentions to use GBTs. More study is required on the transition process organisations undergo when adopting GBTs. Because this is conceptual research that focuses on review studies, no empirical evidence is acquired to expand the notion. There are more challenges to overcome as GBT's acceptability grows.

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Conflict of Interest Statement

The authors declared that they have no conflict of interest.

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