Validating the Effects of Organizational Internal Factors and Technology Orientation on Environmental Sustainability Performance of Malaysian Construction firms

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Abstract

The essence of emphasizing the value of environmental sustainability for construction companies is to reduce the environmental footprint of construction operations or projects and make construction activities more environmentally friendly and economically competitive. Due to the harmful consequences of construction practices such as various aspects of environmental degradation, resource destruction, and loss of biodiversity on a global scale, this critical deliberation has prompted different research interests among construction companies. Using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach, this study validates the environmental sustainability performance (ESP) as a construct within Peninsular Malaysia from the perspective of 186 construction companies. An online cross-sectional survey was performed where a well-structured questionnaire obtained data from G7 construction firms. Findings from this study revealed that internal organizational factors (managerial attitudes, social responsibility, and company culture) and technology orientation have significant effects on the environmental sustainability performance (ESP) of Malaysian construction firms.

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Introduction

The Earth has increasingly suffered a complete abuse since the Industrial Revolution over thousands of years, mainly as a result of an unrestricted decline of planets and ecosystems, resources, and ultimately of the quality of life of its populations in the not-so-far future [109]. Rapid economic and infrastructural growth related to the modern survival of human beings has led to over-exploitation of natural renewable resources, such as land and forests and the degradation of non-renewable resources such as minerals and fossil fuels [77]. The generation of CO_2 emissions above the natural carbon storage potential, degradation of the ozone layer, the pollution of water, air and land by toxins, and the degradation of the entire environment are all glaring [90]; [113]. These and many more are the construction industry's contributions to our ecosystem [21]. The usage of these generic resources (energy, water, land, and materials) lead to changes in the ecological structure of the biosphere [117]; [16]. Therefore, to constantly maintain the construction products and the built environment, the construction industry needs inputs from the earth's resources.

These inputs are the materials for constructing, and the embodied energy of the materials used, according to Abidin [2]. Construction firms are important participants in building environment growth and can recognize resource conservation as a key management method for the elimination, reuse and recycle of non-renewable materials, as these materials play a key role in construction activities [2]. In terms of investment, employment, and contribution to GDP, the construction industry is usually one of the main industries in both developing and developed countries [96]; [28];[99]; [87]. Therefore, the environmental effect of industry is estimated to be significant, primarily due to the harm to soil and agricultural land, the destruction of forests and wildlands, air pollution, and the destruction of non-renewable supplies of energy and minerals [83]; [118]; [18].

In the construction industry , the role of buildings in the overall environmental catastrophe ranges from 12.42 percent of the eight major categories of environmental irritants: the use of raw materials (30 percent), energy (42 percent), water (25 percent) and land (12 percent) and carbon emissions such as atmospheric emissions (40 percent), water effluents (20 percent) and solid waste (25 percent) and pollution emissions Buildings and construction utilities maintain up to 66 percent of overall UK energy usage, according to Allouhi, et al. [10]; [94]; [104]. The International Energy Agency [68] cited a related energy use average in the USA (54 percent). In addition, the IEA said that the US residential sector is the sector with the largest consumption.

Dadhich, et al., [33] estimated that for every member of the society, the construction industry consumes about 6 tons of building materials annually in the UK. In Malaysia, high waste and poor recycling are also classified by the construction industry, causing rapid destruction of landfills, growing environmental emissions and adversely affecting the living standards of Malaysians. [19]; [20]; 15];[2]. The above statistics support the belief that the construction sector harshly inflicts major negative economic and environmental impacts on virtually any environmental issue impacting sustainability. To dramatically reduce its effect on the environment, the challenge for the industry is to re-organize the whole operation.

Though, it was acknowledged in several pieces of literature that specific organizational internal factors [70]; [37];[84];[47];[56];[57];[103]; [114]. and technology [119];[44];[124]; [16]. possess a relationship with environmental sustainability performance. Thus far, the influence of these organizational internal factors and technology orientation on environmental sustainability performance within the construction companies in Peninsular Malaysia has not experienced significant attention. Therefore, to clarify these casual claims concerning the relationship among the organizational internal factors and technology orientation to the environmental sustainability performance, an all-inclusive framework is required which will integrate these variables using the mediating and moderating effects of institutional pressure and organizational commitment among Malaysian construction firms.

Literature Review

Environmental Sustainability Performance (ESP)

Construction projects are related to several environmental challenges that differ from one context to the other. Such consequences include energy use, emissions of carbon dioxide, soil loss, depletion of the environment [2]; [16]. In recent decades, rapid urbanization has occurred in developing countries as one of the most significant energy users, contributing to construction and infrastructural growth. As a result, the environment is repeatedly strained to its boundaries, and nations face the challenge of providing infrastructure and housing that can fulfill the social needs of the people in an environmentally sustainable way [51]; [27].

Environmentalists have also highlighted this form of an ideal society in which people live in harmony without ultimately devouring natural resources or destroying the natural environment, leaving behind them nearly identical amounts of man-made and environmental riches as they have passed from previous generations [69];[32]; [105]. The modern world, though, is far from this idea, as construction development is maybe not only one of the sectors that absorbs energy, but still appears to erase the potential to maintain it. Therefore, the aim of solving environmental sustainability issues is to reduce their impacts and making structural systems more sustainable [19]; [1] ; [9].

This is important because construction, such as multiple sources of environmental degradation, resource exhaustion, and destruction of biodiversity on a global scale, has adverse consequences [8]; [97]. There are many environmental protection concerns found and this allows the impacts of the construction industry on the immediate environment to be examined from the "cradle to grave" point of view [97], so that by using fewer sustainable and non-renewable resources, the construction industry could create a safe and toxic-free environment. Aprianti et al. [13]. according to Giljum [55]. Globally, building and construction operations was responsible for 3 billion tons of raw materials annually. By successful environmental planning, management, and regulation, this reduction in resource use will recognize the environmental danger and reduce contamination of water, land, and air [3]; [92]. In the long term, an environmentally-responsive architecture is successful in achieving the aims of sustainable building by encouraging a stable and secure climate, energy conservation, the use of environmentally-friendly resources and an environmentally-friendly environment [17]; [34].

In a related study, Lèbre, Corder, & Golev, [78] found that environmentally sustainable construction also embraces natural resource mining, which contractors and builders have little or no influence upon, but which they can discourage by calling for less finite natural resources, more recycled materials, and waste produced in other manufacturing processes, thus resulting in improved competition to produce more eco-efficient products. Many empirical studies that examined the factors prompting environmental sustainability performance of construction firms uphold the importance of harnessing firm resources and innovative technology as an inimitable way of accomplishing environmental sustainability in construction [86]; [11]; [125].

Organizational Internal Factors

In this study, organizational internal factors are conceptualized as managerial attitudes, the safety of employees, company culture, and social responsibility following [70]; [37];[43];[101];[76]. The resources of the organization can be tangible or intangible and may be a mixture of the two or human resources. Organizational properties such as equipment, land, capital, and manpower are tangible resources. Intangible resources, such as the internal factors in this study, are those that cannot be observed visibly by organizations. Although human resources include the hiring and training of administrators, team members and owners, [122].

Managerial Attitudes

Sustainability of the environment has been a topic of growing concern. Environmental challenges, such as air quality and biodiversity, have been major concerns for many players, including government and company owners and private users or customers [75]. Environmental

sustainability studies [66];[128];[54];[131]; [53] have decreased their focus on the important elements of individuals' pro-environmental or green behaviors. These activities include interventions that will protect the environment from the adverse consequences of human activities [24];[46];[122]. Pro-environmental actions can derive from environmental or eco-centric principles. In some pro-environmental practices (for example, recycling, energy conservation), research on the psychological determinants of pro-environmental actions has identified human beliefs as a significant factor [24]. The degree to which top executives hold eco-centric ideals is likely to impact their contribution to environmental protection in the construction sector [70].

In their hierarchical model, Carfora et al. [24] have stressed the role of environmental principles in justifying pro-environmental impact. This paradigm alludes to the existence of fundamental links between the values of the environment and the issue of awareness, personal standards and pro-environmental behavior. Those results confirmed the projected causal interactions between variables. As predicted, environmental ideals have had a positive effect on understanding of environmental issues and a personal moral dedication to helping to protect the earth.

The direct influence of the environmental principles of top management on environmental efficiency has been studied by a few researchers [70]. However, they did not clarify how, by other factors such as leadership, environmental principles were translated to environmental efficiency. Since environmental challenges have become critical, the essential role of leadership in resolving them has been defined by organizations [41]. Leaders set their policies or strategies for sustainability and distribution of capital, directing all operations towards organizational targets (including environmental sustainability). Management was described by Banerjee et al. [3]. as a critical factor in corporate environmentalism. In addition to communicating corporate sustainability to internal and external partners, Epstein, Buhovac & Yuthas [41] have emphasized the role of leadership in developing and adopting sustainability policies.

Company Culture

The culture of a company can be referred to as the pattern of shared values, beliefs, and agreed standards that shape behavior [79]. One of the key prerequisites for the success of an innovative company is the culture of a company that is resistant to growth [106]. The culture of an organization deals with a lot of aspects, such as openness to R&D outcomes [93], adaptability [73], and common trust.

It takes a staggering approach to create a culture of sustainability. Changing culture hence begins with the top management team, but these actions must be complemented by successful activities that pervade the whole organization [14]; [42]. For example, the values, priorities, and policies of

an organization may assist in sending signals about the company's expectations and strategy to internal and external stakeholders. Therefore, the standards used for employment and promotion can also pass on the kinds of actions to workers that will be compensated. Finally, the substance and strategies of communications, employee training and the success systems of management all support the tactical effort to build a culture of sustainability.

Therefore, in order to become sustainable, businesses should change their values and principles dramatically, substantially upgrade their culture [49];[110]; [63]; [72]; [107]. and institutionalize their organization's environmental protection policies. Jizi [72] indicates that the values and culture of a company vary according to the degree of aspiration for environmental sustainability, and the "dominant value systems will assess sustainability potential."

Social Responsibility

Sustainability has turn out to be the strategic priority of the new millennium. The phrases “sustainability”, “social responsibility”, “corporate social performance”, “going green” and the “triple bottom line” [39]; [40]; all refer to organizations improving their long-standing economic, social, and environmental accomplishment. There is an increasingly growing number of literatures emphasizing the significance of sustainability to a firm and its constructive influence on performance. For instance, the firms listed in the “Dow Jones Sustainability Index” and the “FTSE4 Good Indexes” shown share price performance better to that of firms listed in broader indexes, and firms belonging to the “World Business Council for Sustainable Development” outclassed their stock exchanges by 15-25 percent over a three-year period [119]. A recent survey of business leaders revealed that less than four percent of managers examined deemed being socially and environmentally responsible to be a “waste of time and money” [111].

The organization's attempts to successfully execute sustainability strategies would be cruelly stalled without a meticulous attempt to build company infrastructure that facilitates the development of sustainability strategies. Employee engagement in the sustainability efforts of their company can also contribute to the behavior of community citizenship [50]. Hershey, who has his workers volunteer in their own communities, is an example of this. Over 300 workers have engaged in more than 45 recycling, education and beautification programs in the USA and Canada as part of "Solo’s Sustainability Action Network". Volunteers uncover neighborhood or company-wide projects across the network and lead the way in implementing them. "Similarly, under the" Alcoa Green Works "program, Alcoa staff volunteer in their local neighborhoods to support sustainable developments and observe eco-holidays such as" Earth Day," "Global Climate Day "and" Arbor Day [48].

Finally, 82 percent of the organization's US employees chose to volunteer either by company services or voluntarily, according to a study by General Mills [52], and almost 60 percent of the employees devote up to 5 hours a month volunteering in their respective communities.

Technology Orientation

Companies have been forced to improve their technical ability to succeed in their markets as a result of technological innovation and the shortening life cycle of goods and services [100]; [127]. "The orientation of technology is defined as one where firms concentrate on R&D and emphasize the development and incorporation of new technologies in product development [35]. Technology orientation can also be defined as firms' openness to emerging ideas and their readiness to adopt modern technology during product creation [123]. When companies adopt new technologies, products, and processes, technical orientation (often referred to as invention orientation) is present. This is accomplished by handling the infrastructure system, scheme, and tools of the business by using this technology as a competence [74]; [61].

In Malaysia, the construction industry has undergone rapid growth, driven by technology and innovation. In the industry, multiple variables are taken into account-ways to develop quicker and easier while enhancing cost effectiveness and sustainability [31]. CIDB’s proactive measures resulted in identifying and promoting proven systems - Industrialized Building System (IBS) and Building Information Modelling (BIM). [31]; [16]. Therefore, in this study, TO is conceptualized as technological capability, top management capability, commitment to learning (learning) and commitment to change (unlearning) following Seçkin-Halaç, [112].

Top Management Capability

In the context of general corporate strategy, strategic orientation is supposed to represent the company culture as well [85]. A technology-oriented company is also expected to conform the firm's vision and mission. Therefore, according to the strategic orientation of the companies, top management should settle on whether to improve internal or externally acquired technology; at what degree to spend in R&D; to compete or collaborate with competitors; which other approach is the better for the company either now or in the future [23]; [91]. Similarly, ensuring the company's businesses are carried out with up-to - date technology and agreeing on R&D investment amounts and directions are also the responsibility of management to care about possible plans [23];[12].

The main source of being competitive is attached to top managements’ capability of blending other organizational capabilities and competences to adjust to the fast-changing environment quickly [88]; [22]; [102]. Additionally, technically trained managers and/or managers that work together with technical/technological operations significantly are more likely to incorporate

technology into strategic decision-making [112]. Managers create differences in how they see the environment, evaluate the options, and the decisions they made. In terms of a new product development perspective, because no innovation can be produced in a space, top management backing and resource commitment have paramount significance [112].

Technological Capability

Technology is projected as a firm's most important core capability [76]. Technology assets are in the middle of competitive advantage because combinations of a variety of technological resources provide hard to duplicate and unique positions and study asserts these "specific technology resource combinations" as technological capability. Technological capability is "a set of pieces of knowledge that comprises both practical and theoretical expertise, methods, procedures, experience and physical devices and equipment." This capability is strongly related to product, design, process, and information technologies. [76] defined technological capability as "a set of operational abilities, manifested in the firm's accomplishment via numerous technological activities and whose greatest objective is firm-level value management by developing difficult-to-copy organizational abilities."

The vigor of technological capability hinges on how efficient the elements of the capability have been bundled. Therefore, those elements, namely R&D commitments and expenditures, technical abilities of personnel, and how to improve these skills particularly by training to increase technological capability endowments are appeared to improve this capability [112]; [82]. Firms that intend to achieve competitiveness by technology-based product innovation must have a strong technological capability [112];[80]; [62]. A firm's technical skills, R&D resources, and technological support are also perceived to be the vital factors that create competitiveness through innovations [71].

Song et al. [115] stressed that technological capability allows an organization to enhance production processes while decreasing costs. Firms that use technology must tactically develop or recognize technology-based prospects for dealing with the environment in a way to realize their strategic vision [112]; [91].

Commitment to Learning (Learning)

The fields of strategic management consider organizational learning as one of the standard resources of competitive advantage and organizational performance. Organizational learning is described as a process of creation, procurement, and integration of knowledge targeted at the development of resources and competencies that lead to better organizational performance [81]. Learning at an organizational level is an organizational competence that provides intuition and understanding from experience through investigation, observation, analysis, and a commitment

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to examine both successes and failures; then act in response to that learning [89]. The ability to understand faster than competitors is understood to bring competitive advantage [81].

Learning is the process that turns resources into useful, rare, unique, and non-substitutable capabilities by practices and repetition. During this process, skill and transforming every bit of information to the enduring corporate knowledge was highlighted [112]; Organizational learning is largely debated as a blend of four processes. These are knowledge acquisition via external and internal sources, information dissemination among members, information clarification to achieve a common understanding, and organizational memory which aims to store amassed knowledge to be able to make use of when needed [98];[81]; [112]. In a competitive environment, gathering information from the inside of the organization along with outside of the industry would probably provide a clear and broad perspective to where and how to employ technology-based in solving environmental suitability challenges.

Commitment to Change (Unlearning)

As an important process that accelerates new learning/knowledge creation/innovation/technology production, unlearning (a) is concerned with deleting/shedding knowledge, (b) can have a peculiar value connected to it such as irrelevant, obsolete, etc., and (c) can either be an end by itself or act to an end learning or change [116]. Unlearning has three components: cognitive- to get new knowledge, behavioral – the changes in schedules, and normative- removing all unwanted routines from organizational memory [129].

Unlearning is a process where “organizations changed their cognitive structure, mental model, dominant logic and core idea to realize the relocation of organization value, norms and practices” [26]. “As much as change is about adjusting the new, it is about separating from the old” [129]. Therefore, in order to apply unlearning, commitment to learning, and commitment to change may appear to be required. Nonetheless, it is not comfortable for people to dispense with their current and deep-rooted beliefs and practices in organizations.

Unlearning has to do with deliberately eliminating something which is deep-rooted in an organization’s routines, memory, and beliefs. This process is appeared to be a prerequisite for learning new things. Leaving behind usual practices/strategies, previous methods/approaches, which are hindering the new approaches to learning, is also judged as organizational competitiveness [25]. However, collective memory can lead to apathy and can limit future changes. For example, with a poor track record/history of a new technology application prompting people the unproductive efforts and time during the earlier technology implementation, is connected to people’s feelings/expectations.

Methodology

This study adopts a cross-sectional survey research design wherein data was obtained from 185 representatives of construction firms (comprises of top or middle management level who are involved in the day-to-day running of the firm as well as taking strategic decisions about how the firm are been run like CEO, Executive Director, Managing Director, Construction Managers, and Project Managers) operating among the local, national and multinational construction firms within Peninsular Malaysia. Those representatives were selected as suitable respondents for this study following the recommendation of Bamgbade et al. [16]. and Adeleke et al. [6] that they are the best people who have the idea of what environmental sustainability is all about in construction firms. Furthermore, a proportionate cluster random sampling technique was used in this study to select respondents from a sample frame of the construction firm's representatives.

The PLS measurement model was used to validate the efficiency of environmental sustainability in the Malaysian construction industry to determine the individual item reliability, internal consistency of reliability, content validity, discriminant validity, and convergent validity of all the constructs in this analysis, as can be seen in Figure 1;[67]; [59]; [18]; [4] ; [7]. The content validity of the instruments was performed prior to the pilot study, which reflects the degree at which the dimensions and items of the constructs were described and evaluated in this study [58]. In order to determine the validity of all the items, consulting experts (both from industry and academics) were involved. This research item was then sent out to ten experts who are familiar with the constructs of this research. Their recommendations were incorporated into the research instrument's final draft.

Results

As seen in Table 1 below, this research attempts to know the demographic background of the respondents in the survey. The demographic features found in this sample include positions in the company, gender and years of experience. The study found that 14.6% (27), 18.9% (35), 21.1% (39), 13.5% (25), 21.1% (39), and 10.8% (20) of the 185 respondents were Chief Executive Officer, Executive Officers, Managing Directors, Construction Managers, Project Managers, and others, respectively. Similarly, as for the working experience, where the highest percentage (47.0%) recorded was those whose experience was between 1 to 5 years, followed by respondents with more than 10 years of experience (28.6%), and 6-10 years (24.3%) in that order. Also, male respondents constituted 68.1% (126) and females 31.9% of the sample size. Furthermore, the firms' studied specializations were in residential buildings, non- residential buildings, social amenities, infrastructure, and others with 44.9%, 40.5%, 16.8%, 44.9%, and 13.3% respectively. The company ownership type is majorly local and foreign-invested enterprise with 84.3.0%, and 15.7% respectively while locations of business were local market areas, within a few states, regional, across Malaysia and international markets with 22.2%, 24.9%, 10.3%, 38.4% and 4.3% respectively while the company's employees strength range

from <100 (68.1%), 101 – 250 (9.2%), 251 – 500 (4.9%) and > 500 (16.8%) within the sample framework.

Table 1. Demographic Characteristics of Respondents and Firms

Respondents	**Frequency**	**%**
Position in the company		
Chief Executive Officer	27	14.6
Executive Director	35	18.9
Managing Director	39	21.1
Construction Manager	25	13.5
Project Manager	39	21.1
Others	**20**	**10.8**
Gender		
Male	126	68.1
Female	59	31.9
Work experience		
1-5 years	87	47.0
6-10 years	45	24.3
More than 10 years	53	28.6
Parameters	**Frequency**	**%**
Company Age		
1-5 years	39	21.1
6-10 years	29	15.7
More than 10 years	117	63.2
Operational Location		
Local market areas	41	22.2
Within few states	46	24.9
Regional	19	10.3
Across the entire Malaysia	71	38.4
International market	8	4.3
Company Ownership		
Local	156	84.3
Foreign-invested enterprise	29	15.7
Joint Venture	-	-
Workforce		
<100	126	68.1
101-250	17	9.2
251-500	9	4.9
>500	31	16.8
Specialization		
Residential apartment	83	44.9
Non-residential apartment	75	40.5
Social amenities	31	16.8

Infrastructure	83	44.9
Others	25	13.5

Measurement Model

This study seeks to investigate the effects of organizational internal factors, and technology orientation on the environmental sustainability performance of Malaysian construction firms. The measurement assessment model used in the validation is shown in Figure 1 below.

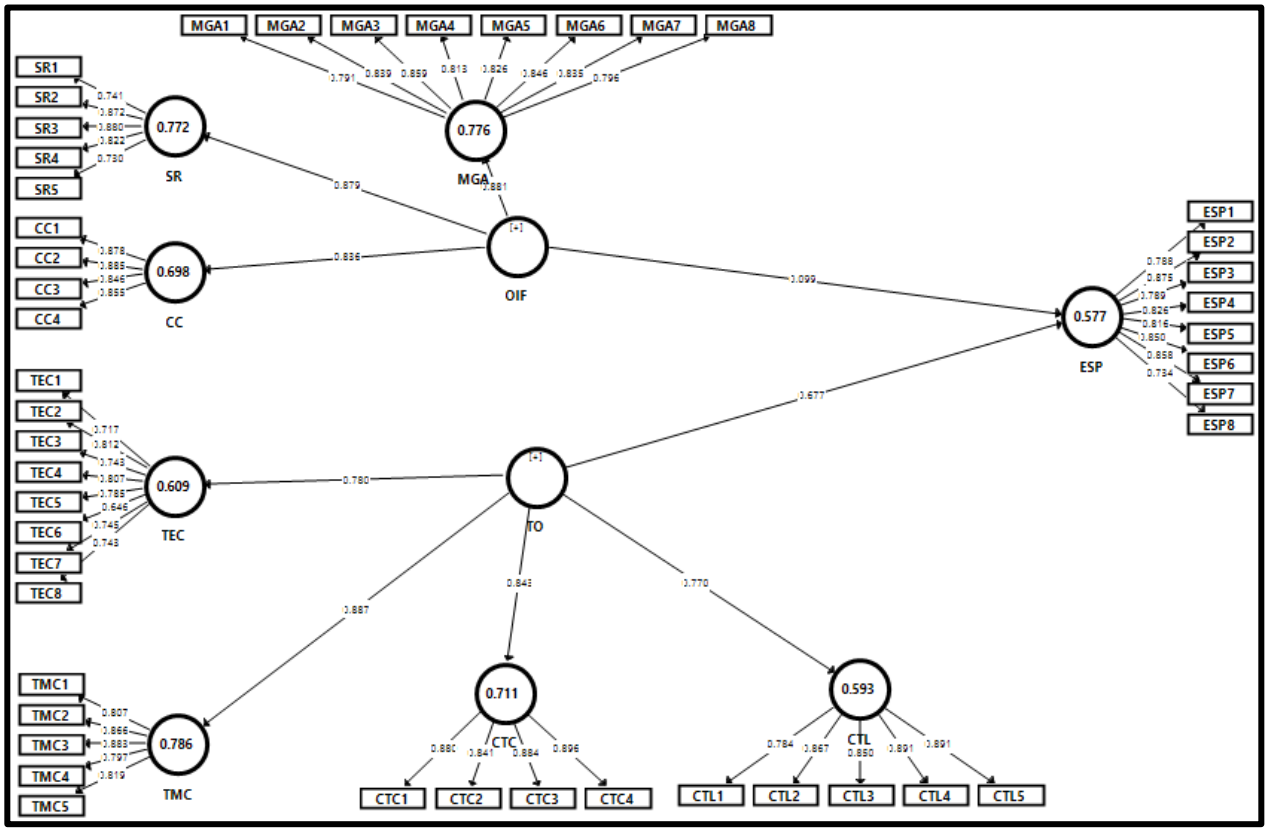

Figure 1. Measurement Model

Indicator/Item Reliability

In this analysis, the assessment of individual item reliability was carried out by analyzing the outer loadings of each of the latent variables [29]. Assessing the indicator loadings is the first step in the assessment of the reflective measurement model. Loadings over 0.708 are recommended, since they signify that more than 50 percent of the variance of the indicator is justified by the construct, thereby providing acceptable item reliability [59]. Figure 1 and Table 2 show that all measurement items except TEC6 were loaded above the recommended minimum threshold of 0.708 [60]; [108]. Nevertheless, if CR and AVE meet their appropriate threshold

standard and retaining them does not significantly impede model credibility, items loading between 0.5 and 0.7 should be maintained [95], [60]. It should also be understood that all individual measurement items have added significant value to their studied constructs [108];[120]; [30]; [5].

Table 2. Convergent and Reliability Analysis

Construct Dimension	Items	Loading	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Managerial Attitude	MGA1	0.791	0.933	0.945	0.682
	MGA2	0.839			
	MGA3	0.859			
	MGA4	0.813			
	MGA5	0.826			
	MGA6	0.846			
	MGA7	0.835			
	MGA8	0.796			
Social Responsibility	SR1	0.740	0.868	0.906	0.658
	SR2	0.871			
	SR3	0.880			
	SR4	0.823			
	SR5	0.731			
Company Culture	CC1	0.878	0.889	0.923	0.750
	CC2	0.885			
	CC3	0.846			
	CC4	0.855			
Technology Capability	TEC1	0.717	0.889	0.912	0.565
	TEC2	0.812			
	TEC3	0.743			
	TEC4	0.806			
	TEC5	0.785			
	TEC6	0.646			
	TEC7	0.745			
	TEC8	0.743			
Top Management Capability	TMC1	0.807	0.891	0.920	0.698
	TMC2	0.866			
	TMC3	0.883			
	TMC4	0.797			
	TMC5	0.819			
Commitment to Learning (Learning)	CTL1	0.784	0.909	0.933	0.735
	CTL2	0.867			
	CTL3	0.850			

	CTL4	0.891			
	CTL5	0.891			
Commitment to Change (Unlearning)	CTC1	0.880	0.898	0.929	0.766
	CTC2	0.841			
	CTC3	0.884			
	CTC4	0.896			
Environmental Sustainability Performance	ESP1	0.790	0.929	0.942	0.669
	ESP2	0.873			
	ESP3	0.786			
	ESP4	0.823			
	ESP5	0.816			
	ESP6	0.850			
	ESP7	0.859			
	ESP8	0.739			

According to Drolet and Morrison [38] and Diamantopoulos et al. [36] reliability's values between 0.60 and 0.70 are considered "acceptable in exploratory research," values between 0.70 and 0.90 range from "satisfactory to good" while values of 0.95 and above are considered problematic, as they show that the items are superfluous, thereby plummeting construct validity. In this study, Cronbach's alpha (CA) and Composite Reliability (CR) ranged from 0.868 to 0.933 and 0.906 to 0.945 for all the constructs respectively which surpassed the benchmark of 0.7, thereby, affirming the internal consistency and reliability of all constructs. Also, the average variance extracted (AVE) for all constructs ranging from 0.565 to 0.766 which is higher than the threshold of 0.50, hence, signifying convergent validity for all the constructs [60]; [121].

To test for discriminant validity, the Heterotrait-Monotrait Ratio (HTMT) which was proposed by Henseler et al. [65] as an alternative to Fornell & Larcker's [45] method was been applied. The HTMT is advocated to be a superior boundary measure for examining discriminant validity. As an estimate for factor correlation, the HTMT should be considerably lesser than one (ideally<0.850) to distinguish between two factors [64]; 60]. The results of Table 3 below show a range between 0.421 and 0.881 which fall below the threshold of 0.90, hence implying all constructs are independent of each other and that the standard for discriminant validity are been met.

Table 3. Discriminant validity (HTMT)

	CC	CTC	CTL	ESP	MGA	SR	TEC	TMC
CC								
CTC	0.442							
CTL	0.421	0.643						
ESP	0.565	0.666	0.674					
MGA	0.583	0.607	0.573	0.645				
SR	0.881	0.559	0.441	0.595	0.667			
TEC	0.835	0.576	0.416	0.639	0.784	0.843		
TMC	0.541	0.792	0.67	0.732	0.709	0.625	0.652	

Discussions of Findings

The research validated the impact of internal organizational factors and technological orientation on the success of Malaysian construction firms in environmental sustainability. In general, the findings of the study indicate that the measurements for all constructs consisting of managerial attitudes, social responsibility, company culture, technical capability, top management capability, learning (commitment to learning) and commitment to change (unlearning) with environmental sustainability performance are valid and acceptable indicators of their constructs. The results also demonstrated that all the measured items were proper measures and accurate in describing their constructs, which explains the validity of the construct. This was established by the high outer loading of the items, CR, AVE, and square roots of the AVE for all the constructs which are consistent with the previous study of Bamgbade et al. [16].

Conclusion

The study examined the effects of internal organizational factors and technology orientation on the performance of Malaysian construction companies in terms of environmental sustainability. The findings of the study showed that measurements are true and appropriate for all organizational internal variables (managerial attitudes, social responsibility, company culture, and technology orientation (top management capability, technical capacity, learning (commitment to learning) and unlearning (commitment to change) with environmental sustainability performance constructs. The results have showed that in describing their respective constructs (which describes construct validity), all the measuring items are both accurate and good measurements. This was evidenced by the high items' loadings, CR, and AVE for all the constructs.

Although this research has shown some understanding of the role of internal organizational factors and technology orientation in Malaysian construction companies' environmental

sustainability performance, this is definitely not without limitations. First, as the study adopts a cross-sectional design in which the method of data collection is "one-shot," "single-point-in-time," prohibiting causal inference from being drawn from the population of the study. For future research considerations, an alternative research design, a longitudinal design, is also recommended. Secondly, this study offers quite limited generalizability as it focused mainly on large construction companies. Although, these large firms (the G7 construction firms) are observed to be more capable to adopt environmental sustainability practices and strategies than the SMEs construction firms who are inhibited due to their size and resource meagerness [16];[126]; [130].

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