Barriers to Sustainable Construction Practices
(Case Study: The Role of National Culture)

¹*Peter Uchenna Okoye, ²Isaac Abiodun Odesola, ³Kevin Chuks Okolie

¹*&³Department of Building, Nnamdi Azikiwe University, Awka, Nigeria.
²Department of Building, University of Uyo, Uyo Nigeria.

ABSTRACT: This study examined national culture dimensions that constitute barriers to the implementation of sustainable construction practices among construction professionals in Nigeria. It deployed Statistical Package for the Social Science (SPSS) software to analyze data collected through a questionnaire survey. Mean Score Index (MSI) result revealed 47 national culture variables that have great potential for causing barriers to implementation of sustainable construction practices in Nigeria with the MSI range of 3.30 - 4.72. The variables were grouped into six of Hofstede's national culture dimensions (large Power Distance, Individualism, Masculinity, strong Uncertainty Avoidance, Short-Term Orientation, and Restraint) with an average MSI range of 3.84 - 4.22. The Kruskal-Wallis H and Mann-Whitney U tests indicated that irrespective of organizational and individual characteristics, there was no significant difference in the national culture of construction professionals hindering the implementation of sustainable construction practices in Nigeria (p>0.05); but for Individualism (IDV) and Uncertainty Avoidance (UAI) dimensions which indicated significant differences (p<0.05) due to personal attributes, disposition, and exposure. The study established that the differences have only a small effect (r = 0.171 and 0.156 respectively), signifying that the observed differences in IDV and UAI culture dimensions based on years of experience, were not a result of differences in the sizes of the groups. They then study raised concern for a new way of thinking towards overcoming barriers to implementing sustainable construction practices in Nigeria and suggested for optimization and operationalization of national culture dimensions that support the implementation of sustainable construction practices and eschewing those that cause barriers.

Keywords: Construction Industry, Construction Professionals, Implementation, National Culture Dimensions, Sustainability

INTRODUCTION

After the World Commission on Environment and Development (WCED) report (WCED, 1987) that marked a global watershed towards sustainable development debate, the last four decades have witnessed notable world events that have geared toward increasing awareness and promotion of sustainability goals in the built environment (Umar & Khamidi, 2012). Although the underlying principle of sustainable development is to simultaneously pursue the triple bottom line of economic, social, and environmental dimensions in all fronts of human endeavor, the practical applications of the sustainability model in various economic sectors have been quite challenging (Bansal, 2002).

In recent years, the importance of the construction industry towards achieving sustainable development has started to gain widespread recognition, though with a severe consequence to the environment (Brennan & Cotgrave, 2013). Sustainable construction, therefore, encapsulates the construction sector's response to sustainability (Dania, 2016). According to the Agenda 21 for sustainable construction in developing countries, sustainable construction is a holistic process aimed at restoring and maintaining harmony between the natural and the built environments, and creating settlements that affirm human dignity and encouraging economic equity (du Plessis, 2002). Thus, sustainable construction is simply the application of sustainability principles to the activities of the construction sector (Gunatilake & Liyanage, 2010).

Despite the increasing awareness and willingness to adapt sustainability measures and practices (Tokbolat et al., 2020), implementation of sustainable construction practices have been

found to be inundated with severe and widespread barriers and obstacles (see e.g. Abidin, 2010; Ali & Alkayed, 2019; AlSanad, 2015; Chan et al., 2018; Gunduz & Almuajebh, 2020; Häkkinen & Belloni, 2011, Hoxha & Shala, 2019; Ifije & Aigbavboa, 2020; Mohd-Rahim et al., 2016; Nduka & Ogunsanmi, 2015; Ochieng et al., 2014; Pham et al., 2020). Precisely, elements of national culture have been identified as barriers to the implementation of sustainable construction practices especially in the developing countries (see e.g. Aghimien et al., 2019; Ametepey et al., 2015; Brennan & Cotgrave, 2013; Chan et al., 2018; Darko & Chan, 2017; Chukwu, 2018; Daniel et al., 2018; Davies & Davies, 2017; du Plessis, 2001; 2002; Djokoto et al., 2014; Esezobor, 2016; Lee et al., 2014; Ojo et al., 2014). According to Wallbaum et al. (2010), industrialized nations are mostly faced with institutional than technical barriers whereas, in the developing countries; institutions are ruled by long cultural traditions, which encourage social segregation and uneven resource distribution. Thomson and El-Haram (2011) also agreed that delivering sustainability in practice remains a challenge due to different traditional cultural/structural barriers and lack of integration among construction stakeholders. This position was substantiated by Effah (2015) and Gunatilake (2013) who found that cultural factors were major internal factors influencing the process of implementing sustainable construction at the construction project level.

Contrarily, national culture has been found to have positive (Ho et al., 2012; Ioannou & Serafeim, 2012) and negative (Ringov & Zollo, 2007) effects on sustainability. Similarly, inconsistencies have been reported concerning the effects of national culture dimensions such as masculinity/femininity and uncertainty avoidance on sustainability related issues (Haxhi & van Ees, 2010).

Despite the foregoing realities, empirical studies that have holistically examined the leading roles of national culture in the implementation of sustainable construction practices in Nigeria are scarce. No study known to the authors has actually focused on national cultures serving as barriers to the implementation of sustainable construction practices in Nigeria. Sarhan et al. (2018) attributed this to the lateness of research activities on barriers to the implementation of sustainable construction practices in developing countries against what was obtainable in developed countries.

In view of this, several questions have remained unanswered. These include the problem concern of this study which is the missing link in the implementation of sustainable construction practices vis-à-vis the culture dimensional perspectives of construction professionals in the face of alarming economic, environmental, and social challenges bedeviling the construction industry in Nigeria. This study is, therefore, aimed at examining the national culture dimensions inhibiting sustainable construction practices implementation in Nigeria. According to Yin et al. (2018), positive culture promotes sustainable construction practices whereas, negative culture inhibits sustainable construction practices. However, these cultures are rooted in the national culture which affects the willingness as well as the extent to which the stakeholders recognize the need for sustainable construction practices (Luo & Tang, 2016). In addition, Abdullahi and Lee (2017) suggested that looking beyond the surface of culture is likely to reveal more sustainable solutions.

Theoretical Framework and Empirical Review
Cultures exist among many different social groups, including regions, generations, and socioeconomic groups (Kirkman et al., 2017); and at different levels including individual, regional, and country (Fische et al., 2010; Rinuastuti et al., 2014; Yoo et al., 2011). Hofstede (1980; 1991; 2001) conducted one of the most influential studies on national and organizational culture based on work conducted between 1967 and 1973 at IBM worldwide and subsequent updates. Hofstede collected empirical data on value orientations of approximately 116,000 employees in 72 countries. Initially, four dimensions were uncovered based on these data (Power Distance, Uncertainty Avoidance, Individualism-Collectivism, and Masculinity-Femininity). A subsequent study published the Chinese culture connection (Hofstede & Bond, 1988), "Long Term Orientation" (initially called Confucian Work Dynamism) (Hofstede, 2001). However, in the 2000s, research by Bulgarian scholar Michael Minkov using data from the World Values Survey (Minkov, 2007), allowed a new calculation of the fifth and addition of a sixth dimension called "Indulgence versus Restraint" (Hofstede et al., 2010).

Based on Hofstede's framework, Power Distance represent the degree of human inequality that underlies the functioning of each particular society or setting. In the small power distance organizations, hierarchy means an inequality of roles, established for convenience, decentralization is popular, etc.; whereas in the large power distance organizations hierarchy reflects existential inequality between higher and lower levels, centralization is popular while there are more supervisory personnel (Hofstede et al., 2010). Individualism versus Collectivism, as a societal, not an individual characteristic, is the degree to which people in a society are integrated into groups (Hofstede, 2011). While individualism stands for a society in which the ties between individuals are loose, collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which continue to protect them throughout their lifetime in exchange for unquestioning loyalty (Hofstede, 2011; Hofstede et al., 2010).

Uncertainty Avoidance is the extent to which members of a society or organization feel either uncomfortable or comfortable in unstructured situations. Unstructured situations, therefore, are novel, unknown, ambiguous, surprising, and different from usual. Masculinity on one part represents a preference in society for achievement, competition, heroism, assertiveness,

and material reward for success, whereas femininity, stands for a preference for cooperation, consensus, modesty, caring for the weak, and quality of life. Masculinity versus femininity dimension is also related to the division of emotional roles between the genders; it opposes "tough" masculine to "tender" feminine societies (Hofstede, 2011; Hofstede et al., 2010).

Long-term Orientation stands for a society that fosters virtues and is oriented toward future rewards, in particular perseverance and thrift. Short-term orientation stands for a society that fosters virtues related to the past and present, in particular respect for tradition, preservation of "face," and fulfilling social obligations (Hofstede, 2011; Hofstede et al., 2010). Indulgence is defined as a tendency to allow relatively free gratification or control of some desires, impulses or feelings. Restraint stands for the tendency to curb the gratification of desires and feelings by strict social norms and prohibitions (Minkov, 2007; Hofstede et al., 2010). Relatively weak control is called "Indulgence" and relatively strong control is called "restraint".

However, Hofstede's cultural framework has been used and applied extensively in a wide variety of contexts, across most of the behavioral science disciplines (Ongwatana & Chordia, 2008). While this approach has been duly criticized for some of its imperfections, it has proven far durable and insightful across many business contexts (Smith, 2010). In construction and built environment research, the framework has also been applied (Ali, 2006; Alkharmany, 2017; Alyousif et al., 2010; Kumar et al., 2019; Meng et al., 2016; Naoum et al., 2015; Phua, 2012). However, the invasive influence of Hofstede's cultural framework over the academic, and the excess of recommendations and finding arising from the study brought about some assumptions of the applicable cultural framework.

In spite of some expressed concerns about the application and generalisability of Hofstede's framework (Kirkman et al., 2017; McSweeney et al., 2016; Minkov, 2018; Taras et al., 2012; Venaik & Brewer, 2016), it remains the most influential (Fougère & Moulettes, 2007) and most validated (Ali, 2006), due to its subsequent updates (Hofstede et al., 2010); and has spurred more research and inspiration among scholars (Beugelsdijk et al., 2017). On this backdrop, this study adopts the framework as espoused by Hofstede et al. (2010) as the conceptual paradigm for analysis. The fact that this research is positioned at the intersection of construction projects and national culture (focusing on the construction professionals' perception, attitude and behaviour to sustainable construction practices), makes the dimensional model presented by Hofstede an appropriate conceptual approach for this study.

Meanwhile, several studies (Haxhi & van Ees, 2010; Parboteeah et al., 2012; Ringov & Zollo, 2007) have identified culture as an important explanatory variable in terms of sustainability-related variations. While this body of research clearly emphasized the importance of national culture in predicting sustainable construction practices and associated aspects, empirical findings revealed considerably mixed effects. A study conducted by Husted (2005) indicated that individualism is positive whereas power distance and masculinity are negatively related to the Environmental Sustainability Index. A similar study conducted by Park et al. (2007) affirmed that there are significant multidimensional interrelationships among national culture dimensions and environmental sustainability measures. Meng et al. (2016) found that Uncertainty Avoidance, Long-Term Orientation, and Individualism national culture dimensions play a significant role in connecting infrastructure sustainability and culture. Whereas Tsoy and Yongqiang (2016) revealed that sustainability-oriented governance leads to sustainable development. Lahuerta-Otero and González-Bravo (2018) confirmed that cultural factors affect sustainability strategies, depending on specific environmental issues. However, Kumar et al. (2019) showed that environmental performance is significantly influenced by the culture of a country. This implies that measuring cultural dimensions and their impacts on global environmental performance could help to identify the supporting cultural dimensions and design an appropriate strategy to optimize environmental performance. Similarly, Adedeji et al. (2017) depicted the direct effect of national culture on sustainability disclosure and intellectual capital as well as the direct effect of intellectual capital on sustainability disclosure.

Consequently, Opoku (2015) contended that the increasing recognition of culture as a powerful and important aspect in fostering economic, social, and environmental dimensions of development implies that culture is a key element in the concept of sustainable development. Accordingly, it frames people's relationships and attitudes towards the built and natural environment. Therefore, sustainable development is an integral part of society and culture; affecting all aspects of operations in the built environment. It is on this strength that UNESCO (2012a; 2012b; 2015) stressed that if achieving sustainability is first and foremost about making appropriate use of the planet's resources, culture must be at the center of our development strategies. Consequently, since cultures frame people's relationships to others in their society and the world around them, including the natural environment, hence the condition of their behaviors is of paramount importance, thus, the basis for this study.

Although the aforementioned studies have demonstrated a growing awareness of the critical roles national culture plays in achieving good project performance in the construction industry (Ankrah, 2007), none of these studies was directed towards exploring how national culture could influence the course of implementing sustainable construction practices in Nigeria. Yip (2009) argues that the foregoing gap is the fundamental cause of the growth of sustainability in society. In addition, the ultimate goal of implementing sustainability is to achieve lasting changes in employee attitudes and behavior, as well as in organizational value systems (Arulrajah, 2015; Garavan & McGuire, 2010; Garavan et al., 2010). Therefore, appreciable

adoption of sustainability principles in the construction sector is only likely to occur when stakeholders actually understand the purposes for such changes and see the need for it (Bal et al., 2013; Pitt et al., 2009; Rodriguez-Melo & Mansouri, 2011).

MATERIALS AND METHODS

This study is survey research that made use of structured questionnaires administered to construction professionals working in different construction organizations such as contracting firms, consultancy firms, academia, government agencies, and corporate/non-governmental organizations in the South-Eastern states of Nigeria. The questionnaire was divided into two parts. Part 1 captured respondents' demographic information; whereas Part 2 contained 47 variables grouped into 6 Hofstede's national culture dimensions which were extracted from literature, and measuring roles of national cultures as barriers to implementing sustainable construction practices in Nigeria. The respondents were asked to express their opinion based on their experience on the extent the national culture variables constitute barriers to the implementation of sustainable construction practices on a 5-point Likert Scale. Where 1= very slightly; 2= slightly; 3= moderately; 4= greatly; 5= very greatly.

The population of this study comprises all registered architects, builders, engineers (civil, mechanical, electrical), building services engineering, quantity surveyors and estate surveyors and valuers practicing in the study area and obtained from the register of their professional associations in the states. From the pool of a total population of 728 professionals, a sample size of 256 was determined based on Cochran's (1977) iterative and final correction formulas.

A total of 256 copies of the questionnaire were randomly distributed to the respondents through both self-administration and online posts via established mail contacts. Out of this number, 162 questionnaires representing about 62.50% were returned and found satisfactory for use in the analysis. However, prior to the distribution of the questionnaire, the locations and contacts of the prospective respondents were first identified, and special consent/permission was sought and obtained from the relevant respondents. The objectives of the study were clearly stated in the consent letter. Subsequently, questionnaires were administered through a simple random sampling to the respondents who consented to the request until the desired sample size was obtained. No further permission from the ethics committee or any other committee was required or necessary for data collection through a questionnaire for this study.

The data generated from the survey were subjected to descriptive and quantitative analysis. The internal consistency of the research instrument was determined using the Cronbach's Alpha (α). Whereas, Cronbach's Alpha > 0.6 would imply that the instrument for data collection for this survey is reliable and acceptable (Adeniran, 2019; Ekolu & Quainoo, 2019; Tavakol & Dennick, 2011), while bearing in mind the propositions of Panayides (2013) and Taber (2018) concerning acceptable Cronbach's Alpha benchmark. Subsequently, Mean Score Index (MSI) was computed and used to rank the national culture variables. Kruskal-Wallis H test and Mann-Whitney U test statistics (nonparametric test) were conducted to determine significant difference in ranking of the influence of national culture dimensions as barriers to the implementation of sustainable construction practices among the construction professionals working in three categories of organisations (private, public and corporate/non-governmental), and based on their years of experience. The whole statistical analysis was done using SPSS Version 22.

To further ensure the reliability of the result, the Margin of Error (ME) was computed at a 95% Confidence Interval (C.I) within which the result would be acceptable. Usually, the critical value is expressed as a t-statistic. In this case, the t statistic has 255 degrees of freedom and a cumulative probability equal to 0.975. From the t-distribution, the critical value was found to be 1.96. Therefore, with finite population correction, the ME within which the result of this study would be reliable is ±4.935% at the 95% confidence level. This is in line with DataStar (2008) which suggested that an acceptable margin of error in a survey study should fall within 4% and 8% at the 95% confidence level. The result of the analysis is presented in the subsequent section.

Decision: Reject H0 if p<0.05 otherwise, do not reject H0 and conclude.

RESULTS AND DISCUSSION
Characteristics of the Respondents for the Study

Table 1 showed the background information of the respondents. It revealed that 35.19% of the respondents work in private sector organizations, about half (51.23%) work in the public sector organization, while 13.58% work with corporate/non-governmental organizations. Out of these respondents, 13.58% work in organizations handling consultancy services only, 25.93% in the contracting organization only, 24.07% in academics, 32.72% work in the organizations that combine both consultancy services and contracting, whereas 3.70% of the respondents work in other organizations. 17.28% of these respondents are affiliated with the Building profession, 27.16% to the Architecture profession, 28.40% belong to Engineering, 22.84% to the Quantity Surveying profession and 4.32% are affiliated to the Estate Management profession. Furthermore, 48.15% indicated that they deal with building construction projects only, 24.31% deal with non-building construction projects only, while 27.78% handle both building and other construction projects. Similarly, 17.90% of the respondents hold the position of project/construction managers, 32.72% either project/site engineer, architect, quantity surveyor, or

builder. 12.96% hold the post of project consultants, 20.37% supervisors, 6.17% directors, while 9.88% of the respondents hold other job positions not categorized. This implied that the respondents are very relevant and the majority are well-positioned in their various organizations to give vital information about their experience in construction activities.

In terms of educational level, 22.84% of the respondents stated that they had diplomas as the highest educational certificate.

35.80% showed that they had first degree certificates, 29.63% had a Master's degree, 9.26% had Ph.D. as their highest educational qualification, while 2.47% had other certificates. This showed that all the respondents are lettered and could give an account of themselves in terms of responding to the questions in this study. Table 1 also revealed that the respondents have adequate working experience whereas only about 11.11% indicated that they have worked for 5 years or

Table 1: Respondents' characteristics for the study

Variable	Number of Responses	% of Responses
Category of Organisation		
Private	57	35.19
Public	83	51.23
Corporate/non-governmental	22	13.58
Service of Organisation		
Consultancy	22	13.58
Contracting	42	25.93
Academics	39	24.07
Consultancy and Contracting	53	32.72
Others	6	3.70
Professional Affiliation		
Building	28	17.28
Architecture	44	27.16
Engineering	46	28.40
Quantity Surveying	37	22.84
Estate Management	7	4.32
Nature of Construction Project		
Building	78	48.15
Non building	39	24.07
Both	45	27.78
Job Position		
Project/Construction Manager	29	17.90
Engineer/Architect/QS/Builder	53	32.72
Consultant	21	12.96
Supervisor	33	20.37
Director	10	6.17
Others	16	9.88
Highest Educational Level		
Diploma	37	22.84
First Degree	58	35.80
Masters	48	29.63
Ph.D.	15	9.26
Others	4	2.47
Years of Working Experience		
years 0-5	18	11.11
years 6-10	27	16.67
years 11-15	33	20.37
years 16-20	69	42.59
Above 20 years	15	9.26

Continiue of Table 1: Respondents' characteristics for the study

Variable	Number of Responses	% of Responses
Involvement in sustainable construction practices		
Yes	34	20.99
No	89	54.94
Don't know	39	24.07
If "Yes" Aspect of Involvement		
Planning	0	0.00
Design	10	29.41
Procurement	6	17.65
Construction	16	47.06
Operation/maintenance	2	5.88

less. 16.67% indicated that they have between 6-10 years of working experience, 20.37% have between 11-15 years of working experience, a good percentage (42.59%) indicated that they have between 16-20 years of working experience, while 9.26% indicated that they have worked for more than 20 years.

Further questions on the involvement of the respondents in sustainable construction practices revealed that a greater number of the respondents are either not involved in the sustainable construction practices (54.94%) or do not know if they are involved (24.07%), while only a smaller percentage (20.99%) indicated that they are involved. A step further showed that almost half (47.06%) of the respondents who indicated that they are involved in sustainable construction practices do so during the construction phase. 29.41% are involved in the design stage whereas 17.65% and 5.88% are involved in the procurement and operation/maintenance stages respectively. Generally, this suggested a low level of implementation of sustainable construction practices.

Influence of National Culture Dimensions as Barriers to Sustainable Construction Practices

Table 2 showed the result of reliability test and MSI of national culture dimensions constituting barriers to sustainable construction practices in Nigeria. The reliability test result revealed that the Cronbach's Alpha (α) for the six national culture dimensions were > 0.6. Specifically, PDI has a Cronbach's Alpha of 0.703; IDV has a Cronbach's Alpha of 0.852; MAS has a Cronbach's Alpha of 0.895; UAI has a Cronbach's Alpha of 0.936; StO has a Cronbach's Alpha of 0.887; whereas INR has a Cronbach's Alpha of 0.816. This shows that the research instrument was reliable, and could be used as instrument for data collection in the survey. It also implies that in measurement model analysis, test of construct reliability and internal consistency have been satisfied.

The average MSI of the six national culture dimensions was revealed as follows: PDI (4.13), IDV (3.84), MAS (3.94), UAI (4.11), StO (4.22), and INR (4.03) dimensions. Since the MSI for each of the dimensions was >3.00, it therefore suggested

that these dimensions have potentials to inhibit construction professionals from implementing sustainable construction practices. However, the higher the MSI of the national culture dimension, the greater the level to which the construction professionals manifest the impeding culture.

In the same vein, the three highest-ranking PDI variables are local rules, regulations, customs (4.64), engagement of too many workers and small sub-contractors (4.41), and inequality among workers and management (4.40). For IDV, expression of self-interest (4.41), basis for hiring, promotion, and rewards (4.13), and individualistic system of management (3.99) are three top-ranking variables preventing the implementation of sustainable construction practices. Similarly, the three highest-ranking MAS variables preventing the implementation of sustainable construction practices are the assertive management approach (4.24), poor cooperation from residents and other workers (4.14), and preference about money over time (4.07). Those for UAI include operational strategy dependent on expert and technical solutions (4.48), fear of the unknown (4.46), and perception of stress and anxiety (4.35). In the case of StO however, the three highest-ranking is the prioritization of initial costs over operational costs (4.72), lack of long-term business relationships (4.41), and focus on short term vision (4.39); while the three most-ranking INR variables are negative attitude towards work (4.55), perception of helplessness about what happens to me in the job (4.44), and unconducive and unfree working environment (3.87). Since each of these variables has MSI > 3.00, the result signified that these variables are barriers to the implementation of sustainable construction practices in Nigeria. in a specific term, the result further suggested that large power distance, individualism, masculinity, high uncertainty avoidance, short-term orientation, and restraint culture dimensions inhibit implementation of sustainable construction practices among construction professionals in Nigeria.

Overall, the result of the MSI of the identified 47 national culture variables constituting barriers to the implementation of sustainable construction practices in Nigeria showed that all the

Table 2: Result of reliability test and MSI of the influence of national culture dimensions as barriers to sustainable construction practices

SN	National culture Variables	N	MSI	Ranking Within Group	Overall Ranking
	Power distance Dimension (PDI) (Cronbach's Alpha = .703)				
1	Centralised decision making	162	4.19	6	20
2	The culture of "no challenge" to authorities	162	4.14	7	22
3	Variation in salary of workers	162	3.99	8	30
4	Inequality among workers and management	162	4.40	3	10
5	Inflexibility and lack of trust	162	4.24	5	18
6	Local rules, regulations, customs	162	4.64	1	2
7	Protection of rights and privileges	162	3.46	10	44
8	Favouritism in appointment of contractors/workers	162	4.35	4	12
9	Engagement of too many workers and small sub-contractors	162	4.41	2	7
10	Construction workers with dissimilar religions, customs, beliefs, values, traditions	162	3.48	9	43
	Average MSI		4.13		
	Individualism Dimension (IDV) (Cronbach's Alpha = .852)				
11	Expression of self-interest	162	4.41	1	7
12	Employer-employee business-type working relationship	162	3.30	6	47
13	Task-oriented work environment	162	3.88	4	33
14	Basis for hiring, promotion and rewards	162	4.13	2	24
15	Individualistic system of management	162	3.99	3	30
16	Actions and treatments based on individual suggestions or opinions	162	3.35	5	46
	Average MSI		3.84		
	Masculinity Dimension (MAS) (Cronbach's Alpha = .895)				
17	Uncompromising dispute resolution mechanism	162	4.04	4	27
18	Cultural clash among numerous construction stakeholders	162	3.52	7	42
19	Poor cooperation from local residents and other workers	162	3.71	6	39
20	Blame-culture (conflict due to evading responsibility)	162	4.14	2	22
21	Having unspecified goal(s) to achieve	162	3.88	5	33
22	Assertive management approach	162	4.24	1	18
23	Preference about money over time	162	4.07	3	26
	Average MSI		3.94		
	Uncertainty Avoidance Dimension (UAI) (Cronbach's Alpha = .936)				
24	Over commitment to the local contractors	162	4.34	4	14
25	Procurement methods used in the projects	162	4.33	5	15
26	Changes in design and variation orders	162	4.15	7	21
27	Lack of understanding of the culture of workers	162	3.99	8	30
28	Mobility of labour	162	3.80	9	37
29	Perception of stress and anxiety	162	4.35	3	12
30	Scientism about risks in construction business	162	4.28	6	16
31	Operational strategy dependent on expert and technical solutions	162	4.48	1	4
32	Fear of unknown	162	4.46	2	5
33	Expression of aggression and emotion	162	3.65	10	40
34	Effect of localised weather	162	3.43	11	45

Continiue of Table 2: Result of reliability test and MSI of the influence of national culture dimensions as barriers to sustainable construction practices

SN	National culture Variables	N	MSI	Ranking Within Group	Overall Ranking
	Average MSI		**4.11**		
	(Short Term Orientation Dimension (StO) (Cronbach's Alpha = .887				
35	Flexibility to accept long working hours	162	4.10	5	25
36	Poor safety tradition	162	4.26	4	17
37	Lack of long-term business relationships	162	4.41	2	7
38	Focus on short term vision	162	4.39	3	11
39	Prioritisation of initial costs over operational costs	162	4.72	1	1
40	Incompatibility of workers and organisation's aspirations	162	4.03	6	28
41	Work-life imbalance	162	3.81	8	36
42	Poor information and communication sharing systems	162	4.01	7	29
	Average MSI		**4.22**		
	(Restraint Dimension (INR) Cronbach's Alpha = .816				
43	Negative attitude towards work	162	4.55	1	3
44	Moral responsibilities	162	3.57	5	41
45	Unconducive and unfree working environment	162	3.87	3	35
46	Perception of helplessness about what happens to me in the job	162	4.44	2	6
47	Pessimistic about the work	162	3.73	4	38
	Average MSI		**4.03**		

variables are important and should not be overlooked. However, the MSI of the variables of the study ranged from (3.30) for employer-employee business-type working relationship (ranking 47th) to (4.72) prioritization of initial costs over operational costs (ranking 1st). This further suggested that all the 47 identified variables are important to the implementation of sustainable construction practices in Nigeria. Furthermore, the MSI of the overall five highest-ranking variables is the prioritization of initial costs over operational costs (4.72), local rules, regulations, customs (4.64), negative attitude towards work (4.55), operational strategy dependent on expert and technical solutions (4.48), and fear of the unknown (4.46). These five variables represent the most critical national culture barriers to the implementation of sustainable construction practices in Nigeria which must not be ignored.

Test of Hypothesis

The influence of national culture as barriers to the implementation of sustainable construction practices was compared on the basis of organizational and personal characteristics of the construction professionals (in this case, category of organization and years of experience respectively). Based on this, two hypotheses were postulated.

1. Differences in organizations do not significantly influence the national culture dimensions of construction professionals as barriers to the implementation of sustainable construction practices.

2. Years of experience do not significantly influence the national culture dimensions of construction professionals as barriers to the implementation of sustainable construction practices.

Influence of Organisations' Characteristics on National Culture Dimensions as Barriers to the Implementation of Sustainable Construction Practices

Table 3 presented the result of the Kruskal Wallis H Test for the influence of national culture dimensions of construction professionals as barriers to the implementation of sustainable construction practices based on differences in organisation characteristics (category of organisation) of the respondent of the study. The Kruskal Wallis H Test result showed that there was no significant difference in the rating of all the national culture dimensions that constitute barriers to the implementation of sustainable construction practices among construction professionals working in different organisations. In all cases, the computed $\chi 2$ (PDI = .038, IDV = .291, MAS = 1.190, UAI = .236, StO = .114, and INR = .103) are less than the critical values ($\chi 2$ computed $<\chi 2$ critical) at 0.05 significant level. Likewise, the p- values of (PDI = .981, IDV = .864, MAS = .552, UAI = .889, StO = .944, and INR = .950) are less than .05 (p>.05. Thus, the null hypothesis was accepted in all cases. This result confirmed that national culture dimensions causing barriers to the implementation of sustainable construction practices among construction professionals are not different

irrespective of whether a construction professional works in private, public or corporate/NGO organisations.

Influence of Years of Experience of Construction Professionals on National Culture Dimensions as Barriers to the Implementation of Sustainable Construction Practices

The years of experience of construction professionals involved in the study were grouped into two namely, less than or equal to 10 years (≤ 10 years) and greater than 10 years (> 10 years). Mann-Whitney U test was used to compare the difference in the national culture dimensions of construction professionals as barriers to the implementation of sustainable construction practices between the two groups of years of experience as shown in Table 4.

The result revealed that there was no significant difference in the ratings of PDI (U = 2174.000, Z = -1.723, p = .085 > .05), MAS (U = 2133.000, Z = -1.874, p = .061 > .05), StO (U = 2117.000, Z = -1.936, p = .053 > .05) and INR (U = 2255.000, Z = -1.419, p = .156 > .05) culture dimensions as barriers to the implementation of sustainable construction practices among construction professionals based on their years of experience. This therefore, led to the acceptance of the null hypothesis. Contrarily, the result showed that there was significant

difference in the rating of IDV (U = 2054.000, Z = -2.173, p = .030 < .05) and UAI (U = 2102.000, Z = -1.987, p = .047 < .05) culture dimensions as barriers to the implementation of sustainable construction practices among construction professionals based on their years of experience. Thus, the null hypothesis is rejected in this cases. This could be as a result of individual attributes which are associated with IDV and high UAI cultures which could greatly be influenced by exposure, experience and knowledge.

Furthermore, a comparison of the mean of the distribution of the dimensions IDV and UAI was desired for years of experience categories (≤10yrs and > 10yrs) as depicted in Table 5. In the case of IDV, > 10yrs (N = 117) has a larger mean rank (86.44) and median (4.00) than ≤10yrs (N = 45) with mean rank (68.66) and median (3.83) and thus tends to take larger values. This suggested the existence of statistical significance difference between the two groups. Likewise, for UAI: > 10yrs (N = 117) has a larger mean rank (86.03) and median (4.18) than ≤10yrs (N = 45) with mean rank (69.71) and median (3.91) and thus tends to take larger values. This is also suggesting the existence of statistical significance difference between the two groups. However, to determine the magnitude of the difference between the two groups in the two instance cases, an effect size

Table 3: Result of Kruskal Wallis H Test

Test Statistics[a,b]						
	PDI	**IDV**	**MAS**	**UAI**	**StO**	**INR**
Chi-Square	.038	.291	1.190	.236	.114	.103
df	2	2	2	2	2	2
Asymp. Sig.	.981	.864	.552	.889	.944	.950
a. Kruskal Wallis Test						
b. Grouping Variable: Category of Organisation						

Table 4: Result of Mann-Whitney U Test

Test Statistics[a]						
	PDI	**IDV**	**MAS**	**UAI**	**StO**	**INR**
Mann-Whitney U	2.174E3	2.054E3	2.133E3	2.102E3	2.117E3	2.255E3
Wilcoxon W	3.209E3	3.090E3	3.168E3	3.137E3	3.152E3	3.290E3
Z	-1.723	-2.173	-1.874	-1.987	-1.936	-1.419
Asymp. Sig. (2-tailed)	.085	.030	.061	.047	.053	.156
Exact Sig. (2-tailed)	.085	.029	.061	.047	.053	.157
Exact Sig. (1-tailed)	.043	.015	.030	.023	.026	.078
Point Probability	.000	.000	.000	.000	.000	.000
a. Grouping Variable: Years of Experience						

Table 5: Result of Mean Rank from Mann-Whitney U Test

Ranks					
PDI	≤10yrs	45	71.31	3209.00	
	> 10yrs	117	85.42	9994.00	
	Total	162			
IDV	≤ 10yrs	45	68.66	3089.50	
	> 10yrs	117	86.44	10113.50	
	Total	162			
MAS	≤10yrs	45	70.40	3168.00	
	> 10yrs	117	85.77	10035.00	
	Total	162			
UAI	≤ 10yrs	45	69.71	3137.00	
	> 10yrs	117	86.03	10066.00	
	Total	162			
StO	≤ 10yrs	45	70.04	3152.00	
	> 10yrs	117	85.91	10051.00	
	Total	162			
INR	≤ 10yrs	45	73.11	3290.00	
	> 10yrs	117	84.73	9913.00	
	Total	162			

was calculated.

The effect size (r) can be calculated by dividing the absolute (positive) standardised test statistic z by the square root of the number of groups (N) as represented in equation 1.

$$\text{Therefore, } r = \frac{z}{\sqrt{N}}$$

Equation (1)

Where, z = 2.173 for IDV and 1.987 for UAI, and N = 162.

For IDV: $r = \frac{2.173}{\sqrt{162}} = 0.171$

For UAI: $r = \frac{1.987}{\sqrt{162}} = 0.156$

Based on Cohen's classification of effect sizes where 0.1 = small effect, 0.3 = moderate effect and ≥0.5 = large effect, the effect sizes for both case were 0.171 (IDV) and 0.156 (UAI) small effects. This suggested that though there are significant differences in the roles of IDV and UAI culture dimensions as barriers to the implementation of sustainable construction practices among construction professionals based on their years of experience, the differences in the sizes of the groups have only a small effect.

From the foregoing results, this study has demonstrated the importance of national culture exhibited by construction professionals and its role in the implementation of sustainable construction practices. While the result revealed that the six national culture dimensions (large PDI, IDV, MAS, strong UAI, StO, and INR) based on Hofstede's framework have great potential towards causing barriers to the implementation of sustainable construction practices among construction professionals, StO has the greatest potential followed by large PDI, strong UAI, INR, MAS, and IDV in that order.

Implicitly, this result denotes that small power distance, collectivism, femininity, weak uncertainty avoidance, long-term orientation, and indulgence promote the implementation of sustainable construction in Nigeria. This, therefore, suggests that the ability to overcome the impediments of implementing sustainable construction practices in Nigeria is rooted in the culture of the practitioners and organization/society, which are expressed in their daily life and places of work (Effah, 2015; Gunatilake, 2013; Thomson & El-Haram, 2011). For example, the perception and prioritization of initial costs over operational costs, existing local rules, regulations, customs, negative attitude towards work, operational strategy of the organization and the professionals and uncertainty surrounding the outcome of the new venture (fear of unknown), are a clear reflection of these cultures. These are also in line with the five critical

national culture barriers to the implementation of sustainable construction practices in Nigeria identified in this study. This result highlighted the importance of the cost of sustainable construction practices vis-à-vis the cost benefits of such adventure. It also raises concerns about the prevailing rules and regulations for construction practices and personal attributes and dispositions of the practicing construction professionals in Nigeria. It aligned with the results of other studies such as Ali and Alkayed (2019), Sarhan et al. (2018), and Tokbolat et al. (2020), who identified national culture elements as barriers to the implementation of sustainable construction practices.

Although five critical barriers were established from a total of 47 national culture variables that constitute barriers to implementing sustainable construction practices among construction professionals, the overall MSI for each of the variables suggested that they are all barriers to implementation of sustainable construction practices in Nigeria. But what the highest-ranking barriers (prioritization of initial costs over operational costs, local rules, regulations, customs, negative attitude towards work, operational strategy, and fear of unknown) suggested was that they are of the greatest concern to the construction professionals in Nigeria. This result supported the result of Aghimien et al. (2019). They also demonstrated the importance of future investments, equality of roles and decentralization of power within construction organization, teamwork and cooperation among professionals in the construction industry, greater readiness to take risks, tolerance, and less emotional resistance to change, humanization of construction practices, allowing relatively free gratification of basic and natural human desires and above all positive attitude to work. The result aligned with that of Schweiger et al. (2018) who proposed that with participatory strategy and increase awareness about change, there would be less resistance to change.

However, the Kruskal Wallis H test result indicated that the national culture dimensions that constitute barriers to the implementation of sustainable construction practices are not significantly different on the basis of organizational characteristics. This suggested that some national culture constitute barriers to the implementation of sustainable construction practices among construction professionals in the same way in Nigeria, irrespective of the differences in the organizational characteristics. On the other hand, the Mann-Whitney U test result showed that the national culture dimensions that constitute barriers to implementation of sustainable construction practices are not significantly different for individual characteristics of years of experience, but for IDV and UAI dimensions which indicated significant difference due to individual attributes that are associated with IDV and strong UAI cultures. This in turn could be greatly influenced by the level of exposure, experience, and knowledge. In this instance, therefore, it is not surprising that the respondents indicated differences in the rating of IDV and UAI culture

dimensions, looking at the number of years the professional has put into practice. It is expected that a professional who has spent more than ten years working on construction activities or establishment would be able to show a better level of understanding, knowledge, and exposure to issues relating to sustainable construction practices than those who have just spent few years (say < 10 yrs) in the practice.

Nevertheless, the study revealed that the differences were of small effects. This implied that irrespective of the differences in the roles of IDV and UAI culture dimensions due to differences in the years of experience, the differences in the sizes of the groups have only small effects. This, therefore, affirmed that the effect of personal attributes of the professional cannot easily be ignored if sustainable construction is to be achieved in Nigeria. This result is supported by Meng et al. (2016) who found that there is no significant difference based on organizational and individual characteristics as barriers to implementation of lean construction among construction professionals. But it differs from the result of Sarhan et al. (2018) due to factors relating to differences in the national culture. In this case, Sarhan et al. (2018) conducted their study in the Kingdom of Saudi Arabia, while this study was in Nigeria. Furthermore, it partially agreed and disagreed with Husted (2005) in the sense that the study focused on environmental sustainability only and found high PDI and MAS are retarding environmental sustainability while IDV promotes it. The present study considered the three dimensions of sustainability and found that PDI, IDV, and MAS culture dimensions all have the potential to cause barriers to the implementation of sustainable construction practices among construction professionals.

CONCLUSION

Efforts to bring various innovative practices (including sustainable construction) prevalent in the developed countries to the developing countries have been ranging over the years. However, the plausibility of achieving this task has been queried due to incompatibility in the national and regional cultures of developed and developing countries of the world. In other words, barriers relating to national culture have been suspected. In view of this, this study has identified national culture variables and dimensions that constitute barriers to the implementation of sustainable construction practices among construction professionals in Nigeria.

Generally, there are 47 national culture variables grouped into six national culture dimensions that are currently inhabiting the implementation of sustainable construction practices in Nigeria. The study identified five top-ranking barriers that are of serious concern to the construction professionals in Nigeria as follows: Prioritisation of initial costs over operational costs, local rules, regulations, customs, negative attitude towards work, operational strategy dependent on expert and technical solutions, and fear of unknown. These variables signified the

importance of six national culture dimensions of large PDI, IDV, MAS, strong UAI, StO, and INR towards the implementation of sustainable construction practices in Nigeria. Since these dimensions, constitute barriers to implementation of sustainable construction practices in Nigeria; invariably their opposites which are small power distance, collectivism, masculinity, weak uncertainty avoidance, long-term orientation, and indulgence would promote the implementation of sustainable construction practices.

Furthermore, the study affirmed that irrespective of organizational differences, there is no difference in the national culture of construction professionals hindering the implementation of sustainable construction practices in Nigeria. In the same vein, there is no difference in the national culture of construction professionals hindering the implementation of sustainable construction practices based on the individual characteristics of years of experience, but for IDV and UAI cultures which showed significant difference due to personal attributes and exposure. Consequently, the study indicated that the differences only showed a small effect. This suggested that the observed significant differences in the roles of IDV and UAI dimensions as barriers to implementation of sustainable construction practices among construction professionals based on their years of experience are not pronounced, due to differences in the sizes of the two groups. Rather it is due to inherent personal characteristics of the professionals which are associated with IDV and UAI dimensions.

Expectedly, the study has made case for practical, theoretical, and policy implications. It has raised concern about a new way of thinking towards overcoming barriers to the implementation of sustainable construction practices in Nigeria since this study has confirmed that they are rooted in the national culture. Practically, there is a need for optimization and operationalization of national culture dimensions that support the implementation of sustainable construction practices in Nigeria and eschew those that lead to barriers. Since years of experience in construction, a professional is linked with differences in the individual characteristics, it is expected that experienced construction professional should transform their years of experience into practice so as to enhance implementation of sustainable construction practices. By implication, issues concerning the national culture of construction professionals should be taken very seriously.

Theoretically, this study demonstrated that the process of implementing sustainable construction practices in Nigeria could be embedded in the national culture framework. Looking beneath the surface of construction professionals' organizational and individual characteristics, national culture variables have great potentials to either inhibit or promote the implementation of sustainable construction practices in Nigeria. Finally, this study has provided theoretical support to the emergence of a new paradigm in sustainable construction research and thus has contributed to the emerging literature on rethinking the resistant behaviour of construction stakeholders from different perspectives, particularly as regards to sustainable construction practices and national culture in Nigeria.

REFERENCES

Abdullahi, A.L., & Lee, A. (2017). The influence of culture, beliefs and experience on the sustainable end of life management of buildings in Nigeria. *Journal of Construction Project Management and Innovation,* 7(1), 1793-1806. https://doi.org/10520/EJC-8505ef9d2.

Abidin, N.Z. (2010). *Sustainable construction practices in Malaysia.* In: I. Dincer, A. Hepbasli, A. Midilli, & T.H. Karakoc (Eds.) Springer Science+Business Media. https://doi.org/10.1007/978-1-4419-1017-2_24.

Adedeji, B.S., Popoola, O.M.J., & Ong, T.S. (2017). National culture and sustainability disclosure practices: A literature review. Indian-Pacific Journal of Accounting and Finance (IPJAF), 1 (1), 26-48.

Adeniran, A.O. (2019). Application of Likert scale's type and Cronchba's Alpha analysis in an airport perception study. Scholar *Journal of Applied Science and Research,* 2(4), 1-5.

Aghimien, D., Aigbavboa, C., & Thwala, W. (2019). Microscoping the challenges of sustainable construction in developing countries. *Journal of Engineering, Design and Technology,* 17(6), 1110-1128. https://doi.org/10.1108/JEDT-01-2019-0002.

Ali, H.H., & Alkayed, A.A. (2019). Constrains and barriers of implementing sustainability into architectural practices in Jordan. *Alexandra Engineering Journal,* 58(3), 1011-1023. https://doi.org/10.1016/j.aej.2019.09.003.

Ali, T.H. (2006). *Influence of national culture on construction safety climate in Pakistan.* Ph.D. Dissertation, Faculty of Engineering and Information Technology, Griffith University, Queensland, Gold Coast Campus, Australia. Retrieved from http://hdl.handle.net/10072/366047, 2 November 2019.

Alkharmany, A. (2017). *Project management: the effect of Saudi national culture on the attitudes of key stakeholders towards delay in construction projects in Saudi Arabia.* Ph.D. Dissertation, University of Brighton. Retrieved from https://research.brighton.ac.ukfilesFinalThesisAlkharmany, on 23 February 2020.

AlSanad, S. (2015). *Awareness, drivers, actions, and barriers of sustainable construction in Kuwait. Procedia Engineering,* 118, 969-983. https://doi.org/10.1016/j.proeng.2015.08.538.

Alyousif, A., Naoum, S., Atkinson, A., & Robinson, H. (2010) National culture influence on management practices in the construction industry of United Arab Emirates. In: C. Egbu (Ed.) *Proceedings 26th Annual ARCOM Conference,* 6-8 September 2010, Leeds, UK, Association of Researchers in Construction Management, 511-520.

Ametepey, O., Aigbavboa, C., & Ansah, K. (2015). Barriers to successful implementation of sustainable construction in the Ghanaian construction industry. *Procedia Manufacturing,* 3, 1682-1689. https://

doi.org/10.1016/j.promfg.2015.07.988.

Ankrah, N.I. (2007). *An investigation into the impact of culture on construction project Performance.* Ph.D. Dissertation, SEBE, University of Wolverhampton, UK.

Arulrajah, A.A. (2015). Contribution of human resource management in creating and sustaining ethical climate in the organisations. *Sri Lankan Journal of Human Resource Management,* 5(1), 31-44.

Bal, M., Bryde, D., Fearon, D., & Ochieng, E. (2013). Stakeholder engagement: Achieving sustainability in the construction sector. *Sustainability,* 5(2), 695-710. https://doi.org/10.3390/su5020695.

Bansal, P. (2002). The corporate challenges of sustainable development. *The Academy of Management Perspective,* 16(2), 122-131. https://doi.org/10.5465/ame.2002.7173572.

Beugelsdijk, S., Kostova, T., & Roth, K. (2017). An overview of Hofstede-inspired country-level culture research in international business since 2006. *Journal of International Business Studies,* 48(1), 30–47. https://doi.org/10.1057/s41267-016-0038-8.

Brennan, M., & Cotgrave, A. (2013). Development of a measure to assess attitudes towards sustainable development in the built environment: A pilot. In: S.D. Smith, & D.D. Ahiaga-Dagbui, (Eds.) *Proceedings of the 29th Annual ARCOM Conference,* 2-4 September 2013, Reading, UK, Association of Researchers in Construction Management, 1265-1273.

Chan, A.P.C., Darko, A., Olanipekun, A.O., & Ameyaw, E.E. (2018). Critical barriers to green building technology adoption in developing countries: The case of Ghana. *Journal of Cleaner Production,* 172, 1067-1079. https://doi.org/10.1016/jclepro.2017.10.235.

Chukwu, I. (2018). *Sustainability in the Nigerian construction industry: The feasibility of adopting green building rating system.* PhD Dissertation, Indiana State University, Terre Haute, Indiana.

Cochran, W.G. (1977). *Sampling techniques* (3rd Ed.). New York: John Wiley & Sons Inc.

Dania, A.A. (2016). *Sustainable construction at the firm level: Case studies from Nigeria.* Ph.D. Dissertation, School of Construction Management and Engineering, University of Reading. Retrieved from http://centaur.reading.ac.uk/72754/1/18028935_Dania_thesis.pdf. 21 August 2019.

Daniel, E.I., Oshineye, O., & Oshodi, O. (2018). Barriers to sustainable construction practice in Nigeria. In: C. Gorse, & C.J. Neilson (Eds.) *Proceeding of the 34th Annual ARCOM Conference,* 3-5 September 2018, Belfast, UK, Association of Researchers in Construction Management, 149-158.

Darko, A., & Chan, A.P.C. (2017). Review of barriers to green building adoption. *Sustainable Development,* 25(3), 167-179. https://doi.org/10.1002/sd.1651.

DataStar. (2008). *What every researcher should know about statistical significance.* Retrieved from https://www.surveystar.com/startips. 15 February 2020.

Davies, O.O.A., & Davies, I.O.E. (2017). Barriers to implementation of sustainable construction techniques. *MAYFEB Journal of Environmental Scienc*e, 2, 1-9.

Djokoto, S.D., Dadzie, J., & Ohemeng-Ababio, E. (2014). Barriers to sustainable construction in the Ghanaian construction industry: Consultants' perspectives. *Journal of Sustainable Development,* 7(1), 134-143. • https://doi.org/10.5539/jsd.v7n1p134.

du Plessis, C. (2001). Sustainability and sustainable construction: The African context. *Building Research and Information,* 29(5), 374-380. https://doi.org/10.1080/09613210110063809.

du Plessis, C. (2002). *Agenda 21 for sustainable construction in developing countries.* Pretoria, South Africa: CSIR, CIB and UNEP-IETC.

Effah, P.K. (2015). *Strategies for implementation of sustainable development in the construction industry in Ghana: Case study in Nkoranza South and Sunyani East.* Master of Science on Construction Management Thesis, Department of Building Technology, Kwame Nkrumah University of Science and Technology, Kumasi.

Ekolu, S.O., & Quainoo, H. (2019). Reliability of assessment in engineering education using Cronchba's Alpha, KR and split-half methods*. Global Journal of Engineering Education,* 21(1), 24-29.

Esezobor, E.L. (2016). *Sustainability and construction: A study of the transition to sustainable construction practices in Nigeria.* Ph.D. Dissertation, Birmingham City University, UK.

Fischer, R., Vauclair, C.M., Fontaine, J.R.J., & Schwartz, S H. (2010). Are individual-level and country-level value structures different? Testing Hofstede's legacy with the Schwartz value survey. *Journal of Cross-Cultural Psychology,* 41(2), 135- 151. https://doi.org/10.1177/0022022109354377.

Fougère, M., & Moulettes, A. (2007). The construction of the modern west and the backward rest: Studying the discourse of Hofstede's culture's consequences. *Journal of Multicultural Discourses,* 2(1), 1-19. https://doi.org/10.2167/md051.0.

Garavan, T.N., & McGuire, D. (2010). Human resource development and society: Human resource development's role in embedding corporate social responsibility, sustainability, and ethics in organisations. *Advances in Developing Human Resources,* 12(5) 487–507.

Garavan, T.N., Heraty, N., Rock, A., and Dalton, E. (2010). Conceptualising the behavioural barriers to CSR and CS in organisations: A typology of HRD interventions, *Advances in Developing Human Resources,* 12(5) 587–613

Gunatilake, S. (2013). *The uptake and implementation of sustainable construction: Transforming policy into practice.* Ph.D. Dissertation, School of Built and Natural Environment, University of Central Lancashire.

Gunatilake, S., & Liyanage, C. (2010). Harmonising sustainable construction policy with practice at project level: a research proposition. In: C. Egbu, (Ed.) *Proceedings of the 26th Annual ARCOM Conference,* 6-8 September 2010, Leeds, UK, Association of Researchers in Construction Management, 1457-1466.

Gunduz, M., & Almuajebh, M. (2020). Critical success factors for sustainable construction project management. *Sustainability,* 12, 1990. https://doi.org/10.3390/su12051990.

Häkkinen, T., & Belloni, K. (2011). Barriers and drivers for sustainable building, *Building Research and Information,* 39(3), 239–255.

Haxhi, I., & van Ees, H. (2010). Explaining diversity in the worldwide diffusion of codes of good governance. *Journal of International Business Studies,* 41(4), 710–726. https://doi.org/10.1057/jibs.2009.39.

Ho, F.N., Wang, H.-M.D., & Vitell, S.J. (2012). A global analysis of corporate social performance: The effects of cultural and geographic environments. *Journal of Business Ethics,* 107(4), 423–433. https://doi.org/10.1007/s10551-011-1047-y.

Hofstede, G. (1980). *Culture's consequences: International differences in work related values.* Beverly Hills, CA: Sage.

Hofstede, G. (1991). *Cultures and Organisations: Software of the Mind.* London: McGraw Hill.

Hofstede, G. (2001). *Cultures consequences: Comparing values, behaviours, institutions, and organisations, across nations* (2nd Ed.). Thousand Oaks, CA: Sage Publications, Inc. Retrieved from http://us.sagepub.com/en-us/nam/cultures-consequences/book9710. 10 July 2019.

Hofstede, G. (2011). Dimensionalising cultures: The Hofstede model in context. *Online Readings in Psychology and Culture,* 2(1). http://dx.doi.org/10.9707/2307-0919.1014.

Hofstede, G., & Bond, M.H. (1988). The Confucius connection: From cultural roots to economic growth. *Organisational Dynamics*, 16(4), 5-21. https://doi.org/10.1016/0090-2616(88)90009-5.

Hofstede, G., Hofstede, G.J. and Minkov, M. (2010). *Cultures and organisations: Software of the mind* (3rd Ed.). New York: McGraw Hill.

Hoxha, V., & Shala, F. (2019). The benefits and challenges of sustainable buildings in Prishtina, Kosovo. *Facilities,* 37(13/14), 1118-1152. https://doi.org/10.1108/F-08-2018-0097.

Husted, B.W. (2005). Culture and ecology: A cross-national study of the determinants of environmental sustainability. MIR: *Management International Review,* 45(3), 349-371.

Ifije, O., & Aigbavboa, C. (2020). Identifying barriers of sustainable construction: A Nigerian case study. *MATEC Web of Conferences,* 312, 04004. https://doi.org/10.1015/matecconf/202031204004.

Ioannou, I. and Serafeim, G. (2012). What drives corporate social performance? The role of nation-level institutions. *Journal of International Business Studies,* 43(9), 834–864.

Kirkman, B.L., Lowe, K.B., & Gibson, C.B. (2017). A retrospective on culture's consequences: The 35-year journey. *Journal of International Business Studies,* 48(1), 12-29. https://doi.org/10.1057/s41267-016-0037-9.

Kumar, S., Giridhar, V., & Sadarangani, P. (2019). A cross-national study of environmental performance and culture: implications of the findings and strategies. *Global Business Review,* 20(4). 1051-1068. https://doi.org/10.1177/0972150919845260.

Lahuerta-Otero, E., & González-Bravo, M. I. (2018). Can national culture affect the implementation of common sustainable policies? A European response. *Cross-Cultural Research,* 52(5), 468-495. https://doi.org/10.1177/1069397117739849.

Lee, K.H., Ahn, Y.H., Jeon, M., & Suh, M.J. (2014). *Organisational strategies to support sustainability in the construction company.* In the World SB14, 28-30th October 2014, Barcelona, Spain.

Luo, L.L., & Tang, Q. (2016). Deos national culture influence corporate carbon disclosure propensity? Journal of International Accounting Research, 15(1), 17-47. https://doi.org/10.2308/jiar.51131.

McSweeney, B., Brown, D., & Iliopoulou, S. (2016). Claiming too much, delivering too little: Testing some of Hofstede's generalisations. *Irish Journal of Management,* 35(1), 34-57. https://doi.org/10.1515/ijm-2016-0003.

Meng, J., Yan, J., & Liu, B. (2016). An exploratory study of relationships between national culture and infrastructure sustainability, *Procedia Engineering,* 145, 1226 – 1233. https://doi.org/10.1016/j.proeng. 2016.04.158.

Minkov, M. (2007). *What makes us different and similar: A new interpretation of the World Values Survey and other cross-cultural data*. Sofia, Bulgaria: Klasika i Stil.

Minkov, M. (2018). A revision of Hofstede's model of national culture: Old evidence and new data from 56 countries. *Cross Cultural and Strategic Management,* 25(2), 231-256. https://doi.org/10.1108/CCSM-03-2017-0033.

Mohd-Rahim, F.A., Mohd-Yusoff, N.S., Chen, W., Zainon, N., Yusoff, S., & Deraman, R. (2016). The challenge of labour shortage for sustainable construction. Planning Malaysia: *Journal of the Malaysian Institute of Planners,* 5, 77 – 88.

Naoum, S.G., Alyousif, A.T., & Atkinson, A. R. (2015). Impact of national culture on the management practices of construction projects in the United Arab Emirates. *Journal of Management in Engineering*, 31(4), https://doi.org/10.1061/(ASCE)ME.1943-5479.0000265.

Nduka, D.O., & Ogunsanmi, O.E. (2015). Stakeholders perception of factors determining the adoptability of green building practices in construction projects in Nigeria. *Journal of Environment and Earth Science,* 5(2), 188-196.

Ochieng, E.G., Wynn, T.S., Zuofa, T., Ruan, X., Price, A.D.F., & Okafor C. (2014). Integration of sustainability principles into construction project delivery. *Architectural Engineering Technology,* 3(1), 1–5. https://doi.org/10.4172/2168-9717.1000116.

Ojo, E., Mbowa, C., & Akinlabi, E.T. (2014). Barriers in implementing green supply chain management in construction industry. *Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management,* January 7 – 9, 2014, Bali, Indonesia, 1974-1981.

Ongwatana, P., & Chordia, G. (2008). *How does culture influence communication in multicultural teams in China and India.* Master Thesis, Masters in Strategic Project Management (European), Umeå School of Business.

Opoku, A. (2015). The role of culture in a sustainable built environment. In: A. Chiarini (eds.) *Sustainable Operations Management. Measuring Operations Performance,* Springer, Cham. https://doi.org/10.1007/978-3-319-14002-5_3.

Panayides, P. (2013). Coefficient Alpha: Interpret with caution.

Europe's Journal of Psychology, 9(4), 687-696. https://doi.org/10.5964ejop.vi4.653.

Parboteeah, K.P., Addae, H.M., & Cullen, J.B. (2012). Propensity to support sustainability initiatives: A cross-national model. *Journal of business ethics,* 105(3), 403-413. https://doi.org/10.1007/s10551-011-0979-6.

Park, H., Russell, C., & Lee, J. (2007). National culture and environmental sustainability: A cross-national analysis. *Journal of Economics and Finance,* 31(1), 104-121. https://doi.org/10.1007/BF02751516.

Pham, H., Kim, S.Y., & Luu, T.V. (2020). Managerial perceptions on barriers to sustainable construction in developing countries: Vietnam case. Environment, *Development and Sustainability,* 22(4), 2979-3003. https://doi.org/10.1007/s10668-019-00331-6.

Phua, F.T.T. (2012). *The salience of national culture in influencing individuals' HRM preferences and construction firms' HRM practices.* CIB-DC25753, 1119-1128. Retrieved from http://www.irbnet.de/daten/iconda/CIB_DC25753.pdf. 7 April 2019.

Pitt, M., Tucker, M., Riley, M., & Longden, J. (2009). Towards sustainable construction: promotion and best practices. *Construction Innovation*, 9(2), 201-224. https://doi.org/10.1108/14714170910950830.

Ringov, D., & Zollo, M. (2007). The impact of national culture on corporate social performance. Corporate Governance: The *International Journal of Business in Society*, 7(4), 476–485. https://doi.org/10.1108/14720700710820551.

Rinuastuti, H., Hadiwidjojo, D., Rohman, F., & Khusniyah, N. (2014). Measuring Hofstede's five cultural dimensions at individual level and its application to researchers in tourists' behaviours. *International Business Research,* 7(12), 143-152. http://dx.doi.org/10.5539/ibr.v7n12p143.

Rodriguez-Melo, A., & Mansouri, S.A. (2011). Stakeholder engagement: Defining strategic advantage for sustainable construction. *Business Strategy and the Environment,* 20, 539-552.

Sarhan, J.G.I., Xia, B., Fawzia, S., Karim, A., & Olanipekun, A.O. (2018). Barriers to implementing lean construction practices in the Kingdom of Saudi Arabia (KSA) construction industry. *Construction Innovation*, 18(2), 246-272. https://doi.org/10.1108/CI-04-2017-0033.

Schweiger, S., Stouten, H., & Bleijenbergh, I.L. (2018). A system dynamics model of resistance to organisational change: The role of participatory strategies. *System Research and Behavioural Science*, 35, 658-674. https://doi.org/10.1002/sres.2509.

Smith, B. (2010). If culture is software of the mind, then ours needs an upgrade: Lamentations on our illiteracy of African business and culture. *Journal of Business and Economics Research,* 8(3), 83-92.

Taber, K.S. (2018). The use of Cronbach's Alpha when developing and reporting research instrument in science education. *Research in Science Education,* 48, 1273-1296. https://doi.org/10.1007/s11165-016-9602-2.

Taras, V., Steel, P., & Kirkman, B. (2012). Improving national cultural indices using a longitudinal metaanalysis of Hofstede's dimensions. *Journal of World Business,* 47, 329-341. https://doi.org/10.1016/j.jwb.2011.05.001.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education, Editorial,* 2, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd.

Thomson, C.S., & El-Haram, M. (2011). Exploring the potential of sustainability action plans within construction projects. In: C. Egbu & E.C.W. Lou (Eds.) *Proceedings of the 27th Annual ARCOM Conference,* 5-7 September 2011, Bristol, UK, Association of Researchers in Construction Management, 1085-1094.

Tokbolat, S., Karaca, F., Durdyev, S., & Calay, R.K. (2020). Construction professionals' perspectives on drivers and barriers of sustainable construction. Environment, *Development and Sustainability,* 22(5), 4361-4378. https://doi.org/10.1007/s10668-019-00388-3.

Tsoy, D., & Yongqiang, G. (2016). A cross-national study of the relationships between cultural determinants, sustainable governance and sustainable development. *International Journal of Management Science and Business Administration,* 2(4), 28-43. http://dx.doi.org/10.18775/ijmsba.1849-5664-5419.2014.24.1003.

Umar, U.A., & Khamidi, M.F. (2012). Determined the level of green building public awareness: Application and strategies. *Proceedings of the International Conference on Civil, Offshore and Environmental Engineering,* Kuala Lumpur Malaysia.

UNESCO. (2012a). *Culture: a driver and an enabler of sustainable development.* UN system task team on the post-2015 development agenda. Paris: The United Nations Scientific, Educational and Cultural Organisation (UNESCO). Retrieved from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/post2015/pdf/Think_Piece_Culture.pdf. 9 November 2019.

UNESCO. (2012b). *Culture and development.* Havana: UNESCO

UNESCO. (2015). UNESCO's work on culture and sustainable development evaluation of a policy theme. *Internal Oversight Service,* IOS/EVS/PI/145 REV.5. Retrieved from http://unesdoc.unesco.org/images/0023/002344/234443E.pdf. 9 November 2019.

Venaik, S., & Brewer, P. (2016). National culture dimensions: The perpetuation of cultural ignorance. *Management Learning*, 47(5), 563–589. https://doi.org/10.1177/1350507616629356.

Wallbaum, H., Silva, L., du Plessis, C., Cole, R.J., Hoballah, A., & Krank, S. (2010). *Motivating stakeholders to deliver change.* Proceedings of ReIDVenting Construction, Mexico City, Mexico, 141–157.

WCED. (1987). *Our common future.* Oxford: Oxford University Press. Retrieved from http://www.un-documents.net/our-common-future.pdf. 4 November 2019.

Yin, B.C.L., Laing, R., Leon, M., & Mabon, L. (2018). An evaluation of sustainable construction perceptions and practices in Singapore. *Sustainable Cities and Society,* 39, 613-620. https://doi.org/10.1016/j.scs.2018.03.024.

Yip, R.C.P. (2009). *The cultural shift of the construction industry of Hong Kong under the influence of sustainable development.* Ph.D. Dissertation, Department of Civil and Structural Engineering, The

Hong Kong Pao Yue-Kong Library. Retrieved from http://www.lib.polyu.edu.ht. 9 November 2019.

Yoo, B., Donthu, N., & Lenartowicz, T. (2011). Measuring Hofstede's five dimensions of cultural values at the individual level: Development and validation of CVSCALE. *Journal of International Consumer Marketing,* 23(3-4), 193-210, https://doi.org/10.1080/08961530.2011.578059.