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Article

Exploring Factors Influencing Renewable Energy Diffusion in Commercial Buildings in Nigeria: A Grounded Theory Approach

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Abstract: The adoption and integration of renewable energy technologies (RETs) into buildings is key to making the necessary transition to low-carbon and resilient built environments. However, such technologies have struggled to gain a firm foothold in countries within the sub-Saharan African (SSA) region. This is particularly the case in Nigeria, which suffers from severe energy poverty, despite its significant RE and conventional energy potential. In Nigeria, a significant proportion of the energy demand for offices is provided by self-powered off-grid fossil-fuel generators. The country is also one of the primary settings for increased construction activity. This, combined with its susceptibility to the effects of climate change, presents significant concerns relating to the resilience of its built environment. However, there has not yet been a comprehensive empirical study addressing this, as previous studies have been limited in their insight and perspectives. This study adopted a grounded theory method (GTM) aligned with Charmaz's approach, to gain in-depth participant-driven insights into factors influencing sustainable energy use in commercial buildings, focusing on solar photovoltaics (PVs). This led to the development of a theory of the sustainability transition process of construction professionals (CPs). It provides relevant, reliable, and relatable points of reference that would be beneficial to policymakers in developing plans for actionable interventions for PV and broader sustainable measures toward green energy transition. Furthermore, it highlights the value of employing GTMs in construction management research beyond the developing context. This paper contributes theoretically, empirically, and methodologically to facilitate a better understanding of the situations (context) grounded in empirical data.

Keywords: sustainable energy transitioning; renewable energy technologies; photovoltaics; Nigeria; office buildings; low-carbon built environment; grounded theory



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1. Introduction

Buildings accommodate human activity, with most, if not all humans spending their time in and/or around buildings [1]; as such [2], describes them as the “most valuable assets of mankind” (p. 173), given that they have a sphere of influence that extends beyond providing safe and comfortable accommodation, defining human interaction, productivity, and wellbeing, which are determining factors of quality of life [3]. However, the activities of the construction industry are well documented as negatively impacting human development and environmental stability [4]. The construction industry is the 3rd-largest consumer of fossil fuels [5], and the largest consumer of raw materials [6], accounting for circa 40% of energy consumption and energy-related CO₂ emissions [7] and circa 75% of global environmental degradation [8]. Furthermore, with the activities of the construction industry and, therefore, their impact expected to significantly increase due to population growth [9,10], there is a persistent drive to curb its activities, particularly given the global climate crisis [11].

In its 2021 Global Status Report for Buildings and Construction, the [7] identifies global decarbonisation of buildings and the construction sector by 2050 as fundamental to

achieving the goals of the Paris Agreement, and the integration of low-carbon technologies such as PVs is seen as integral to this (see also [12,13]). While PVs and other RETs, and their use in buildings, are not new [14], the existential threat of climate change has elevated them as key mitigation measures in both scholarly and public discourse, given their availability as abundant, clean, replenishable, and untapped resources [11]. Based on the numerous reports by the IPCC, renewable energies will aid in improving energy access and reducing energy use and waste generation, as well as enhancing market options [15]. Consequently, energy consumption, energy generation, and resource management in relation to how buildings are designed, constructed, operated, and maintained over their lifetime are very much in focus [16–18]. While RET integration is making headway in the Global North and has seen the complete transition to sustainable energy use in places such as the island of Ta'u in American Samoa, which is powered entirely by PVs [19]; such technologies have struggled to gain a firm foothold in countries within the African continent—particularly in the sub-Saharan Africa (SSA) region [20]—despite their potential and availability [21].

It is, however, worth noting that the island of Ta'u is very different from other countries, even within the context of the Global North, given its size, location, population, economy, and level of development, among other factors. However, what it evidences is the very real possibility of what the future can look like with REs. Additionally, countries such as Mozambique in the SSA region and Morocco in the North Africa region demonstrate this. The former is described as the world's greenest country, driven by hydro energy [22], while the latter is currently home to the world's largest solar power plant [23]. This speaks not only to the African region's RE potential to meet its own energy needs, but more broadly to its possible role in championing access to clean, reliable, and affordable energy for all. Nevertheless, most countries in the SSA region, including Mozambique, face energy access challenges [11,24], and given that the activities of the construction industry are expected to significantly increase—especially in developing countries, such as those on the African continent—due to their rapid urbanisation and population growth [7,10], this, combined with their high susceptibility to the effects of climate change [11], presents a significant concern not only to their environmental resilience, but also to the goal of achieving global decarbonisation. Moreover, it will contribute to fluctuations in energy costs and uncertainty, which they already experience [23].

Consequently, there is a need to better understand situations on the ground, in a bid to mitigate the further energy consumption and process-related CO₂ emissions of the continent's building stock—which are currently at 60% and 32%, respectively [7]—as a priority. This study focuses on Nigeria, which equally exemplifies the challenges experienced and the opportunities present in countries within the SSA region [21], from its energy poverty to its abundant renewable resources and energy potential [11,25,26]. It explores buildings within the commercial sector (i.e., office buildings), as evidence suggests that, globally, they are one of the top consumers of energy, and generate significant volumes of waste [13]. Moreover, being in a hot region, there is increased demand for cooling, which the [7] identifies as the fastest-growing energy demand. Furthermore, given the links between commercial buildings and a country's economic wellbeing and status as a platform for globalisation (global business) [27], it is reasonable to assume that there will be increased energy demand and consumption as the country industrialises, making it a prime candidate for RET integration. Interestingly, the projection for a low-carbon scenario in Nigeria, as outlined in the World Bank's 2013 report on Low-Carbon Development: Opportunities for Nigeria [20], identifies off-grid technologies as more cost-effective than fossil-fuel generators (generators), which are currently how energy needs are met for generation and supply [28,29], accounting for over 90% of the energy supply to organisations [30].

Office buildings present a unique case given their generator dependence [31], and although their consumption has historically trailed behind that of residential buildings, Refs. [30,32] note that it is certain to increase. For example, Ref. [33] identified the use of 6000 diesel generators by a leading Nigerian telecommunications company to power their office buildings. It is therefore noteworthy that in 2015, the primary utility

provider in Nigeria, PHCN, identified the commercial sector as one of the three primary energy consumers due to the growth in the building sector [34]. Consequently, it has become important to examine office buildings within the context of design, energy use, sustainability, and climate change in the Nigerian built environment if the country's energy consumption is to be reduced, given their significant environmental, social, and economic impact. Therefore, this study aims to explore the factors influencing the transition to sustainable energy use in commercial buildings, with a focus on PVs.

The article is organised into six sections: The first section presents a brief introduction to the impact of the activities of the construction sector, and approaches to its decarbonisation, using RETs in particular. It includes an overview of the RE situation from the perspective of the Global North and South, with a focus on the SSA context, and commercial buildings in Nigeria in particular. The subsequent section presents a literature review covering the context of the study (Nigeria) and discusses its energy situation within the context of regional and global perspectives and, more specifically, the state of RE adoption in buildings. This is followed by a discussion in Section 3 on the use of a qualitative strategy employing grounded theory, presenting an overview of the data collection and analysis process, with discussions on sampling, examples of the interview dataset, graphical and textual examples of the coding process, and the quality protocol. In Section 4, the results of the data analysis are presented and discussed. Section 5 brings the study together in an all-embracing discussion within the context of the extant literature. It presents the constructed theory and reflects on how it is situated within the extant literature and theory in various disciplines. Finally, the article is concluded in Section 6, with specific contributions to knowledge and recommendations to support policy, practice, and further research.

2. Literature Review

The use of literature in grounded theory is an area of contention; however, under the constructivist approach (CGTM), literature is encouraged throughout the process [35,36]. In this study, the literature was consulted before and after the field study, corresponding with [37] noncommittal and integrative phases. The former sought to frame the problem and contextualise the research to aid in developing theoretical sensitivity to what exists, without impacting openness and flexibility [35]; this is the issue of contention among proponents of grounded theory [36]. The latter sought to examine the theory within the context of the existing body of knowledge.

2.1. Nigerian Context

Nigeria is Africa's most populous country and largest economy, as well as home to one of the world's largest energy deficits, not to mention being endowed with an abundant and diverse catalogue of RE resources and energy potential [11,26,38]. Given the significance of RETs in the fight to combat climate change and Nigeria's energy potential—particularly relating to solar power [39]—the country is well-positioned to play a key role in championing sustainability. Solar energy is seen as having the potential to significantly contribute to Nigeria's energy portfolio nationally and, more specifically, in buildings, given its widespread availability and application [40]. Additionally, solar energy has been identified as being more economical than generators [20]. Despite this, Nigeria is highly dependent on independent, decentralised conventional energy sources from fossil-fuel generators (generators) [11,28,29], as ease of access to reliable and affordable electricity has proven to be somewhat unattainable [41,42]. The aforementioned studies identified regular power outages from the national grid as the norm, with varied implications for human wellbeing, productivity, and property, not to mention the associated costs. Consequently, Nigeria's use of generators to bridge the energy access gap makes it Africa's largest generator importer [11], for which the IEA, in its 2017 Energy Access Outlook Report [43], estimated a yearly fuel cost of circa USD 22 billion associated with private backup diesel generation for Nigerian businesses and households (see also [44]). The country's energy mix is primarily crude oil and gas, hydropower, and biomass (fuelwood), with hydropower and fossil fuels both contributing to its on-grid electricity system [39]. Other RETs,

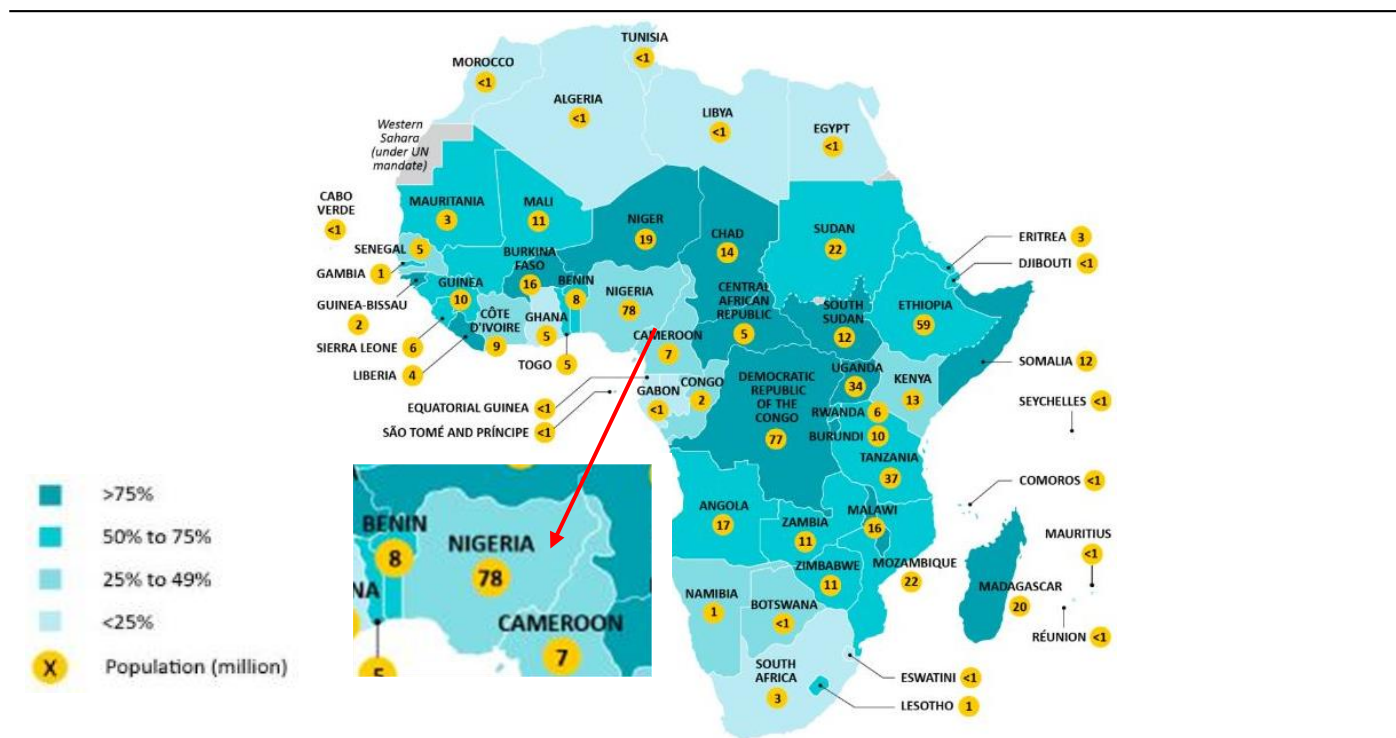
such as solar energy, are underutilised and not prioritised [45]. Nigeria’s oil-producing capacity and exportation gains have been identified by scholars as a reason for this, as well as negatively affecting its power sector [46–48]. While the country has undergone reforms to improve and expand its energy access [38,49], the expected results are yet to be achieved. Tables 1 and 2, along with Figure 1, provide an overview of the country’s power status.

Table 1. Comparative energy consumption of selected countries.

Country	Population (2018 Estimate, in Millions)	Electricity Consumption 1971 (kWh/Capita)	Electricity Consumption 2018 (kWh/Capita)	Population without Access to Electricity 2017 (Estimate, in Millions)	Total Power Capacity 2016 (Million kWh) (Installed Generating Capacity)
Pakistan	207.86	94	444	52	26.9
Nigeria	203.50	28	126	77	10.52
Bangladesh	159.45	11	336	60.3 (2013)	11.9
Egypt	99.41	203	1606	0	45.12
United Kingdom	65.11	4255	4749	0	97.06
South Africa	55.38	2246	3740	9	50.02
Ghana	28.10	313	333	5	38.01

Source: IEA [11].

Table 2. Energy deficit in African countries and comparative power outages of regions in the world.



Region	Power Outage Occurrence	Power Outage (Average Duration, h) 2015	Firms Experiencing Power Outages (%)	Firms Owning/ Sharing Generators (%)
Sub-Saharan Africa	253	741	78.7	53.2
South Asia	99	217	66.2	45.4
Middle East and North Africa	70	160	53.4	38.2
Latin America and Caribbean	15	27	64.1	27.1
East Asia and Pacific	12	26	45.9	32.5
Europe and Central Asia	7	12	37.9	17.2
OECD high-income	1	1	-	-

Source: IEA [11].

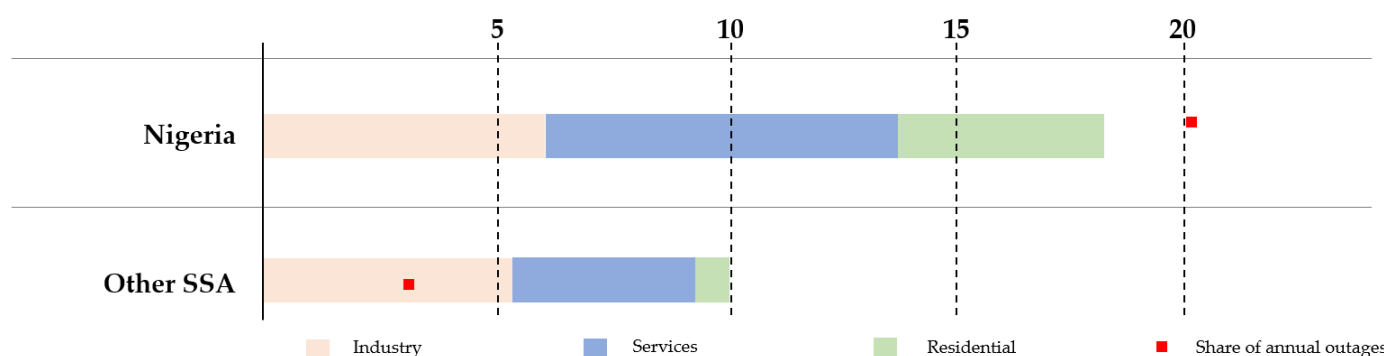


Figure 1. Source: Comparison of electricity demand by generators between Nigeria and the SSA region (Source: IEA [11]).

As can be seen from Tables 1 and 2, along with Figure 1, Nigeria lags behind its peers both regionally and globally, which speaks to the severity of the situation—especially as it could be reasonably argued that the country needs more electricity than most, given its current and projected rapid population growth.

2.2. RETs

Research into RET and its potential for building adoption in the Nigerian built environment is not new; however, the available literature is primarily limited in focus to the adoption of PV in the residential sector, or RETs more broadly from a national perspective [31,39,50]. From a residential sector perspective, studies have mostly focused on small-scale, decentralised, standalone power generation for rural use [41,51,52]. However, its application in private residences in urban areas is growing (see [53,54]). Meanwhile, the literature from the national perspective focuses on its use in large, centralised grid power generation for wider energy diversification, such as the use of solar plants, scaling up on existing hydropower utilisation, and/or generating bioenergy from forestry resources and waste [55–58]. However, to the best of our knowledge, there is no specific in-depth contextual empirical study relating to sustainable energy transitioning within the commercial context that explores the nexus between building design, fossil-fuel generator dependence, and climate change.

Researchers argue that the focus on residential adoption is due to its historically higher share of energy consumption in Nigeria [30] and globally [7], along with the perceived benefit of decentralised power to combat energy access challenges and economic poverty, in terms of both infrastructural works to connect to the national grid and costs to rural residents. Additionally, Ref. [18], among others (see [59]), opine that the lack of reliable country-specific data and/or in-depth evidenced research relating to commercial buildings has contributed to this. This was an issue that several Nigerian studies identified as emblematic in the country as relates to sustainability [60,61]. Interestingly, available studies relating to office buildings reveal a predisposition toward quantitative research strategies, which [62] note reflects the culture of construction management research. While they have their merits, it has been argued that they impose restrictions and limit insight for deeper understanding—particularly within the developing context [63,64]. This methodological monopoly is subject to ongoing discourse, identifying its narrowness and the need for pluralism in construction management research [65,66]. For instance, the studies by [67,68] highlight the underrepresentation of qualitative approaches in studies conducted in Nigeria and the SSA region, respectively.

Ref. [63] speaks of the need to conduct research specific to a context—particularly relating to developing countries—to ensure the development and implementation of strategies for sustainable development best suited to them (see also [67,69,70]). For instance, Ref. [67] opine that context-specific research would present the opportunity to contribute to theoretical development, by offering insight into the contextual peculiarities of the region in terms of geography, culture, people, resources, economy, policy, etc., thus ensuring the generation of relevant and accurate

data for informed knowledge as opposed to generalised issues/problems. This is particularly significant in the context of sustainability, given its multifaceted nature and diverse concepts; consequently, its pace, extent, and level of adoption would be influenced based on a range of factors beyond technology—particularly in the SSA context [64]. As such, it does not readily or easily align itself with a one-size-fits-all paradigm [71], as evidenced by [72] recent study exploring PV integration in historic buildings in two European countries (Italy and Switzerland). The study revealed differing adoption rates due to legislative and authorisation frameworks. As such, while countries may appear similar on the surface, this may be superficial, and a thorough investigation can reveal nuances and in-depth insights. This speaks to the need to restrict the adoption of blanket assumptions and/or impose a predefined framework on research related to SSA and/or the developing context, leading to limited insight, as has often been the case [73,74]. According to [74], there is a clear difference between the historical and contemporary realities of developing and developed countries, which makes it difficult to simply compare or adopt the transition approach and frameworks aligned with advanced nations (see also [70]). Furthermore, evident in the literature are comparative studies between countries in the same region and on different continents that attest to this and reinforce Du Plessis' (2007) call for context-specific inquiry (see [75–77]). The value of sustainability is immeasurable in the SSA context, so understanding its context with all its nuances, complexities, and contradictions is key to unlocking its potential, which will have global implications.

The study by Unuigbo et al. (2020) is the only empirical study identified that sought to investigate REs within the commercial sector. Although it did not generate a theory, it identified cultural-related factors as significant for informing the adoption of RE beyond economic and technical factors often identified in the literature. However, this study seeks a more holistic and comprehensive framework to support sustainable energy transitions.

3. Methodology

Grounded theory was chosen as best-suited to achieve this study's aims, due to its ability to obtain in-depth insights grounded in participants' experiences, which it facilitates through its naturalistic, flexible, rigorous, and systematic approach [78]. By adopting [79] constructivist approach (CGTM), this study sought to limit predefined (mechanical) applications associated with quantitative research approaches. CGTM aided in facilitating a participant-driven process to understand their interactions within their particular social setting, leading to the development of a theory that fits the data with strong descriptive and explanatory power [35,80]. This was particularly relevant to this study, given the subject matter, field of study/discipline, sector-specific focus, and context, as it sought to highlight the voice of CPs, identify nuances, and fill missing gaps to understand their decisions, the processes they engage in, and the conditions under which they occur, relating to sustainability within the context of design from a commercial perspective.

3.1. Sampling and Recruitment

Sampling commenced with an initial purposive strategy guided by theoretical sampling for the selection of participants best-suited to provide the necessary insight for final theory construction [35,78]. Ref. [78] speaks to the selection of the most knowledgeable population to aid in maximising and enhancing the collection of rich data as being the obvious and most practical solution at the outset. This refers to people who could provide detail as well as refine the findings, thereby contributing to the theory's development [81]. Accordingly, the target population was CPs (see Table 3) with insight and/or expertise on office buildings, and to ensure variation in sampling for a comprehensive view [81,82], the initial purposive sampling recruited CPs from diverse disciplines.

Table 3. Participants' characteristics.

Discipline	
Architect	16
Mechanical engineer	5
Electrical engineer	6
Structural engineer	3
Facilities manager	2
Project manager	2
Years in practice	
1–10	3
11–20	11
21–30	6
31–40	9
41–50	5
Qualification	
HND	1
Undergraduate	15
Postgraduate (Masters)	16
Doctorate	2

The participants were recruited from a personal network and based on recommendations/referrals of participants. 15 CPs with over 10 years' experience made up the initial sample and served as a baseline. Using a personal network allowed for easy access to the targeted sample [83]. Ref. [83] highlight the value of personal connections and/or commonalities with participants as aiding in gaining access and building rapport for a better understanding of realities, which was central to this study given the context under investigation. However, the selection process adopted criteria recommended by [79] to limit potential researcher bias and power imbalance, and to ensure rigour in the process. Accordingly, at a minimum, it was a requirement that all participants engaged in the study were registered with their relevant statutory and professional institutions, had no professional working relationship with the researcher(s), and were directly involved in commercial projects. This meant that not only did participants have the prerequisite qualifications and understanding to speak about the design process and associated matters that emerged, they also did not feel pressured to respond in a particular way.

The study site was in Nigeria, and participant interviews were conducted in their offices. Following the initial data collection and simultaneous analysis, theoretical sampling based on the findings guided further participant selection, bringing the sample up to a total of 34. This meant that the sampling became more focused, thereby ensuring that the theory was based on relevance, fit, and grounding in the data, as opposed to population representation [84]. The sample size met the requirements of qualitative studies, including grounded theory studies, based on the focus on theoretical saturation, quality, and robustness [84–86].

3.2. Data Collection

Semi-structured face-to-face interviews were the chosen form of data collection, as they allowed for a naturalistic approach and direct engagement with participants, as well as the opportunity to immediately follow-up on areas of relevance [87], as such, while they were fresh. An interview guide supported the interview process, which was designed to collect data regarding both general and specific contexts in which CPs operated in the Nigerian built environment in relation to their design process, sustainability, and energy access/provision behaviour. Questions about key themes and/or concepts—such as sustainability experiences and generator provision—were asked. However, the interview guide was flexible to address topics and/or matters raised by participants, meaning that the type and form of questions went through a development process to ensure the relevance of the topic and the focus of the interviews in line with the analytical process. Reflexivity

as a process—through memoing—was essential to this, as it aided the researcher(s) in separating the subjective from the objective. All interviews were conducted in English, with data collection conducted in two phases.

In the first phase of data collection, the interview questions were open-ended, broad, and presented unambiguously. This was intended to create a baseline, but also to facilitate ease in answering the questions to encourage participants to respond freely to subsequent questions. It was also important that there were no leading questions or questions that gave the impression that there was a required way to answer. Accordingly, words similar to, associated with, and/or connoting barriers and drivers were avoided. During the interviews, participants were asked questions such as “Can you tell me about the design process in Nigeria in general and your role in it?” and “What is your understanding of sustainability in the built environment?” Participants energy access/provision behaviour was explored in-depth, focusing on their experiences and processes to provide insight into their perceptions about sustainability and generator use. Furthermore, the questions took into consideration the diverse disciplines of the participants in the way they were presented, along with the terminology used. As the interview progressed, participants were asked about the energy provision pathways, with questions such as “Have you considered and/or made provision for an alternative energy source in a building, which source, and why?”, “Can you give an example of an alternative energy source you have used in buildings and what made you consider it?”, and “What are your views about generators and their use in buildings?” These questions sought to elicit information about their sustainability behaviour.

As the process evolved, in the second phase of data collection, the interview questions became more focused to facilitate deeper insight based on participants responses, so as to ensure that the topic was aligned with the analytical process. As such, we followed the leads provided for theoretical saturation towards theory construction. This was facilitated by theoretical sampling to direct further collection of detailed, explicit, relevant, and rich data informed by coding and memos, both of which are fundamental to grounded theory studies [35] as they underpin the analytic and reflective process. Ref. [22] (p. 199) highlights the value of theoretical sampling as “strategic, specific, and systematic”, as it focuses on a detailed exploration of new and developing themes to understand what they mean. At this stage, our questions were aimed at enriching and/or elevating categories such as “accepting and maintaining the status quo”, “not threatened”, and “being a luxury problem”, for the construction of a well-grounded theory. Participants were asked questions such as “Why do you think they [peers, public, clients] are not threatened and how do you think that can be addressed?” and “What do you mean by professionals have thrown in the towel?” The questions were presented in an open-ended way to allow for participants to express themselves and address the issues. For example, for the category “not threatened”, theoretical sampling directed the focus of questions to understand “what it meant and/or represented to participants”, “how it influenced their perceptions and in turn sustainability behaviour”, and “whether this was based on data/information or perception”. This category was later renamed “being sheltered—avoiding responsibility” following further in-depth exploration.

3.3. Data Analysis

Data analysis commenced with the transcription of all interviews (audio recordings), starting right after the first interview, and adopted a three-stage coding process as outlined by [35]. This consisted of initial coding (using a line-by-line process to explore and interpret data through descriptive codes), followed by focused coding (a more direct and conceptual process to sift and select codes by elevating the ones with revealing insight into theoretical categories to advance the direction of the study), and concluded with theoretical coding (an increasingly conceptual process consisting of refining and advancing the theoretical categories, exploring their relationships, and substantiating them in the literature). Coding was conducted manually, aided by Microsoft Word, Microsoft Excel, Mendeley (reference manager), and Mindomo (concept mapping tool) to manage (organise, record, and store)

the data (transcripts, memos, and field notes) systematically, as shown in Figure 2. The manual analysis allowed the researcher(s) to remain close to the process for enhanced theoretical sensitivity.

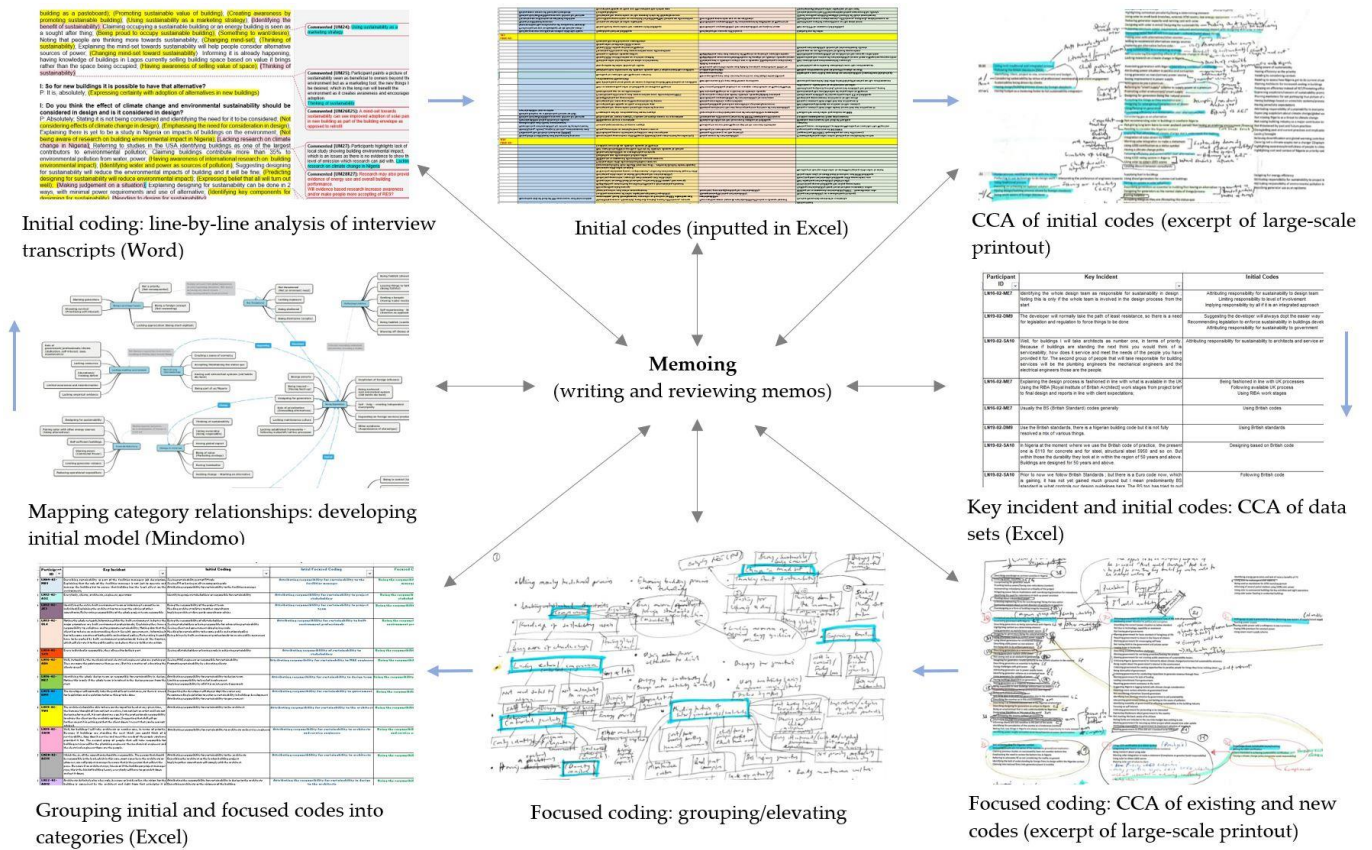


Figure 2. Graphical representation of the coding process.

From the outset of data analysis, concepts and processes associated with grounded theory—such as the constant comparison method (CCA), theoretical sensitivity, and memo writing—were employed to ensure that the codes and development of the categories right through to theory construction remained grounded in the data. For instance, CCA facilitated the review and organisation of codes and initial categories into concepts until theoretical saturation.

As outlined in Figure 2, each interview transcript was first reviewed as a separate document, and codes either constructed or based on the participants own words (in vivo) were input into an Excel document to manage the process, due to the significant number of codes generated. The document also provided a highly visual and comprehensive picture of the data, which facilitated ease in CCA to form the initial relationships between the codes, and for further comparison with new and larger datasets (other interview transcripts). This evolved further to a higher-level analysis through focused coding, supported by the review of existing memos and generation of new memos, whereby codes that were considered to be “telling”—i.e., having more analytical power (theoretical reach)—were elevated to initial categories, with their associated codes grouped under them. Audio recordings were also re-listened to for enhanced data sensitivity, and to ensure that the codes and analysis process were grounded in the data, being a key tenet of grounded theory [88]. Additionally, it aided the validation of code and category relationships to identify potential gaps and refocus the analysis if required. For example, in the case of category relationships, in vivo codes such as, “bringing your own power” and “relying on generators” reflected participants’ views on the energy access situation, and were grouped under separate categories of “behaviour” and “being part of us”. While the categories were

intended to be conceptual, with more abstraction as the analytic process developed, it was still important to ensure that they remained true to the data. As coding progressed, the initial categories were further compared with one another and the new codes from the second batch of datasets (second phase of data collection). The similarities observed in the codes being developed reaffirmed and validated the relevance of the focused codes (initial categories) from the first phase of data collection.

For example, codes such as “paying lip service to sustainability” and “not feeling the effects of climate change” were similar to those obtained from the first phase of data collection and related well with the initial category “not threatened”. This also confirmed the appropriateness of the first sampling, and provided more depth and understanding of the processes, actions, and/or interactions expressed by participants. Meanwhile, in vivo codes such as “living with generators for years” and “saviour” were breakthrough moments. For instance, in the case of “saviour”, the earlier data had contained codes such as “relying on generators”, “having epileptic mains power”, “using generators 24/7”, etc., although they had not been anchored in analysis relating to “saviour”. However, the relationship between the codes had been identified earlier, with the realisation that it reflected the Nigerian perspective, derived from how participants and others viewed the energy situation. However, the analysis focused on energy poverty purely as a contextual characteristic, rather than developing an explicit analysis of dependence as a psychological and/or cultural characteristic. Through CCA, codes reflecting similar experiences were generated, such as “growing up with generators”, “needing generators to survive”, “not having Nigeria without generators”, and others. The in vivo code “saviour” provided a deeper and more insightful analytical perspective on what had been coded in the interviews, by making explicit what the researcher had sensed but had not conceptualised. Tables 4 and 5 show different aspects of the coding process.

Table 4. Example coding process.

Excerpts from Transcripts	Initial Coding	Focused Coding	Category
“There is that general notion of as we use the local term ‘a cabal’ that operates the generating sector at least as regards generators that would always ensure the sale of generators is not affected”.	Believing that there is a generator cabal Ensuring generator continuation	Cabal/cartel	
“But sadly, the government policy just wants someone to sign, most times the work doesn’t get done, and even if it gets done it’s not thoroughly done. So, if your EIA is not done properly then it’s easier to just, I mean get it done somehow you know. Have a quick exchange . . . ”.	Expressing disappointment Lacking stringent policies and rules Being easier to bribe officials to get things done	Non-compliance Corruption	Exploiting and undermining systems
“He now wanted us as a government to take it over and build so many but, because of corruption, because if there is nothing that will go back to those that will approve this thing, they ignored it”.	Lacking government support due to corruption Not approving the project without a bribe	Corruption	
“People are born into some of these smells, and they are totally immune, they can’t even smell, they can’t tell the difference anymore”.	Being born into pollution/ polluted environments Being accustomed to pollution/ polluted environments Building immunity over time	Living with pollution	
“If in this estate now, there is no light and everywhere has a generator on and you walk around apart from the sound, the noise, the-you have been living with generators for years, so you don’t even know-unless you go to somewhere else that is quite . . . ”.	Living with a generator Being accustomed to generators	Living with generators	Co-existing

Table 4. Cont.

Excerpts from Transcripts	Initial Coding	Focused Coding	Category
“Generators from the point of view of the environment is a very big liability to Nigeria but without generators, I would say that there would virtually be no Nigeria”.	Being an environmental liability No country without generators	Being a threat Being a saviour	Being a threat and a saviour
“I think they [professionals] in Nigeria have just thrown in the towel. You know, I think they have accepted to a certain extent the dysfunction [. . .] so, it is a case of look we need to make the best of a bad situation. We need to just make this work the best we can and move on”.	Throwing in the towel Accepting dysfunction (the status quo) Making the best of a bad situation	Giving up/ surrendering	Accepting impotence and fatalism

Table 5. Comparison of a sample of datasets from the initial and main study.

Excerpts	Phase 1		Phase 2		Excerpts
	Initial Coding	Focused Coding	Initial Coding		
“We use the British standards, there is a Nigerian building code, but it is not fully resolved a mix of various things”.	Using British standards Unresolved Nigerian building code	Norm developing (copying foreign systems)	Adopting standards based on convenience Nigerian standards are foreign standards		“The standards that we use are the convenient standards that we’ve usually gotten from the US, UK, maybe China. I mean just what is convenient, they never go through and then I mean that is what is termed as a Nigerian standard”.
“Designing for generators is the basic reality. It’s in your face every day at home and work, with regular bills for diesel purchase. It cannot be avoided”.	Designing for generators is an unavoidable reality Being a prevalent feature in everyday life Implying that generators are a constant financial drain	Creating a sense of normality (accepting/maintaining the status quo) Designing for generators Being part of us	Being unavoidable to design without generators Being a part of buildings		“Absolutely. Generators are designed for in a building. You can’t escape it; you end up with big generator blocks in most buildings”.
“People don’t feel threatened because the changes are so incremental . . . but it does happen over a protracted period”.	Not threatened by what is not seen/felt Not noticing incremental changes	Not threatened	Being blessed with the weather Not experiencing natural disasters like other countries		“You see we are too blessed; we don’t really have these serious disasters like some other countries where-like a tsunami”.
“You always need the trendsetter [. . .] the moment it becomes a trend, you get a lot of offtakes”.	Needing trendsetters to encourage adoption Promoting adoption through examples	Having trendsetters Self-experiencing	Being convinced by real examples/posterboard projects Seeing/experiencing to believe and adopt		“I think a lot of people are convinced by real-life examples. They have got to see it work. [. . .] Then when you do that, and everybody will now want a solar glass building. It’s what happens”.

Memos were copiously written throughout the study from the outset, and took the form of illustrations, texts, or both. They provided an audit trail of the theory development process for reference, enhanced theoretical sensitivity, and academic rigour, and aided in ensuring quality control [89]. Additionally, they aided in refining the interview questions/guide to reflect the new and/or emergent codes and categories with the settings. This meant that the interviews (transcripts) and codes were in a state of continuous reanalysis to inspect the data for accuracy and grounding.

3.4. Quality

Quality inherently guides grounded theory, because it has checks in place to mitigate inaccuracies and bias due to its systematic and rigorous process [88]. However, the quality measures conceptualised and outlined by Charmaz (2014)—namely, credibility, originality, resonance, and usefulness—were adopted in this study [90].

Ensuring credibility from the outset of this study was key, and was initially introduced using an interview guide (functioning as a live reference tool) for data collection, which ensured the depth and sufficiency of the data to explore and support or validate the empirical evidence. This led to the generation of a rich and diverse range of data that facilitated the development of the theory, grounded in the data. The data were also compared with extant literature that resonated with the perceptions and experiences of other CPs within the regional and global context, as well as across other disciplines and fields. This served to confirm the generality and transferability of the findings and, thus,

their usefulness as a wider contribution to the knowledge embedded in the constructed theory. All of the inferences and assertions made were based on the participants direct accounts (capturing the fullness of their perceptions and experiences), presented as dense and detailed descriptions of data and context offered as examples in this paper for clarity and transparency. Additionally, the initial findings were made available to participants later in the process, and were reviewed by experts with experience in grounded theory. A summary of the final findings was also reviewed. This lent more credibility to the findings and process, which further increased their resonance.

Originality, according to [35], is about insight and significance, and was demonstrated by this study, which is the first empirical study of its kind to investigate the factors influencing sustainability transitioning practices and processes in commercial (office) buildings, with a specific focus on the nexus between building design, fossil-fuel generator dependence, and climate change. Additionally, it deviates from the established and predominantly singular methodological approach (i.e., quantitative) aligned with the construction management research paradigm and culture that have historically been imposed on research related to the developing context. Using a GTM theoretically contextualised and conceptualised the multiple and diverse perceptions and experiences of CPs. As such, it generated a theory that “fits the studied realities . . . ” ([91], p. 409) to offer deeper insight and understanding of situations that will be beneficial to development.

This study has led to deeper insight and understanding of the context and conditions under which Nigerian CPs operate in relation to PVs and the wider sustainable context, by identifying, defining, explaining, qualifying, and interpreting their behaviour (i.e., decisions, practices) and processes surrounding sustainable-energy-related transitions. The theory reflects the duality and co-existence of elements representing the varied manifestations of sustainability and/or being sustainable within the context of psychological, cultural, social, and historical factors, among others, which influence the move towards or away from the use of sustainable energy in commercial buildings. This suggests that while the constructed theory is well-grounded, it may be modifiable to another context, which is key to grounded theory [92].

4. Results

In line with achieving the aims of this study, the analysis of 34 interviews culminated in the development of 4 interrelated theoretical categories and, through further elaboration, led to the construction of a theory: “Being part of us” (core category) (see Table 6). In presenting the findings, typical narratives (i.e., exact participant statements) are presented in italics, with pseudonyms (in brackets) representing the participant. The quotes are not exhaustive, and merely offer some insight into the theory’s development process.

Table 6. Overview of the results.

Category 1	Core Category: Being Part of Us		
	Category 2	Category 3	Category 4
Hostage Syndrome	Being Sheltered—Avoiding Responsibility	Following the Leader	Future-Proofing—Reflecting the Local Perspective
<ul style="list-style-type: none"> • Being held captive • Being a saviour 	<ul style="list-style-type: none"> • Not threatened • Not a priority 	<ul style="list-style-type: none"> • Being influenced • Having an agenda 	<ul style="list-style-type: none"> • Changing perspectives • Moving towards autonomy

4.1. Being Part of Us

“Being part of us” emerged as the core theoretical concept grounded in the realities of CPs. It embodied their multiple and diverse sustainability-related perceptions, experiences, attitudes, and/or behaviours, which were contextualised, delineated, and portrayed as theoretical categories. The theoretical categories (descriptive processes) were conceptualised as “hostage syndrome”, “being sheltered-avoiding responsibility”, “following the leader”, and “future-proofing-reflecting the local perspective”, and represent the positive and nega-

tive factors influencing the transition to sustainable energy use (and broader sustainable measures) in commercial buildings. “Being part of us” offers a process framework within which the varied manifestations and their associated practices can be explained, situated, and examined based on the conditions under which CPs operate, influenced by their value systems, internal and external stimuli, and the context of the issue(s) being faced. As such, the process varies.

CPs’ sustainability-related beliefs and attitudes were found to be informed and/or directed by a set of principles and practices associated with culture, situated within the context of integrated psychological, contextual, historical, social, and preservation considerations. Ensuring continuity was a key motivator identified by CPs, which manifested in contrasting interpretations and practices; however, both were viewed as sustainable and/or being sustainable. One interpretation aligned with preserving one’s functionality, while the other interpretation aligned with preserving that of the environment, and of society in general. When engaging with PVs and related sustainability measures during their practice, CPs’ sustainability approaches focused either on situational realities, ideals, and/or cultivating a balance between both by revising and redefining ideals. Re-visioning described taking a second look at or re-examining the processes based on relevant situations and making assumptions, while re-defining described making changes, alterations, and/or adjustments in line with the context. This revealed a duality of co-existing elements, one was firmly rooted in the old and/or traditional, acting as a constant, regardless of the situation. The other was rooted in the desire to be part of the new and/or contemporary trends, acting as a catalyst. Through re-visioning and re-defining, the CPs tailored their needs and requirements either towards or away from sustainability, within the context of situational realities and changing sustainability ideals that affect them.

“Hostage Syndrome” and “Being Sheltered-Avoiding Responsibility” represent processes tailored away from sustainability. Thus, negative factors influencing the transition to sustainable energy use in commercial buildings, that were based on what CPs believed they could do or must do. This manifested in “surrendering and compromising” and “evading” associated practices, respectively. “Following the Leader” and “Future Proofing-Reflecting the Local Perspective” represent processes tailored towards sustainability. Thus, positive factors influencing the transition to sustainable energy use (and broader sustainable measures) in commercial buildings that were based on what CPs believed they were expected to do or should do, and manifested as “copying, learning and navigating” and “tailoring to suit and devising anew” related practices, respectively. Figure 3 provides an overview of the core category’s relationships with the interrelated categories. The individual theoretical categories are elaborated on and discussed further in the sections below.

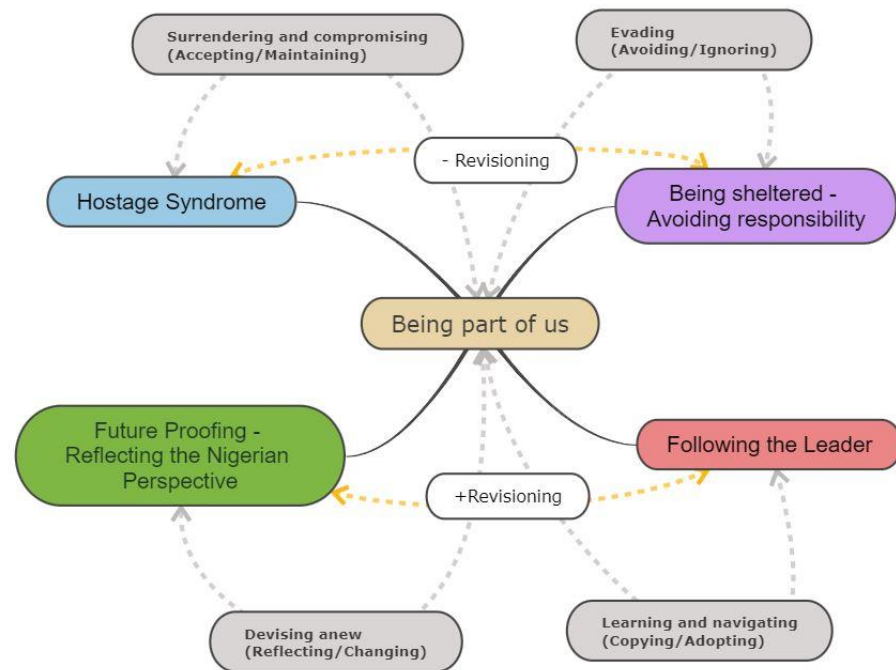


Figure 3. Overview of the results.

4.2. Hostage Syndrome

Hostage syndrome conceptualises the rationalisation, acceptance, and normalisation of systems, practices, and processes associated with the use of fossil-fuel generators by CPs during their practice, based on their perceived benefits despite their detrimental environmental and human impact. This represents factors negatively influencing the transition to sustainable energy use and broader sustainable measures in commercial buildings. This manifested in the attitudes and practices associated with “surrendering and compromising” to the situation, such as designing for generators, which has become deeply ingrained in the identity of the country, thereby creating an environment where CPs believe that without it, the country would cease to exist.

In responding to clients’ needs, in their design decisions and recommendations, CPs felt that they had to compromise in maintaining existing systems that they believed to be necessary, despite recognising them as a threat. As such, they were compelled to manage what they believed to be both a help (blessing) and a hindrance (curse), informed by the belief that their fate was linked to it, thereby reflecting their dual role—co-existing as rescuer and captor—and the psychological adjustments and/or sacrifices that the CPs were willing to make.

Hostage syndrome was developed from two sub-categories, namely, “being held captive” and “being a saviour”. The former represents the hindrance sentiment (i.e., captor perspective) relating to the operational constraints experienced by CPs due to their perceived lack of an enabling environment, while the latter represents the help sentiments (i.e., rescuer perspective) relating to the operational flexibility and assured continuity (i.e., comfort and safety) that the CPs believe generators offer and, as such, their attributed value as a “knight in shining armour”. Figure 4 below illustrates the narratives of participants conceptualising hostage syndrome.

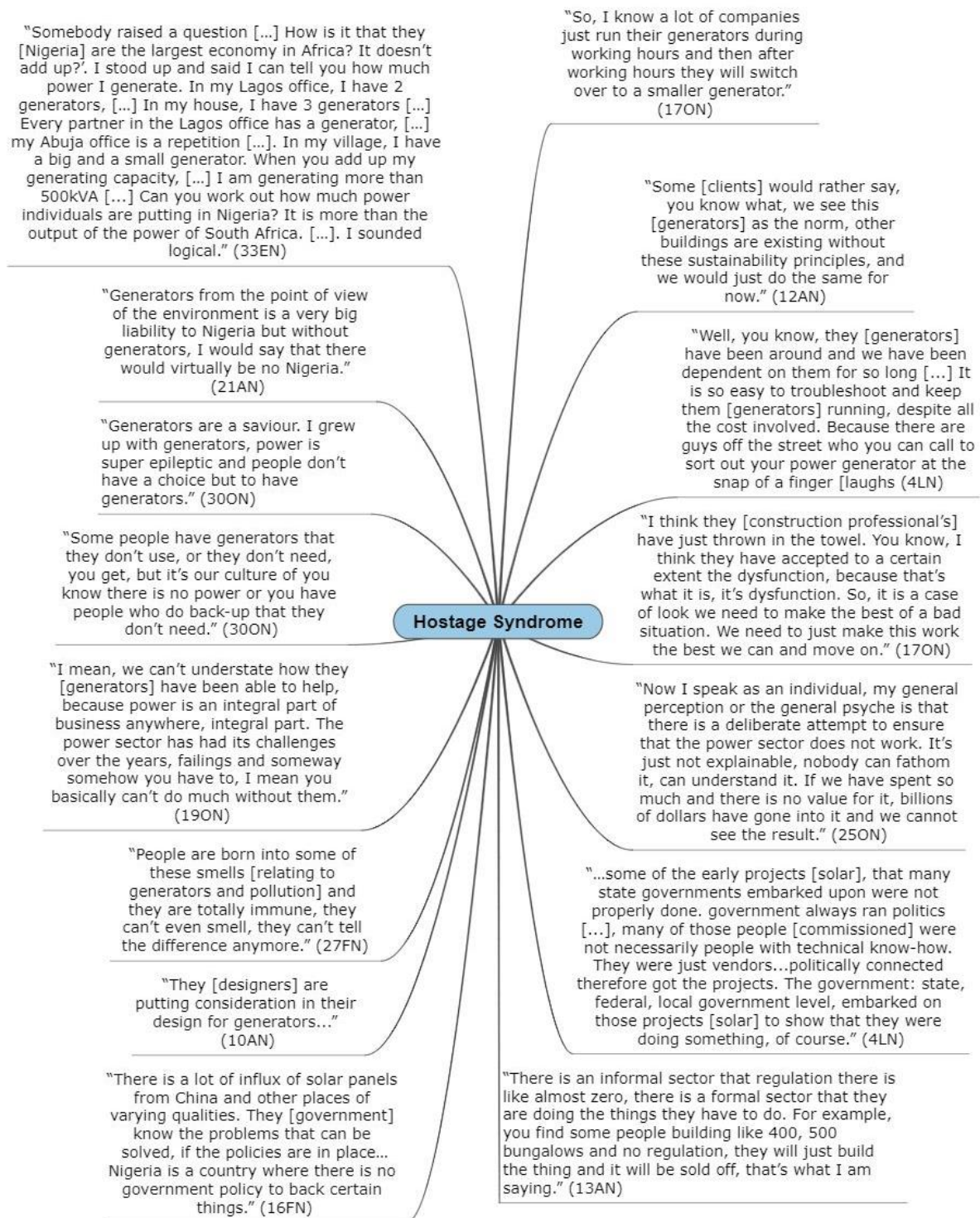


Figure 4. Example excerpts from participants' comments conceptualising hostage syndrome.

Key to the excerpts was the willingness of CPs and, by extension, their clients to adjust their thinking and practices relating to building design and, consequently, to surrender to practices such as "designing for generators" that have become institutionalised due to a lack of or lax polices, resulting in a negative influence on the realisation of a sustainable built environment. As such, they normalised the situation due to their perceived sense of hopelessness (fear of being without) and instead chose to hold on to generators as the only option (being responsible for the country's existence).

Generators were described as a permanent fixture, demonstrating their necessity and established status over time due to unreliable national supply, which was characterised as non-existent or, at best, epileptic. Hence, generators had become entrenched in everyday life, and people had become accustomed to all of their aspects—even the pollution. This led to their acceptance as the de facto power source based on the ease of access they offered, relieving electricity supply pressures as well as the concerns that CPs had about their functionality.

CPs also addressed the ease of acquiring, operating, and maintaining generators based on their access to and familiarity with them, as well as the fear of being without electricity, such that provision for multiple generators to a single building was seen as necessary. They deemed this responsible for hindering the consideration of alternatives such as RETs by their clients. Interestingly, some CPs acknowledged the higher expense associated with the use of generators in comparison with RETs such as PVs, although the initial investment required in the latter was identified as a concern. Generators had become something of a crutch, due to their perceived indispensability, such that CPs were either unwilling to take a chance or were not allowed to by their clients. According to some participants, their peers had resigned themselves to a situation that they described as “dysfunctional”, due to feeling powerless to improve things and/or the belief that their actions would be to no avail. CPs struggled to imagine an alternative situation or reality different from the one that they currently experienced, further reinforcing the cycle of dependence and the belief that the country’s existence was underpinned by generators. The country is viewed as having a generator economy. Thus, there was a lack of will to push beyond what they deemed necessary, which was characterised by some as typical Nigerian behaviour—accepting and maintaining the status quo, thereby creating a sense of normality that perpetuates a culture of generators, with implications beyond their general use for electricity provision, including altering the design/building process, regardless of its cost and environmental impact, which were well acknowledged.

Not having supporting facilities relating to infrastructural, regulatory, and financial systems was also at the forefront of the minds of CPs contributing to the use of generators, along with its associated unsustainable practices related to buildings. There was a consensus that the government knew what to do to promote sustainability and curtail the informal systems and sectors established based on the paucity of policies but was unwilling to do so. Consequently, informal and formal sectors co-existed and competed, with the former often overperforming (leading) and undermining the latter. There was a general belief expressed by all CPs of a concerted effort by what they called the “cabal” to maintain generator use and proliferation by any means necessary to exploit and undermine systems for financial gain. According to CPs, there was no other justification to which they could attribute it, as it made no sense. They also believed that it opened the construction industry up to exploitation by encouraging non-compliance through the influx and use of fake and/or substandard products ending up in construction projects, which was already the case with solar panels, as well as electrical and building services equipment.

Beyond the role of the government, which CPs collectively agreed was key to promoting PV integration in the built environment, they also attributed responsibility to their clients and peers for facilitating some unsustainable practices—to the former, for actively procuring substandard or alternative materials for use in their projects, thus compromising the quality, integrity and, ultimately, performance of the buildings. CPs attributed this to “trader mentality”—not wanting to spend money, prioritising fast investment returns, and/or seeking the easiest and cheapest approach. Meanwhile, their peers were perceived as not actively educating their clients accordingly, which some CPs attributed to fear of loss of their commissions. Thus, it was easier to go with the flow. Furthermore, CPs expressed concern about the wider implications—such as public awareness and trust—relating to PV adoption and broader sustainability issues due to lack of accurate information and/or misinformation from the earlier PV projects, as well as experiences associated with using poor-quality products. This had the consequence of RETs being viewed as not viable in Nigeria.

4.3. *Being Sheltered—Avoiding Responsibility*

“Being sheltered—avoiding responsibility” conceptualises the scepticism, denial, indifference, and externalisation of responsibility about environmental issues expressed by CPs, based on a perceived false sense of security. It represents factors negatively influencing the transition to sustainable energy use and broader sustainable measures in commercial buildings, manifesting attitudes and practices associated with “evading”.

When faced with environmental issues, CPs expressed uncertainty about their link to building practices, based on the perceived absence of visible effects and/or the belief in the limited contribution of their practices to such issues. Thus, environmental issues such as climate change were seen as distant and/or insignificant and, as such, not requiring attention, revealing a disinterest and lack of concern. “Being sheltered—avoiding responsibility” was developed from two sub-categories: “not threatened” and “not a priority”. The former represents a sense of detachment from environmental issues as external/foreign and, consequently, not warranting action, while the latter represents a lack of interest and/or concern associated with matters not perceived as vital and/or directly contributing to one’s livelihood. Figure 5 illustrates the narratives by participants conceptualising “Being sheltered—avoiding responsibility”.

Key to the excerpts was the disconnect and uncertainty about environmental issues, which although acknowledged as happening, were not believed to be happening in the country or, if so, not significantly enough to require a response. This revealed an inability or unwillingness to grasp the severity of the situation, making it appear trivial—especially as viewed in an economic and geographical context (i.e., a foreign and/or distant issue with the potential to impact their job security). Thus, environmental issues and sustainability were perceived as unconnected and unrealistic for consideration in building design, with CPs reporting something of an unsustainable built environment as business as usual.

Environmental issues such as climate change were viewed as distant and, as such, not given due consideration by some CPs in design, based on the perception that they were separate from and inconsequential to the happenings in the country. Climate change, and sustainability more broadly, was viewed by some as a foreign concept—although there was an awareness of it based on the global climate debate—because it was not practiced in the country. Interestingly, they expressed clear environmental changes in the country, but were reluctant to attribute them to climate change. Instead of attributing it to normal weather changes, some CPs attributed it to denial, further suggesting that the disconnect was exacerbated by the country’s generally mild climate. The country’s mild climate was linked to the perceptions of comfort and security, due to the sense of stability and protection it offers. In essence, it functioned as a mask, covering up the weather changes, such that they were not noticed or made less visible, and could not then be viewed as noteworthy.

Thus, there was a lack of perceived threat from what is not experienced or believed to be imminent, which according to CPs fuelled inaction and informed climatic stances, resulting in their lack of consideration in building design. Additionally, it engendered feelings of uncertainty and doubt about climate change, based on the belief by some that if it existed not only would it be felt, but there would also be material evidence (i.e., documentation). Climate change was perceived as unclear and intangible, making it difficult to grasp, and highlighting the value of information as a gap filler and catalyst for creating awareness, knowledge, and/or change, thus impacting their ability and/or willingness to consider environmental issues and proffer sustainable solutions to clients that they could justify. The long-term use of generators contributed to this, as it implied to some CPs that it had little or no environmental consequence. As such, some believed that a green Nigerian building industry would not fix the environmental issue and did not see it as necessary given that generators were/would be in use. According to CPs, climate change was not a concern of their clients, as they did not see it as their responsibility or see a need to change how they did things. Indeed, they believed that climate change—and sustainability more broadly—was the responsibility of the government, based on the view that it was a

communal (public) issue. However, the extent of the government's sustainability action was described as beautification.

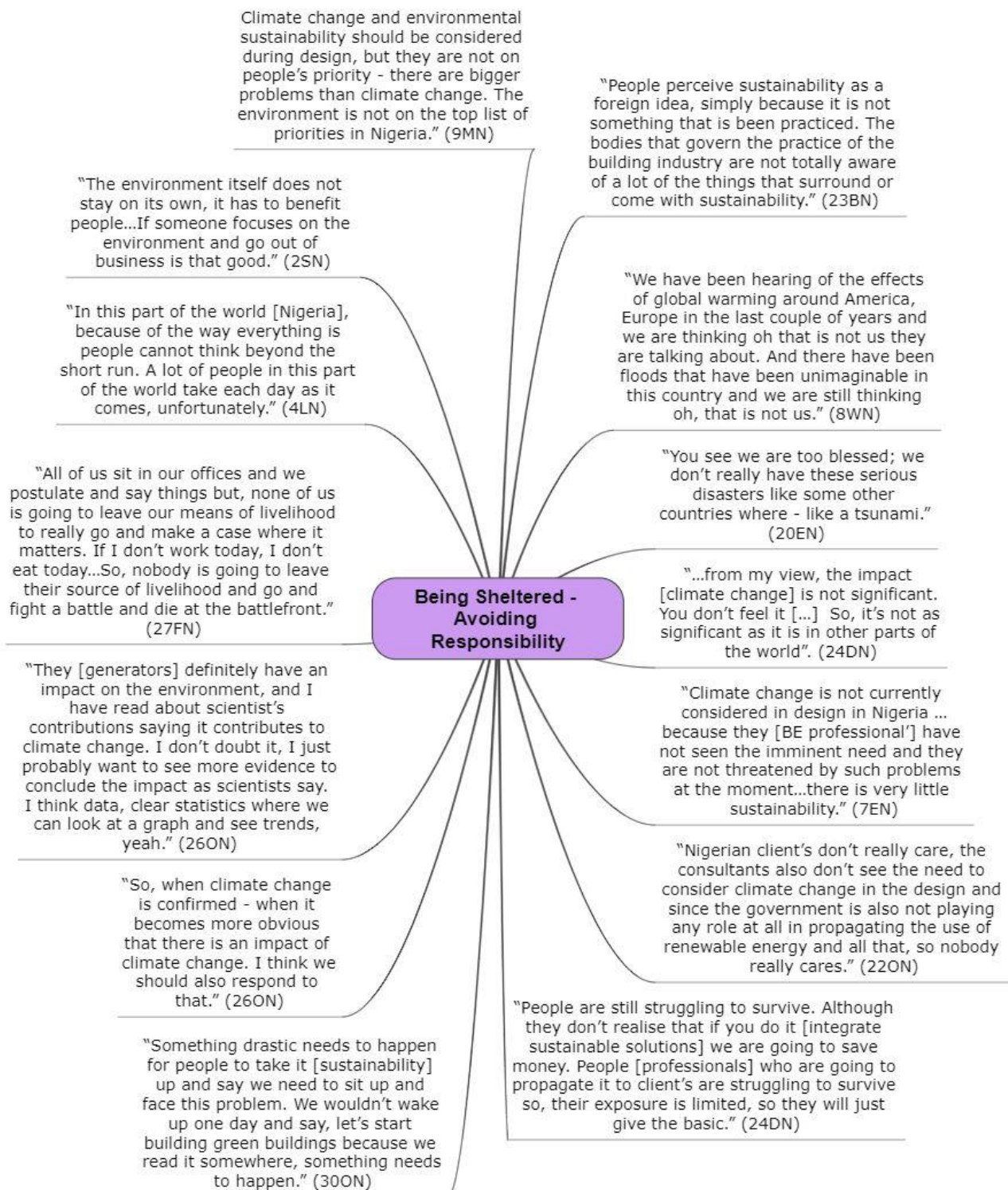


Figure 5. Example excerpts from participants' comments conceptualising being sheltered—avoiding responsibility.

Furthermore, the stance of some CPs prevented them from being proactive. Instead, they accepted situations as broadly the same and, according to others, needed an impetus to change. There was a belief by some CPs that only when something severe occurred would

the focus of their peers, the government, and their clients change, and action be taken. This was seen as being the only immediate way to push forward with a sustainability agenda such as the integration of PVs, as otherwise the environment would not be prioritised and would always be relegated to the bottom of the list because, given the context of a lack of enabling systems and structures, there are other issues perceived as more pressing or as a higher priority, such as their own survival. As such, the focus appeared to be on short-term as opposed to long-term goals. Although most recognised the value of sustainable measures, they noted that for as long as meeting day-to-day needs remained an issue, sustainability would be regarded as a luxury problem—a voluntary measure. The security of the environment was just not sufficient justification, given that it might jeopardise their jobs, which they believed would be under threat if they pushed too much or vociferously advised their clients against the use of generators. Accordingly, their default position was to play it safe and focus on doing the basics and/or following what was perceived as the regular practice—designing for generators. The contextual constraints or challenges served to create an environment in which CPs increasingly relied on their abilities as opposed to the function of the government and/or other institutions. Sustainability and/or being sustainable were viewed within the context of functionality and survival, as opposed to environmental security and intergenerational equity.

4.4. Following the Leader

“Following the leader” conceptualises the sphere of influence that external factors have on the design/building process, including the attitudes of CPs and the broader construction industry in the country. It represents factors both positively and negatively influencing the transition to sustainable energy use and broader sustainable measures in commercial buildings, manifesting as attitudes and practices associated with “copying, learning and navigating”, such as adopting foreign standards or copycatting.

CPs described the acceptance of (willingly) or acquiescence to (forced compliance) external factors during their practice as being driven by clients (particularly internationally), characterised by the adoption of non-indigenous concepts, standards, and systems that function as catalysts towards the adoption of sustainability measures based on perceived economic, social, and environmental value. Meanwhile, catalysts away from the adoption of sustainability measures were based on perceived internal (local)–external (foreign) power imbalance. “Following the Leader” was developed from two sub-categories, namely, “being influenced” and “having an agenda”. The former represents the dual internal and external pressure exerted on CPs, which they felt was directing their decision-making processes during their practice, while the latter represents the cynicism and perceived double standards that CPs associated with external action. Figure 6 illustrates the narratives by participants conceptualising “Following the leader”.

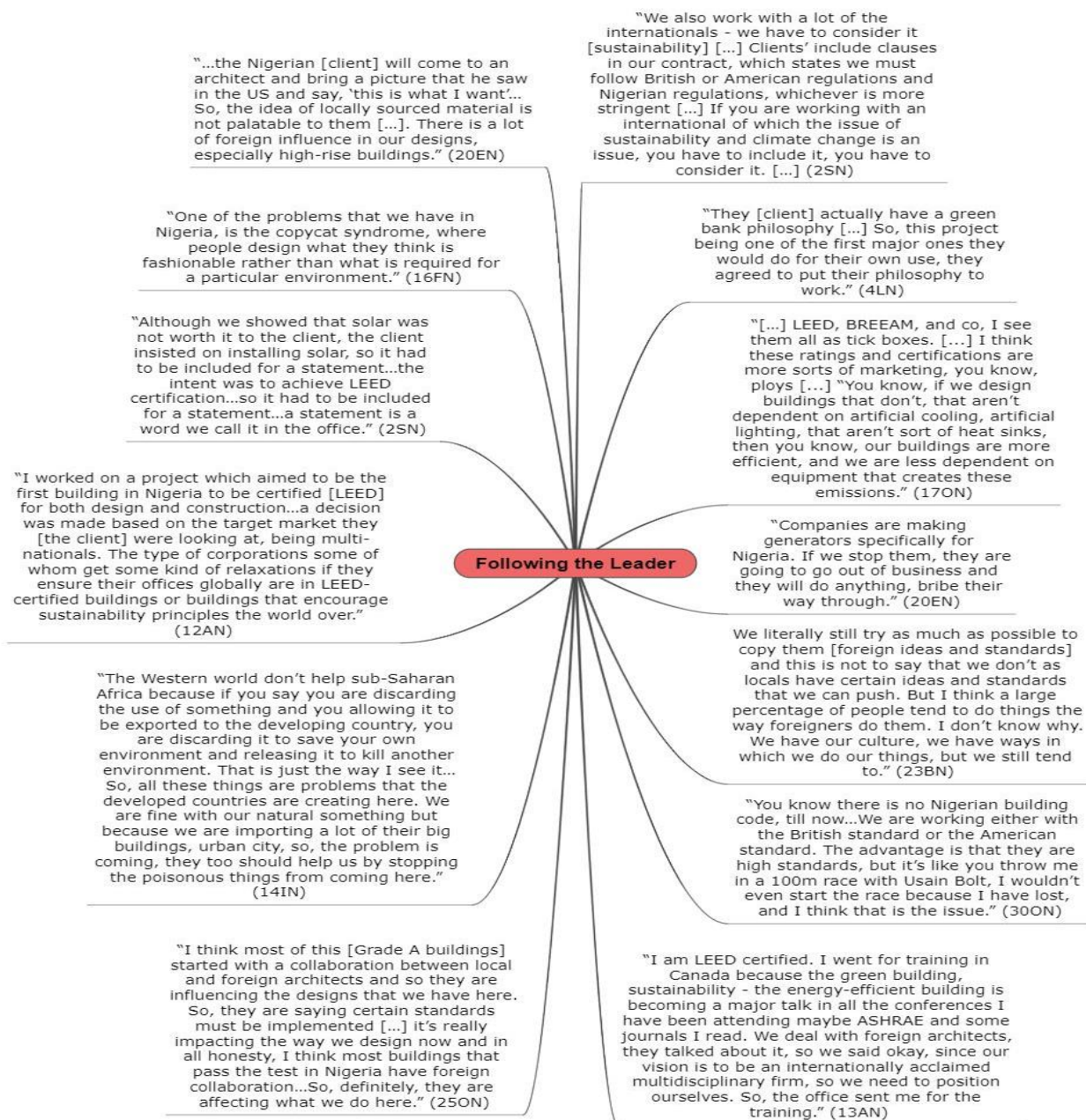


Figure 6. Example excerpts from participants' comments conceptualising following the leader.

Key to the excerpts was the impact of foreign influence on building design and the wider built environment, achieved either through enforcement—by exerting their influence and intervening in the process to suit their requirements—or by encouraging adoption through their advocacy, promoting shared interest. However, regardless of the situation and willingness, ensuring compliance was enabled due to poor standards and perceptions of foreign superiority. As such, certain ideas, standards, products, and/or practices had become the norm, enabling an environment of copycatting, despite the existence of local counterparts. This served to enhance processes, but equally undermined confidence in existing systems and local development. This spoke to the role of the relationships between developed and developing countries, with the former perceived as instigators, facilitating unsustainable practices and taking advantage of developing countries. The latter, perceived as the eradicator, acting as a refuse depot for the unwanted.

CPs described the overwhelming acceptance of and the belief in the superiority of things of foreign origin (idea, standards, products, etc.) and, consequently, their preference

for use during the building process, regardless of their contextual congruence or suitability. They attributed this in part to both the old ways—underlying and lingering historical influences and impressions attributed to colonisation—and new ways, i.e., knowledge of issues and expertise based on innovation and technology. This was particularly the case when engaging with international clients (and, increasingly, local clients with international exposure and/or aspirations), as the local counterparts were viewed as less stringent and/or of lower quality. Moreover, due to their sustainability goals, they actively advocated for such an approach, with the use of their building as the ultimate physical manifestation of their values, thus using their building as a posterboard project to encourage adoption. Some CPs viewed this as fuelling interest in engaging in more sustainable projects, as well as providing the impetus to seek additional expertise, serving to encourage willing participation in and adoption of sustainability measures.

However, this was viewed differently by some CPs—as mere accreditation seeking, for regulatory compliance, for prestige, as an accountability veneer, and/or to gain competitive advantage—i.e., driven by perceived financial benefits as opposed to any environmental concern or social responsibility. Thereby, fostering cynicism with regard to foreign influence, especially based on the view of CPs that if encouraging sustainability was their goal, then they would cease the exportation of harmful (discarded) products from the West (and other foreign/developed countries) to developing countries such as Nigeria—including generators, which are not made in the country. CPs felt that due to the country's developing nature, it was dependent on and vulnerable to exploitation by external forces. Furthermore, there was criticism from CPs about the value of sustainability assessment/certification methods, such as LEED, questioning how sustainable and/or green buildings could be if they still used generators. This is the current practice, with compensation made for the use of generators in such buildings. LEED and other such methods were described simply as marketing tools to certify funding requirements, obtain premium leases, and/or serve as a status symbol.

Notwithstanding their clients' sustainability motives, CPs—willingly or otherwise—had to toe the line and adopt not only certain codes and standards, but also sustainability measures, as this was included in their contracts in some instances. Additionally, CPs noted that Nigerian codes referred to foreign codes such as British codes due to what they characterised as a lack of standards and/or ineffective standards. As such, there was a push by some CPs (and, by extension, their clients) to adopt foreign alternatives, thereby encouraging their use as the norm and, in some cases, the blanket copying of their look and feel (e.g., designs, materials), including attitudes that were not seen as well-suited to the Nigerian context. The latter was expressed by CPs as a problem due to its ability to undermine the originality and expression of local styles (indigeneity) in buildings and the wider built environment, as well as bringing foreign problems associated with such designs and materials. For example, CPs identified designs dependent on artificial cooling based on the full use of glass as heat sinks that have a high energy demand and are expensive to maintain. According to CPs designing for the context was lacking and needed to be reintroduced. There was a view by some CPs—albeit not a majority—that despite their global advocacy for sustainability (i.e., helping developing countries), foreign influence was causing harm as opposed to doing good, and was more interested in controlling things in developing countries for personal gain, using their help as a bargaining tool.

4.5. Future-Proofing—Reflecting the Local Perspective

“Future-proofing —reflecting the local perspective” conceptualises the desire by CPs for change; that is, to be sustainable, and the extent to which they were willing to go to achieve it. This represents factors positively influencing the transition to sustainable energy use and broader sustainable measures in commercial buildings, manifesting as attitudes and practices associated with “tailoring to suit and devising anew” to reflect and consider the context, such as designing for sustainability.

CPs believed that there was an alternative approach to the status quo, which involved encouraging sustainable building design by being deliberate in decision making reflective of the environment and context, thus shifting the paradigm from dependence to independence, informed by self-motivation, self-initiative, and self-benefit/interest, all of which would have a positive influence on environmental awareness and PV adoption, based on social, environmental, and economic benefits. “Future-proofing—reflecting the local perspective” was developed from two sub-categories, namely, “changing perspectives” and “moving towards autonomy”. The former represents the transition of CPs’ views towards sustainable alternatives, informed by the recognition of a problem, while the latter reflects the transition in practice towards a more sustainable approach to designing for sustainability, informed by its identification as a solution. Figure 7 illustrates the narratives by participants conceptualising future-proofing—reflecting the local perspective.

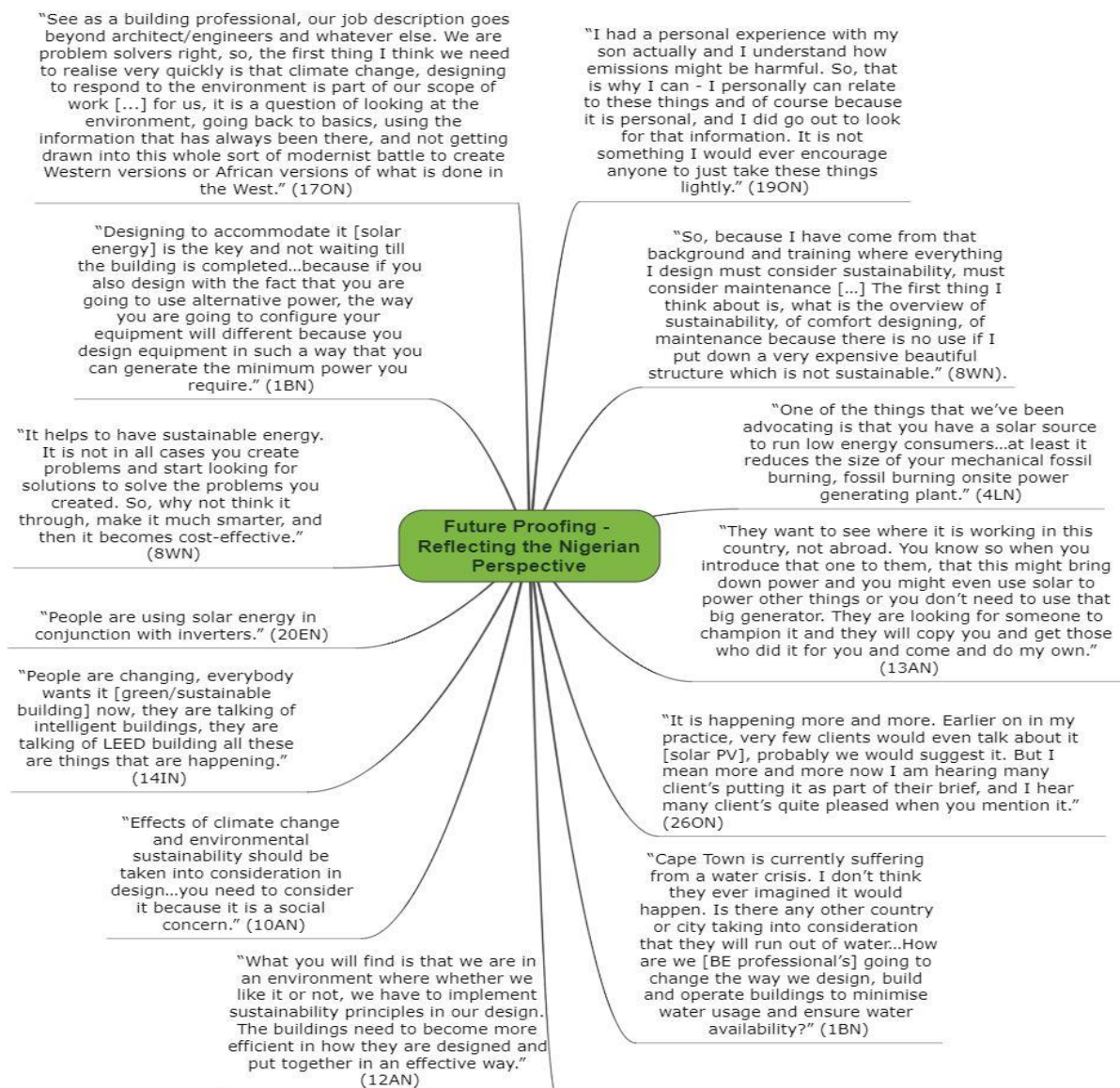


Figure 7. Example excerpts from participants’ comments conceptualising future-proofing—reflecting the local perspective.

Key to the excerpts was CPs’ willingness to adjust their thinking and practices away from the status quo of designing for generators and, therefore, consider the environment and the local context, including their role in ensuring reduced building impact—being

accountable and designing for sustainability from the outset, as opposed to adopting an ad hoc and/or reactive approach to avoid or limit the negative impact.

Cognisant of the global climate discourse and the impact of generators, some CPs stressed the need to adopt sustainable measures. According to them, perceptions and/or belief systems about the existence of climate change were irrelevant, as they did not change what was happening; as such, immediate action was required. Designing for sustainability was seen as essential to this, as it reflects the practice of consciously thinking about sustainability throughout decision making in the design process, such that this becomes the norm, making it a central thread in the design process. Although there was an appreciation by CPs of both the ideal situation and what was realistic, more important was the appreciation that only when something is considered can it have the full opportunity to be impactful. As such, sustainability needed to be at the forefront of CPs' minds to facilitate ease in its implementation.

According to CPs, the country's energy context needs to be considered, asking questions relating to energy provision for buildings such as "do I need to have a generator?", "how much energy is needed?", "should I have alternatives?", and "how does it [generators] impact my ability to say I am operating a clean environment?" This revealed an awareness of the impact of their decisions, but more so their culpability and a willingness to take ownership of it. CPs also saw this approach as mitigating future issues, as it encourages consideration beyond the current situation—what can be immediately achieved—to what may be needed and/or how it can be obtained, engendering a proactive approach. While RETs such as PV were seen as playing a long-term role in ensuring energy security and environmental quality, there was an understanding by CPs that being sustainable was not just about adding RETs, but also about ensuring that the right principles were considered and incorporated in the design from the outset, including consideration of the context. There was a need for a local perspective, with the function of foreign elements playing a supporting role, reinforcing what was already existing—as opposed to creating Nigerian copies of foreign ideas, which was current practice and, indeed, the norm.

According to the CPs, all that was required was "a little thought" by adopting a deliberate and holistic approach, which would ensure environmental and contextual responsiveness in design. Therefore, it was not enough to simply design a building in response to the client's needs (the traditional approach); rather, it was necessary to design for the needs of the environment and, by extension, those inhabiting it. This was taken to heart by some CPs, who attributed their change in perspective and impetus towards more sustainable practices to lessons learned from lived experiences. The value of sustainability and its related measures beyond the singular perceived environmental benefits was growing. For example, there was a push to have trendsetter (exemplar) projects and/or sustainable champions to propel the adoption of PVs and other sustainable measures. CPs saw this as evidencing their viability, and as vital in quashing misinformation and engendering trust, because of past experiences with solar PV projects. It would also deal with the "seeing is believing" approach, as they (clients and broader society) would be able to engage with the projects and processes. CPs also noted that this would aid with buy-in by clients to adopt the "green way", facilitating a positive change in their perceptions of PV—and sustainability more broadly—which was already happening. There were buildings already using PV as the primary energy source, as well as using it in conjunction with generators and/or inverters, identifying a power paring approach as an alternative to meet the requirements of buildings with high energy demands, thereby reducing generator dependence, space requirements, and the operational and maintenance costs associated with generators. Furthermore, more clients requested the inclusion of PV and other sustainable measures in their project briefs.

Some CPs made solar provisions in their design approach as standard practice, allowing for the necessary enabling elements to facilitate connection by the client at a later date. In so doing, they could avoid additional and/or corrective works with associated resource (i.e., cost) implications. This also emphasises the need to advise clients of the requirement for sustainability expertise early in the project, so as to enable concepts and criteria to be

defined, along with recommending workplace strategies to clients that they could easily adopt to reduce energy consumption. Furthermore, CPs reported a growing interest and trend toward certified sustainable office buildings (developments). Such buildings were viewed as beneficial to both clients and tenants, offering economic, environmental, and social benefits, including health benefits and a sense of pride. Having a sustainable building or occupying one was increasingly seen as a thing of desire—a must-have—playing into the sociocultural context of the country in terms of status, identity, and belonging.

In summary, the construction of the core category “Being part of us”, and the development of its four interrelated theoretical categories—“hostage syndrome”, “being sheltered—avoiding responsibility”, “following the leader”, and “future-proofing—reflecting the local perspective”—has been elaborated and discussed. The theoretical categories represent factors negatively and positively influencing the transition to sustainable energy use in commercial buildings. Hostage syndrome captures “surrendering and compromising” practices associated with normalising/minimising to function, lacking an enabling environment, and needing generators to survive. Being sheltered—avoiding responsibility captures “evading” practices associated with feeling detached, being uncertain and sceptical, and focusing on survival. Following the leader captures “copying, learning and navigating” practices associated with championing adoption, norm development, and taking advantage. Future-proofing—reflecting the local perspective captures “tailoring to suit and devising anew” practices associated with being aware, seeing value, and designing for sustainability.

5. Discussion

This study aimed to explore the factors influencing the transition to sustainable energy use in commercial buildings, with a focus on PV. Through the analysis process, the theory “Being part of us” was constructed, embodying the multiple and diverse realities, actions, and contexts that CPs attributed to their experience, which were conceptualised as “hostage syndrome”, “being sheltered—avoiding responsibility”, “following the leader”, and “future-proofing—reflecting the local perspective”. Consultation with the extant literature revealed that the constructed theory “Being part of us” had relatable elements within theories and/or frameworks such as Stockholm syndrome [93] value framework [94], theory of cognitive dissonance [95], diffusion perspectives [96], etc. The theories and/or frameworks offered some insight into how the theory could be explained.

For instance, Ref. [93] Stockholm syndrome theory—which sought to explain the captor–captive dynamic, where the captive remains tied to and is loyal to the captor, to their own detriment—offers a theoretical perspective to explain how CPs’ situational perceptions of service provision as it relates to generators moved beyond transactional actions to personal relationships and experiences, and constituted a psychological crutch within the broader context of sustainability adoption. It identifies four precursors to the syndrome: a sense of security, inability to escape, perceived threat, and a feeling of isolation, which CPs in this study expressed and resonated with by rationalising, accepting and, ultimately, surrendering to the situation and compromising to make things work/better (for continuity). This captured both their feeling of impotence and fatalistic attitude, along with their sense of security and comfort, reflecting their need for continuity beyond their desire for change, and creating a dilemma and challenge, which [95] theory of cognitive dissonance elaborates—particularly in relation to the disconnect from climate change, externalisation of responsibility, and the role of information. Ref. [95] theory provides a process to explain how climatic worldviews are formed, retained, and/or modified. Some CPs may be mobilised towards altering their views on climate change only if this is consonant with their existing beliefs. Therefore, simply having access to information is not a determining factor in awareness or knowledge, as how it is perceived and subsequently used may also be consequential. Meanwhile, for others, information may have the opposite or negative effect, causing them to resist change and double down, thereby reinforcing their existing views and beliefs, and ignoring or evading situations. This is significant, as the adoption of sustainability goes beyond simple acceptance and rejection and/or barriers and

drivers; however, this simplistic and/or singular perspective appears to be consistent with the approach by numerous studies, as identified above—particularly in the SSA context.

Ref. [94] value perspectives identify social and cultural elements informing views and decisions about acceptance that align with those expressed and reported by CPs relating to PV and broader sustainability measures based on their perceived benefits and drawbacks, beyond the financial and technical/technological factors often monopolising the discourse in the literature (see [97–99]). Interestingly, both [97,98] revealed a lack of cost data/evidence to support high-cost perceptions or claims. Some of the alternative factors identified by [94] included opportunity (personal/professional), reputation/status, tradition/belief, impressions, and psychological factors. The value perspectives of CPs were based on internal and external influences that provided insight into the focus of the imitation, processes, and dimensions for the acceptance and adoption of sustainability. Meanwhile, Ref. [96] diffusion perspectives, being the dominant lens used to interpret the theory, address alternative motivations and approaches to innovation, such as faddism and fashion, which are not aligned with the predominantly rational and/or pro-environmental considerations typified in the literature. CPs revealed not only the practice of copying new systems and approaches, but also a willingness to learn and navigate through them to their professional benefit, ultimately having a positive impact on the environment. Highlighting the potential impact of copycat syndrome through faddism, fashion/trendsetting, or forced compliance shows the value of faddism, which has a short-lived impact, but one that can facilitate lasting and notable change. As such, Ref. [96] framework aided in understanding CPs' experiences so as to identify better ways to examine and explain their sustainability adoption behaviour.

The constructed theory of “Being part of us” builds on [96] diffusion perspectives and integrates elements of the theories and/or frameworks to provide a holistic picture of the sustainability transition process in the Nigerian built environment. The breadth and depth of the literature engaged in theoretical coding—including those of different disciplines—is a testament to the conceptual generality and applicability of grounded theory and evidences the wider theoretical potential of this study. The theoretical model is presented in Figure 8.

The theoretical model represents the contextual factors influencing the sustainability transition process in commercial buildings, with a focus on PVs. The processes are conceptualised as four interrelated theoretical categories, namely, “hostage syndrome”, “being sheltered—avoiding responsibility”, “following the leader”, and “future-proofing—reflecting the local perspective”, representing positive and negative influencing contextual factors. The influencing factors are underpinned by a conditional context (i.e., cultural, social, epistemological) and, given the different perceptions and experiences of CPs (based on internal and/or external stimuli, including self-stimulus), engender differing behaviour and attitudes (i.e., ignore, adopt) reflected in their practice. Accordingly, CPs adopt practices relating to “surrendering and compromising” (i.e., normalising/minimising to function), “evading” (i.e., feeling detached), “copying, learning and navigating” (i.e., championing adoption), and “tailoring to suit and devising anew” (i.e., designing for sustainability), which align with “hostage syndrome”, “being sheltered—avoiding responsibility”, “following the leader”, and “future-proofing—reflecting the local perspective”, respectively.

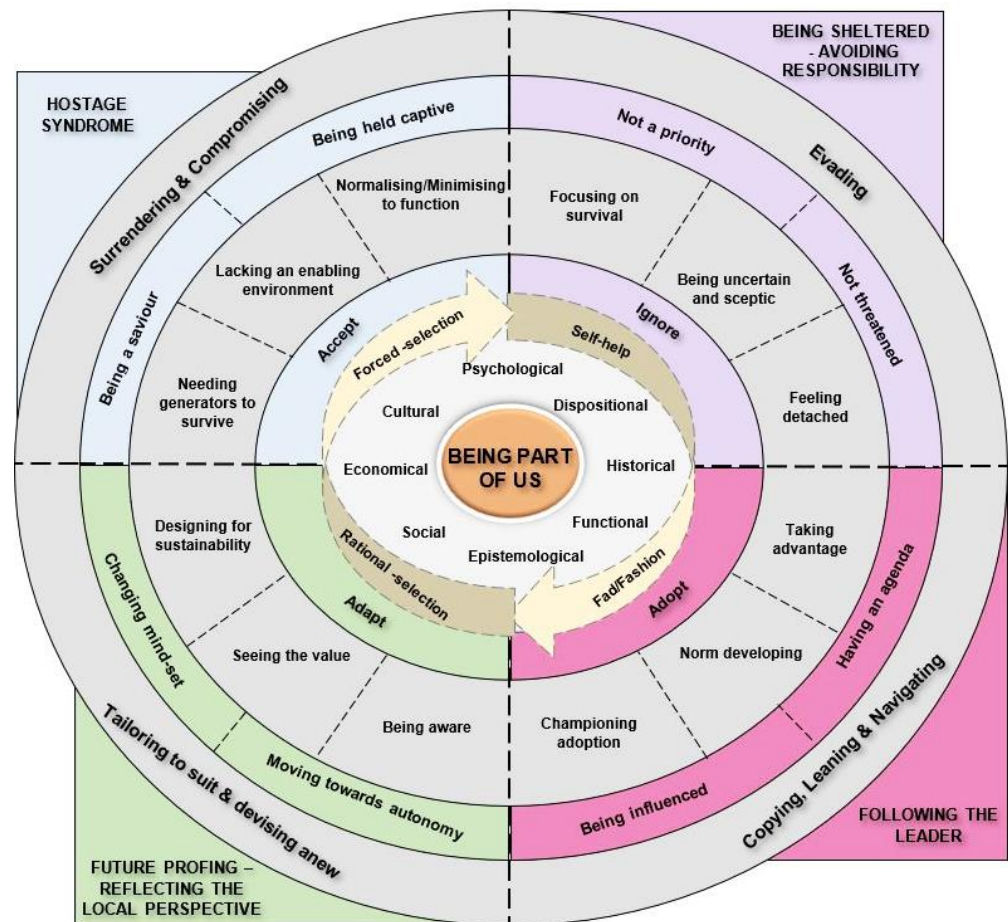


Figure 8. The dynamic process of sustainability transitions by CPs.

6. Conclusions and Recommendations

Our study resulted in several significant outputs, given its aim to explore the factors influencing the transition to sustainable energy use in commercial buildings, with a focus on PV and the strategies adopted accordingly. This has generally not previously been explored in Nigerian studies, and where explored it has generally been limited in focus, detail, and/or insight. This paper contributes theoretically, empirically, and methodologically to facilitate a better understanding of the situation (context), grounded in empirical data.

Firstly, the principal contribution is the development of a novel sustainability transition process model and theory—“Being part of us”—grounded in empirical data that contextualises, delineates, and portrays the multiple and diverse sustainability-related perceptions and experiences of CPs. It offers a framework within which the varied manifestations and their associated practices can be explained, situated, and examined. “Being part of us” reveals the main concerns and expectations of CPs within the context of multidirectional constraints and forces (internal and external), whether individual (personal), business, environmental, or contextual. It identifies how CPs actively manage their design decisions and actions during their practice in response to their clients’ needs/requirements, how they engage with climate change and local environmental needs/issues during their practice, and why and how they decide to seek alternative and/or sustainable practices. “Being part of us” highlights the contextual framework—consisting of factors such as culture, etc.—as informing and influencing CPs’ practices relating to sustainability, especially in the context of survival and security. It also attempts to conceptualise and make explicit the influence of CPs’ psychological state/conditions on their decision-making process.

Thus, this grounded-theory-based study reveals a detailed process relating to sustainability adoption directly from empirical data based on Nigerian CPs’ perceptions and experiences.

The constructed theory of “Being part of us” provides insight on both the holistic and granular levels, based on its theoretical categories, by filling the gaps in psychological, contextual, and cultural perspectives that have not been identified and/or focused on in previous Nigerian studies. The theory of “Being part of us” and its underpinning theoretical categories have been compared with the empirical literature on sustainability in the construction industry, as well as other fields, such as psychology, agriculture, law enforcement, health, business, etc., in Nigeria and other countries, as well as extant theories and/or frameworks such as the value framework, Stockholm syndrome, willingness to adopt the framework, diffusion perspectives, cognitive dissonance, and cultural theory. The theory of “Being part of us” reveals relevance/consonance and shows an evidence base that broadly supports the theoretical constructs.

Secondly, from a practical viewpoint, it offers relevant, reliable, and relatable points of reference to ground actionable interventions for the adoption/integration of PVs (and broader sustainable measures) towards green energy transitioning that could be beneficial to policymakers and practitioners, learning from what works and how it works. For example, the theory establishes links between concepts and practices associated with copycat syndrome, having trendsetters, etc., which have the potential to assuage and/or intensify realities and influence practices and ideals.

Thirdly, from a methodological viewpoint, it moves the study beyond the routine and generalised practices associated with construction management research culture, thereby highlighting the value of employing GTM in further research beyond the developing context.

Fourthly, from an empirical viewpoint, this is the first study to specifically focus on sustainability transition processes related to PVs in commercial buildings—particularly as regards the nexus between building design, fossil-fuel generator dependence, and climate change. In this regard, it provides both granular and holistic insights. For example, it reveals a psychological attachment between CPs and generators, culture as an underlying influence in their practice, and a duality of self-help that underpins and influences sustainability adoption dynamics, practices, and processes. These new insights have not been identified and/or focused on in previous Nigerian studies. In addition to providing new knowledge about PVs within the broader sustainability context, this study builds on existing knowledge in the general substantive areas of sustainability. It highlights CPs’ multiple and diverse realities and the conditions under which they occur, along with their associated conceptualisations of sustainability, which manifest through their actions, practices, and/or processes. Thus, “Being part of us” and its four interrelated theoretical categories have similarities with extant empirical and theoretical literature, evidencing their wider theoretical potential. Regardless, “Being part of us” retains uniqueness and originality in its construct.

Fifthly, from a methodological viewpoint, we employed a qualitative research strategy solely using CGTM, which is novel within the context of inquiry. This contributes to the discourse on methodological pluralism within construction management research, which is generally dominated by quantitative research strategies and paradigms. This research offers an argument for the use of GTM more widely, as it cuts across various disciplines given its accommodation of a range of research paradigms and strategies.

Sixthly, from an originality viewpoint, apart from the use of GTM in this study, the constructed theory and the four interrelated theoretical categories are also novel. This led to the uncovering of deep-rooted historical, psychological, social, and cultural underpinnings, all of which had been missing and/or overlooked in previous Nigerian studies, as along with the changing view of the economic and social significance of PVs (and RETs more broadly) beyond that of environmental—a shift in the paradigm from which all stakeholders can realise benefits. This will aid in creating a broader awareness of solar PVs and other sustainability measures, and it is hoped that it will enhance their adoption, thereby bringing their benefits to the forefront. Additionally, the subject of focus and the context of inquiry are original contributions.

Overall, this study contributes to and enhances the discourse on sustainability in the BE from a local perspective that has far too often been generalised and not investigated

deeply, if at all. The study also focuses on office buildings, which are seeing an increase in energy demand and, as such, will contribute to climate change, and can play an equally significant role in combating it. This is particularly the case in the context of this study, but office buildings are often overlooked. The outputs of this study add value by situating the issues for better examination to inform and facilitate the development and implementation of sustainability strategies suited to its context. This will see Nigeria become a part of the global drive to achieve a low-carbon and resilient built environment. Below are some recommendations to support policy, practice, and further research:

- Make the inclusion of sustainable measures in new constructions mandatory (national policy); this could be done based on the type and size of the development, as well as by prioritising energy-driven retrofits to support a more circular economy.
- Create a more enabling environment and prevent/deter the procurement of substandard products by supporting self-help and innovative approaches by individuals, developers, and vendors interested in sustainable development. This would also create public awareness.
 - Subsidise importation and other relevant fees, such as taxes and duties associated with specific sustainable technologies, products, and services.
 - Implement quality standard initiatives such as awarding special licenses, alongside financial initiatives and creating and publishing a list of accredited vendors with star/quality ratings. This would create a more enabling environment and prevent/deter the procurement of substandard products, while also creating public awareness.
 - Tap into external/international donors and schemes to obtain funding, e.g., clean development mechanisms, leapfrog funds, and scaling social initiatives.
- Formalise building codes and regularly review and update them to reflect the context and changing environment (climate and landscape), particularly as buildings constructed today will be around for years to come.
- Further research investigating designing for sustainability, copycatting for sustainability adoption, the suitability of foreign sustainability certification within the Nigerian context, and the need for a local Nigerian sustainability rating system.
- Create a sector-wide inventory of energy use in office buildings, including both on-grid and off-grid use and generation.
- Set up joint government–industry groups and advisory boards at both the local and national levels to develop strategies and action plans for awareness campaigns, workshops, and training sessions that will drive change and tolerance.
- Establish research bodies and/or knowledge repositories for construction research, which will aid in bridging the data/information deficit.
- Utilise professional conditions of engagement as a special purpose vehicle (SPV) for sustainability adoption. A similar approach is already employed by the regulatory financial body in Nigeria, with the implementation of sustainable banking principles (Deloitte, 2017) and through its adoption of RE in bank buildings.

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