THE MANIFESTATIONS OF VULNERABILITY IN FACILITIES MANAGEMENT: TOWARDS DISASTER RISK REDUCTION IN MANAGING THE NIGERIAN BUILT ENVIRONMENT

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Abstract
*Facilities Management (FM) is a practice that seeks to optimally harness the interaction of resources (which are people, place, processes and technology) with a view to creating a built environment that is enabling yet, conducive. Upon all efforts towards effective FM practice, reported disasters to the built environment are characterised by leaving some effect to the resources managed within the confines of FM practice. Although such effect on the resources managed is most often than not consequential, the magnitude of the consequence is dependent on the vulnerability present in the FM system practiced. Based on the evolved approaches to managing disasters, optimizing the vulnerability to 'would-be' affected facilities in the event of disaster could be by adopting The Sendai Framework for Disaster Risk Reduction (DRR).Core among the mandate of this frameworkis the full understanding of vulnerability(alongside hazard and capacity) in all its ramifications. Although researches specifically in the Nigerian built environment have attempted to assess vulnerability, not much is available that identified the manifestation of vulnerability relative to the core themes ofFM (which are a place, people, processes and technology).*Hence, this study seeks to contextualise the manifestations of vulnerability in managing the built environment with a view to enhance FM practice of the built environment.*This research is exploratory in nature whereby secondary data was obtained using a systematic review technique. Results and findings are also reported qualitatively whereby, the identified primary manifestations of vulnerability are grouped relative to the secondary manifestations which are: human related (people); management related (process); and technology related vulnerabilities. It is worthy to mention that these secondary manifestations are considered to being FM themes (often cited in conceptualising the definition of FM). The implication of this research is not only easing the identification of the manifestation of vulnerability in FM practice in Nigeria, but clustering thematic related manifestations for actions geared towards reducing vulnerability thus improving DRR. This could be beneficial to property owners, Facility Managers and other stakeholders in the Nigerian built environment.*

Keywords: Disaster Risk Reduction; Facilities Management; Manifestation; Nigerian built environment; Vulnerability

INTRODUCTION

Buildings, other facilities as well as the core business of an organisation all represent substantial investments to any organisation. Therefore, effective management of such investment is necessary in ensuring the success of the core business of any organisation. The discipline that that has evolved to ensure such effective management of resource is Facilities Management (FM). Barrett and Baldry (2003) define FM as an integrated approach to operating, maintaining, improving and adapting the buildings and infrastructure of an organisation in order to create an environment that strongly supports the primary objectives

of that organisation. Similarly, FM is a multi-disciplinary profession which integrates a place, people, processes and technology towards effectively managing the built environment (Dore, Ines, & Lo Pedro, 2014; Aziz, Nawawi, & Nor Rima, 2016a; Aziz, Nawawi, & Nor Rima, 2016b). Whether FM is taken to be an approach or a profession, Atkin and Brooks (2009) are of the opinion that the overall purpose of FM is to support an organisation in the successful pursuit of its business objectives.

Achieving the pursuit of any business objective is most often than not hampered by some form of vulnerability in the FM practice of an organisation. For instance, Akasah, Abdul, & Zuraidi (2011), and also Webber (2013) all identified 'limited funds or financial resources' as vulnerability to managing built facilities. Similarly, Harun (2011), Ashraf Abdul Rahman *et al.* (2014), Geoff *et al.* (2015), David *et al.* (2016) and Wamsler & Brink (2016) all acknowledge 'improper management or governance' to being a vulnerability in managing built assets. Furthermore, Abungu (2013), Chmutina & Bosher (2015), and Wamsler & Brink (2016) all opined that 'legislation sufficiency and enforcement' pass for vulnerability to managing built facilities. These different identifications of vulnerability clearly indicate its variability in manifestation towards the effective management of facilities/assets of the built environment.

Vulnerability is a term that is used in different contexts relative to its field of application. There exist some authors that define vulnerability on a broad context. For instance, Venton (2008) qualify vulnerability to being the susceptibility to damage. Similarly, Geoff *et al.* (2015) conceives vulnerability as the propensity or predisposition to be adversely affected. Equally, there are other authors that present the definition of vulnerability specific to a field or an area. For example, while Vatsa (2004) posits that vulnerability in economics denotes the decline in income or consumption, Jigyasu(2004) is of the opinion that vulnerability in works on Disaster Risk Reduction (DRR) to the built environment is linked to the variability of both social and economic indices most often than not represented by some form of property losses. Specific to the definition of vulnerability relative to DRR, it (vulnerability) could be deemed to depend on an index whose variability is qualified by some losses.

The UNISDR(2015b) otherwise termed the Sendai Framework for Disaster Risk Reduction is a global framework whose goal is to prevent new and reduce existing disaster risk to the built environment. Core among its mandate is the full understanding of vulnerability in all its ramifications towards effective DRR. However, gaining full understanding of vulnerability with the aim of DRR requires its (vulnerability) assessment. Nirupama(2012) and also ADPC (2006) stress on the criticality/significance of vulnerability assessment towards DRR. Although researches specifically in the Nigerian built environment have attempted to assess vulnerability (Ibem, 2011;Bilau, Witt, & Lill, 2015;Daramola, Oni, Ogundele, & Adesanya, 2016;Alabi et al., 2017), not much is available that identified its (vulnerability) manifestation relative to the indices that relate to the core themes of FM (which are a place, people, processes and technology).

The focus of earlier definitions of vulnerability was predominantly on the hazard alone causing vulnerability. The

paradigm shift in the definition of the term focused on both the hazard and also the processes that generates vulnerability which encompass a combination of factors which among others include physical, social, economic and environmental factors(Reddy, 2010). Such broader consideration of factors allowed for a better understanding of the term notable in the definition of vulnerability specific to DRR by Jigyasu (2004)which specifically relates to the FM practice in the built environment. Although vulnerability is reported to manifest in different forms in the built environment, not much exist in contextualising the manifestations relative to FM practice. Hence, this study seeks to identify the manifestations of vulnerability towards DRR of the built environment with a view to improve the understanding of the manifestations relative to the themes of FM. Such attempt while being an approach that is in line with the core mandate of the Sendai Framework (which is DRR) could also foster improved understanding of vulnerability thereby enhancing FM.

Facilities Management and the Built Environment

Owning to the complex nature of the built environment, there has been continuous evolution in approaches to its management. Although there is hardly a standardised/universal approach to managing the built environment, almost every approach however, strives for the optimal use of disposable resources. Relative to such, Facilities Management (FM) emerged as a practice whose goal is the sustainable management of the built environment and all that it encompasses. Although there exists several definitions of FM, its conceptualisation by global players of FM such as The International Facilities Management Association (IFMA) and also the European Facility Management Network (EuroFM) is that FM is a discipline that seeks to integrate people, process, place and technology. Owning to the frequency and recurrence of this definition of FM (also adopted by Aziz, Nawawi, & Nor Rima, 2016a; Dorc, Ines, & Lo Pedro, 2014; Aziz, Nawawi, & Nor Rima, 2016b), the people, process, place and technology to be integrated could be referred to as themes in its (FM) definition. The ultimate goal of such integration is ensuring optimal functionality of the built environment with a view to achieving the primary activity/core function of any workable space being managed. This is irrespective of the complexity and variability of factors of any built environment.

The practice of FM in Nigeria is not as developed as its present state in Europe or United States (US). Although available researches in FM in Nigeria are an indication of the interest spurred in the discipline (works such as Timothy & Bioye, 2012;Yewande, Modupe, & Hikmot, 2012;Mansir & Ade, 2014;Timothy & Bioye, 2015 among others), more efforts need to be injected to the conceptualisation of FM relative to the dynamics particular to the Nigerian built environment.

Vulnerability and its Manifestations in Managing the Built Environment

The universality of the term vulnerability is that everyone and everything is vulnerable. Such universality holds irrespective of the area vulnerability is studied whether in finance, manufacturing or any other area of study. Vatsa (2004) argues that defining the term vulnerability requires an understanding of its central concept which is that: vulnerability is a relative measure because it is spatially and temporally variable meaning that it is

dispersed over space and changes over time. Based upon such relativity, several authors in the field of Disaster Risk Reduction (DRR) to the built environment have attempted to define vulnerability. For instance, Venton (2008) qualify vulnerability to being the susceptibility to damage in the case of a destabilising phenomenon (which is a hazard). Similarly, Geoff *et al.* (2015) conceive vulnerability as the propensity or predisposition to be adversely affected whereby such predisposition constitutes an internal characteristic of the affected element (which could include, people, groups, societies, property among others).Also, Vatsa (2004) is of the opinion that vulnerability relates to the consequences of a perturbation. More universally, UNISDR (2015a) reports that vulnerability is the condition (determined by physical, social, economic and environmental factors) that increases susceptibility to the impact of hazards. These definitions of vulnerability reveal its being an inherent characteristic and/or a 'state of being' of an exposed element that could be prone to adverse effects. Relative to these conceptualisations and with particular emphasis to researches with semblances on DRR in Nigeria, several authors have identified different manifestations of vulnerability in the course of managing the built environment. Based on the factors that have contributed to adverse effects to managing the built environment relative to DRR, Table 1 shows some manifestations of vulnerability in the Nigerian built environment.

Table 1: Manifestation of Vulnerability in the Nigerian Built Environment

S/No	Manifestation of vulnerability	Authors
1	*Physical and economic development activities that are* out of context with established procedures and standards	*(Ibem, 2011)*
2	Inadequate infrastructure	(Ibem, 2011;Daramola et al., 2016)
3	Disaster education	(Ibem, 2011)
4	Political issues	(Ibem, 2011;Alabi et al., 2017)
5	Unavailability of information, services and resources	(Daramola et al., 2016)
6	Lack of risk plan/profile	(Niekerk, 2015)
7	Demographic factors (such as income, gender, race and ethnicity, age, settlement status (rural/urban)/ location, occupation and education), high population density	(Soneye, 2014; Ademola, Adebukola, Adeola, Cajetan, & Christiana, 2016)
8	Legislation (sufficiency and enforcement)	(Soneye, 2014;Niekerk, 2015)
9	Lack of funds	(Alabi et al., 2017)
10	Lack of technology resource/ adoption of new technology	(Soneye, 2014;Bilau et al., 2015;Daramola et al., 2016;Aziz et al., 2016*b*;Alabi et al., 2017)

Although these manifestations are in exhaustive, the authors all attest to the rather negative effect these identified factors have in managing the built environment. This qualifies their being vulnerability. Thus, these manifestations have the potential to increase the impact of any disaster on effective FM of assets/facilities in the built environment.

Disaster Risk Reduction as a Strategy Towards Effective Facilities Management of the Built Environment

Facilities that are managed in the built environment are not immune to disasters. Reducing anticipated disasters as such, calls for strategies that will enable effective and efficient FM.

Notable among other strategies is the concept of Disaster Risk Reduction (DRR). According to UNISDR (2009), DRR is the concept and practice of reducing disaster risks through systematic efforts which include analysing and managing the causal factors of disasters through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. More currently, DRR is defined by UNISDR (2015a) as the policy objective aimed at preventing new and reducing existing disaster risk.

The critical goal of DRR is the reduction of vulnerability whereby UNISDR (2015b) emphasise that the priority for action involves the full understanding of vulnerability in all its ramifications as a factor of DRR. This is attested by researches of Stanganelli (2008), Matsuoka, Takeuchi, & Shaw (2013)Scolobig, Prior, Schröter, Jörin, & Patt (2015) and Phillips (2015). Impliedly as such, effective FM aimed at DRR needs to explore the manifestations of vulnerability with a view towards better understanding of its effect to FM in the built environment. Achieving such could be through considering the importance and significance of strategies to reducing disaster risk. Relative to such, authors in the FM domain have lamented on the importance/significance of strategies to risk reduction (as contained in works of Then, Tan, Santovito, & Jensen, 2014;Aziz et al., 2016b;Ebinger & Madritsch, 2012). Such is a commendable step not only towards DRR but also effective FM of the built environment.

METHODOLOGY

This research is exploratory in nature. A qualitative approach to data collection was employed using a systematic review technique. This approach is in line with recommendations by Fabrigar, Wegener, MacCallum, & Strahan (1999) on the use of a systematic review technique for data collection in an exploratory research. Similarly, Roper (2017) is of the opinion that, the use of a systematic review promotes research findings in FM related researches. While the literature used were those from sources (journals, books, conference proceedings among others) relating to DRR in the built environment, those researches specifically relating to the manifestation of vulnerability in the Nigerian built environment were given prominence. Furthermore, results are reported qualitatively. The option of this procedure is consistent with the recommendation of its use by Creswell (2014) for qualitative research. Likewise, Knih (2012) recommend the use of qualitative reporting of results to familiarise with the data, review themes and define/name themes or data patterns. Such recommendation is in line with the quest to achieving the aim of this research.

RESULTS

Based on the manifestations of vulnerability in the Nigerian built environment (presented in Table 1) and also based on the themes of FM (all reported against the backdrop), this section classifies the manifestations of vulnerability relative to each FM theme. The results are presented in Table 2.

Table 2: Classification of vulnerability relative to Facilities Management themes

S/No	Vulnerability manifestation (Primary manifestation)	Facilities Management Theme (Secondary manifestation)
1	Demographic factors (such as income, gender, race and ethnicity, age, settlement status, occupation and education, high population density)	People
2	Disaster education	
1	Legislation (sufficiency and enforcement)	Process
2	Lack of risk plan/profile	
3	Inadequate infrastructure	
4	Funds (inadequate or poorly managed)	
5	Political issues	
6	*Physical and economic development activities that are out of* context with established procedures and standards	
1	Lack of Technology resource/ adoption of new technology	Technology
2	Unavailability of information and services	

Based on the FM themes (considered to being secondary manifestations of vulnerability), the demographic factors (income, gender, race and ethnicity, age, settlement status, occupation and education, high population density) and also disaster education are borne by people which by extension could be deemed to being human related. Furthermore, the provision of sufficient legislation and its enforcement could be seen as process related. Other process related manifestations are: lack of a risk plan/profile; inadequate infrastructure; inadequate and poorly managed funds; political issues; and also physical and economic development activities that are out of context with established standards. Furthermore, lack of technology resource and also unavailability of information and services could be seen to being technology related factors. Although these manifestations are contextual to specific built environment managed, they all share similar characteristic of bearing rather negative effects towards effective FM of the built environment.

CONCLUSION AND RECOMMENDATIONS

This research identifies the manifestations of vulnerability relative to FM of the built environment. Furthermore, the identified vulnerability were categorised based on core themes of FM which are: people, process; and technology. The fourth theme of FM (place) is considered to be a constant since the whole process of FM evolves around space in the built environment. Based on these categorised vulnerabilities, this study has attempted to classify the manifestation of vulnerability in FM both on a primary and secondary level.

However, it is worthy to mention that these identified manifestations are in exhaustive. Gaining deeper insights on the spatial and temporal nature of each manifest vulnerability identified in this study requires some vulnerability analysis and subsequent evaluation using multivariate techniques of analysis. Furthermore, vulnerability relative to the FM theme 'place' could be explored or perhaps, the effect of the identified manifestations relative to the themes people, process and technology could be used in studying the vulnerability each theme has on the FM theme 'place'. Presumably, these are areas for future research towards effective FM of the Nigerian built environment.

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