Building collapse: Pathologies in cities in Ghana

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Festival Godwin Boateng

MSc, Roskilde University, Denmark
BA (Hons) KNUST, Ghana

School of Global Urban and Social Studies

College of Design and Social Context

RMIT University

November 2019

Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis/project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Festival Godwin Boateng
12th November, 2019

Acknowledgements

Most students begin their thesis' acknowledgements with their advisors. Well, for me, because of *Jollof* (Google what it is), I begin with my landlord and his wife: Dr & Mrs Awaworyi Churchill. I am thankful to them for all the Jollof/support. I had most of my moments of analytical epiphany at midnights – i.e. the times I used to wake up to chase some of the wonderful Jollof they always prepared. Nothing inspires writing and thinking than Jollof. Especially, the '*charred under*'. Just so we are clear: Nigerians, I do not mean una (your) Jollof ooo!

Now to my advisors: Dr Binoy Kampmark, Dr Russell Solomon and Dr Robin Cameron, I cannot thank you enough. Thank you very much for all the support. You have been great friends. In addition to my supervisors, I enjoyed mentoring and support from Prof Jan Hayes of the School of Property, Construction and Project Management of the RMIT University and Emeritus Professor Gary Wickham of Murdoch University. I am also thankful to my two examiners—Associate Professor Franklin Obeng-Odoom of the Development Studies and Helsinki Institute of Sustainability Science, the second is anonymous—for their helpful feedback. Not to hang the inevitable flaws retained in the work on their necks. But without them, the work would have been even more imperfect than it is.

A very big thank you to Associate Prof Laura Horn and Prof Lindsay Whitfield – both of Roskilde, University Denmark – for introducing me to political economy. A big shout out to these two buddies: Renee and Alex. And to the Ghanaian Community in Melbourne – particularly the Football Team: Thanks a lot for the chance for me to show why our country does not win trophies anymore. As you all used to say, given my football-sense; rare capacity to defend upfront and lethality in front goal, Ghana is poorer that I may never play for the senior national team: the Black Stars. To Edem and Samuelson: I could not have been the excellent striker everyone wanted in their team without your '*assists*' and '*against*', respectively.

Many thanks to RMIT University for sponsoring my research. I am also thankful to all the institutions who sponsored my travels around the world to attend conferences and similar events, nay, to travel and eat different types of amazing food and make some wonderful friends across the globe. It should have really hit your budget. I know this because I recently bought air tickets with my own money –it felt exactly like pulling out nasal hairs: Eye-wateringly troubling.

A big shout out to all the study participants. I am thankful to the Ackoms and Mr Courage Ahiati, my brother from another mother, and all the people who supported me in diverse ways during fieldwork. I am grateful to my family for their rich support. But as for you '*Asomasi*' (you know yourself), I am still annoyed that you made me travel all the way to Navrongo for '*nothing*'—and you know the '*nothing*' I am talking about!

Dedication

To the memory of my father: David Yaw Boateng

And to my mum, Chritiana Adomako Boateng. I still remember distinctly how you were frowning your face at me when I unilaterally decided to drop out of senior high school. You wanted me to go to school. Well, here you are: a PhD. If I do not make a lot of MONEY with it, it's on YOU.

Table of contents

Contents

Declaration	ii
Acknowledgements	iii
Dedication	iv
Table of contents	v
List of tables and figures	viii
<i>List of tables</i>	<i>viii</i>
<i>List of figures.....</i>	<i>viii</i>
Preface	ix
Abstract	1
CHAPTER ONE: INTRODUCTION	2
<i>Background to the study.....</i>	<i>5</i>
<i>Initial assumptions about potential causes</i>	<i>15</i>
<i>Research questions.....</i>	<i>17</i>
<i>Preview of methods and findings</i>	<i>17</i>
<i>Empirical data refute initial causal assumptions</i>	<i>18</i>
<i>The political economists' methodology of accident research.....</i>	<i>19</i>
<i>The factors behind the collapse of buildings in Ghanaian cities.....</i>	<i>21</i>
<i>Snapshot of study contributions to knowledge on topic and practice</i>	<i>24</i>
<i>Plan of thesis</i>	<i>31</i>
CHAPTER TWO	32
<i>Causes of building collapse in the developing world: What does the literature say?</i>	<i>33</i>
Technical competence of building practitioners	33
Qualification of practitioners and building collapse: Summary of key highlights	36
Building materials and incidents of building collapse in developing countries	38
Building materials and building collapse in developing countries: Summary of key highlights	45
Enforcement of safe building and construction regulations	46
Chapter two: Conclusion.	51
CHAPTER THREE:.....	55
<i>Pathology of urban processes</i>	<i>55</i>
<i>The population growth and social pathology thesis: A brief overview.....</i>	<i>56</i>
<i>Synthesis of competing claims and application to study</i>	<i>59</i>
<i>Conceptual foundation: Urbanization and the urban context.....</i>	<i>62</i>
Theorizing building collapse in cities: Lessons from the urban pathology literature	63
<i>The pressures of accelerated urban building needs and building collapse in urban settings.....</i>	<i>67</i>
(a) Suboptimal constructions engendered by urban building need pressures	67
(b) Suboptimal building use practices influenced by urban political economy pressures	73
<i>The pressures of accelerated urban building needs: Summary of key highlights</i>	<i>75</i>
<i>Deficient construction governance and urban management.....</i>	<i>75</i>

Chapter Three: Conclusion	79
CHAPTER FOUR.....	82
<i>Approaches to safety in the construction sector: A general overview</i>	<i>82</i>
The construction safety approach	83
Forensic structural engineering	87
Chapter four: Conclusion.....	89
CHAPTER FIVE: METHODOLOGY	95
<i>Study approach: Qualitative</i>	<i>95</i>
<i>Methods of data collection:.....</i>	<i>97</i>
<i>Data structuring, management and analysis.....</i>	<i>99</i>
<i>The political economists' methodology of accident research: A brief overview.....</i>	<i>101</i>
<i>Other materials and fieldwork activities</i>	<i>104</i>
<i>Reflexivity on researcher's position.....</i>	<i>105</i>
<i>Limitations of study</i>	<i>106</i>
<i>Trustworthiness, validity and reliability of findings</i>	<i>107</i>
<i>A comment on ethics.....</i>	<i>110</i>
CHAPTER SIX:	112
DATA PRESENTATION & ANALYSIS PART 1:	112
<i>Compromised compliance and enforcement of building permit regulations</i>	<i>113</i>
Human resource challenges	116
Logistical constraints	118
Spate of development	120
Political interference.....	121
Long, costly and complicated permitting process	123
Corruption.....	125
Land conflicts	127
<i>Compromised compliance & enforcement of permit regulations: Summary of key highlights..</i>	<i>135</i>
<i>Use of standard non-compliant materials & improper handling of standard-compliant ones..</i>	<i>136</i>
<i>Outsourcing of jobs to low-skilled and unqualified people.....</i>	<i>144</i>
Regulation failure	145
Rising cost of other building inputs.....	146
Landguardism or activities of land guards.....	153
<i>Outsourcing jobs to low-skilled and unqualified people: Summary of key highlights.....</i>	<i>157</i>
<i>Incremental process of self-building and poor building maintenance culture.....</i>	<i>158</i>
Chapter six: Conclusion.....	163
CHAPTER SEVEN.....	171
DATA PRESENTATION & ANALYSIS PART 2: THE COLLAPSE OF BUILDINGS IN CITIES IN GHANA– WHAT FACTORS ARE AT WORK?	171
Strain on the informal sector to respond to rising building needs in the cities expeditiously	173
Land challenges and inappropriate construction and building use practices in the cities	178
Magnification of building regulation challenges in the cities.....	189
Chapter Seven: Conclusion.....	191
CHAPTER EIGHT:	197
<i>Implications of study findings for other developing countries similarly situated</i>	<i>216</i>

<i>Implications of findings for safety research in the construction sector</i>	<i>221</i>
<i>Implications of findings for practice</i>	<i>224</i>
CHAPTER NINE.....	232
<i>Suggestions/areas for further research.....</i>	<i>236</i>
REFERENCES.....	238
<i>Chapter: 1</i>	<i>238</i>
<i>Chapter: 2</i>	<i>245</i>
<i>Chapter: 3</i>	<i>251</i>
<i>Chapter: 4</i>	<i>255</i>
<i>Chapter: 5</i>	<i>256</i>
<i>Chapter: 6</i>	<i>261</i>
<i>Chapter: 7</i>	<i>268</i>
<i>Chapter: 8</i>	<i>274</i>
<i>Chapter: 9</i>	<i>283</i>
APPENDIX 1:	284
APPENDIX 2:	286
1. Responsibilities of chief investigator	287
2. Amendments.....	287
3. Adverse events.....	287
4. Annual reports	287
5. Final report.....	287
7. Retention and storage of data	287
8. Special conditions of approval	287

List of tables and figures

List of tables

Table 1: Urbanization reversal or de-urbanization policies, 1976-2007.....	3
Table 2: Some of the reported building collapse incidents in Ghana Post-2000.....	14
Table 3: Details of participants, fieldwork and other activities.....	98

List of figures

Figure 1: Rescuers at the scene of the Melcom Achimota collapse incident.....	6
Figure 2: A collapsed building at Cantonments, Accra.....	7
Figure 3: People gather to look at the debris from a building that collapsed in Nairobi, Kenya.....	8
Figure 4: Rescuers work at the scene of a building collapse in Ita Faji, Lagos, Nigeria.....	9
Figure 5: A building collapse scene in Bangladesh.....	10
Fig. 6: Conceptual framework of influences of vulnerability for building collapse in cities in developing countries.....	81
Fig 7: Evolution, scope and focus of construction safety research.....	87

Preface

The thesis follows the traditional doctoral dissertation format. Parts of it have, however, been published or accepted for publication in **10** different sources as **1** book chapter; **3** journal articles; **4** refereed conference papers; **1** trade journal article and **1** non-academic article. These are listed accordingly:

1. Boateng, F.G. (2020). 'Building Safe and Resilient Cities: Lessons from Ghana'. In Churchill, S.A. [ed] (2020). *Moving from the Millennium to sustainable development goals: lessons and recommendations*. Springer Nature
2. Boateng, F. G. (2019). A brief case for an organizational grounding for structural safety in the construction sector. *Construction Management and Economics*, 37(8), 472-47
3. Boateng, F.G. (2019). Knowing what leads to building collapses can help make African cities safer. *The Conversation*, June 25.
4. Boateng, F.G. (2019). A brief essay on socio-cultural factors and building safety in the construction sector. *43rd Australasian Universities Building Education Association Conference 2019*
5. **Boateng, F.G.** & Wright, R. (2019). A conceptual inquiry into building collapse in cities in developing countries. *43rd Australasian Universities Building Education Association Conference 2019*
6. Boateng, F.G. (2018). Exploring the collapse of buildings in urban settings. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*.
7. Boateng, F.G. (2018). Why the de-emphasis of wider societal factors in construction failures analysis is fatal. *Proceedings of the Institution of Civil Engineers –Forensic Engineering*.
8. Boateng FG (2017). Implications of building accidents in urban settings for building safety studies. *In Refereed Proceedings of Australasian Universities Building Education Association 2017 Conference*, Melbourne, Australia.
9. Boateng, F.G. (2017). Why we need to start talking about the social context of building accidents. *Planning News*, Vol. 43, No. 8. pp 18 – 19.
10. Boateng FG (2016). The collapse of buildings in cities in Ghana: Reasoning beyond 'scientism'. *In Refereed Proceedings of The Australian Sociological Association 2016 Conference* (Chou M (ed.)). (TASA), Melbourne, Australia

Abstract

Charles Gore, the British economic geographer, once said that to the extent that national economies and societies are not completely isolated and closed from outside influences, any social inquiry that gives primacy to just *internal* national factors, isolates and separates them from *external* influences as determinants of phenomena has not completed its intellectual task. This view, which is in perfect congruence with the tenets of the *methodology of accident research* developed by political economists for studying public risks, is detailed in Gore's celebrated critique of the so-called methodological nationalism and spatial separatism. This thesis distils the methods, ideas and lessons accrued in the literature on the methodology of accident research to explore the very serious but under researched urban issue of building collapse in developing countries' cities through a case study of Ghana. Much has been written about the speculative urbanism in the Global South—the patterns, problems, and prospects. But much less is known about the foundations of the shaky buildings that characterize it, apart from the conventional pathological—indeed Malthusian—view that the unstable buildings in the cities are the result of building need pressures induced by overurbanization—the so-called 'population bomb'. In this study, the analytical purchase of this *pathological* or *population focal* framing of building collapse in Global South cities to Africa's situation is challenged. It is argued that while they tend to be closely linked to population expansions, the influences of vulnerability for building collapse in African cities are structurally interwoven into the political economy settlement of their housing sectors most of which were shaped and moulded from the dynamic interplay of indigenous, inherited and externally-imposed conditions and factors. The population-heavy approach to building collapse, therefore, serves as a convenient distraction by obfuscating their historical-institutional contexts— i.e. the impact of the housing programs, policies and ideologies of colonial and postcolonial governments and international bodies on the creation and magnification of building risks in those parts of the world.

The thesis assembles detailed empirical data, via interviews and focus group discussions, from a range of professionals, including building inspectors, planners, architects and researchers from Ghana as well as data from various secondary sources and interprets them within the political economists' *methodology of accident research* framework to demonstrate the analytical value of the above proposition. It shows how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal capitalist policies of successive governments and programs of international bodies and their resulting transformations have shaped Ghana's informal settlement of building supply and customary land tenure systems into enduring impediments that undermine compliance and enforcement of safe construction practices, with adverse repercussions for building safety. Based on this analysis, the frequently asserted view that, as with developed countries, vulnerability for building collapses in developing countries could be addressed administratively through the enforcement of technical or engineering regulations or codes has shakier basis than is commonly assumed. Interventions to reduce such risks must be broad, more-wider reaching and involve initiatives that address more than just direct compliance and enforcement of technical regulations. They must also target the historically and socially created socio-political-economic factors, processes and systems that shape, dictate and implicate the pursuit and the provision of building needs and services in ways that produce progressive outcomes for a minority few and largely deleterious outcomes for the majority.

CHAPTER ONE: INTRODUCTION

The discourses on urban conditions tend to be framed around population characteristics especially the size of urban populations (Brenner & Schmid, 2014). Across otherwise diverse academic, political and journalistic circles, the explosive growth and concentration of people in urban settings (the so-called ‘population bomb’) has become the primary point of reference around which questions on contemporary global urban conditions are discussed (Brenner & Schmid, 2014; Bradshaw, & Brook, 2014; Bloom & Canning, 2008). The centrality of population growth to urban discourses is linked to the widely asserted claim that the rapid growth of towns and cities: large, dense, heterogeneous settlements generated economies of scale and external economies; encouraged division of labour and stimulated the technological innovation and the diffusion of knowledge that made the economic transformation of Europe possible (Fox, 2012; 2013; 2014; Smith 1991; Rostow, 1960; Marshall, 1920).

A steady flow of migrants in search of work in urban settings (better yet the ‘*modern sector*’), the narratives go, kept real wages low, thereby enhancing the profits of industrial enterprises and the quantity of surplus capital available for further growth-enhancing investments (Fox, 2013; 2014; Lewis, 1954). By shifting people from subsistent agricultural production into higher value-added industrial activities entailing increasing specialization and exchange, the process of urbanization was seen as contributing to the economic transformation of European societies (Fox, 2013). The European experience of urbanization has generally served as the empirical reference for social scientists seeking to understand the process and its relationship to social change elsewhere (Fox, 2013; 2014). It is widely suggested that the African situation has deviated from the European experience on the nexus between urbanization and economic transformation in very disturbing ways (see, Kamete et al, 2001, for instance).

A series of UN-sponsored studies in Africa and other developing countries in the 1950s revealed historically unprecedented rates of urban population growth and burgeoning shantytowns, rising under-

and un-employment, particularly among young people and many other urban pathologies occurring contemporaneously (Fox, 2013; 2014). The concept ‘over-urbanization’ was coined to describe the apparent imbalance between the rates of urban population growth and industrial development—a situation that was (and is still) portrayed in some circles as ‘abnormal’; ‘parasitic’; ‘premature’ urbanism in comparison to the European experience (Bryceson et al., 2009; Ravallion et al., 2007; Todaro & Smith, 2006; World Bank, 2000 in Obeng-Odoom, 2010). This thinking formed the basis of a rigorous push for urbanization reversal or ‘de-urbanization’ policies in developing countries by the international development establishment (Pye 1969; Sovani 1964; Harris & Todaro, 1970; Lipton, 1977; Bates 1981). There was a sharp increase in the number of developing countries with policies in place to reduce rural-to-urban migration beginning from the 1970s (table 1).

Table 1: Urbanization reversal or de-urbanization policies, 1976-2007

Percentage of countries with policies to reduce rural-urban migration				
1976		1986	1996	2007
Africa	49	48	54	78
Asia	80	63	67	71
Europe	58	50	27	38
Latin America	30	68	35	68
Oceania	0	20	0	83

Source: United Nations (2008)

In Africa, urbanization reversal policies ranged from benign ones such as Egypt’s mild attempt to ease ‘congestion’ and limit the size of Cairo by building 65 new cities (Obeng-Odoom 2009) to harsh ones such as (i) the erstwhile apartheid-era South African *Pass System* by which rural dwellers needed permits before they could visit urban areas (Maylam 1993); (ii) the Zimbabwean *Operation Murambatsvina* by which the military was used to clear out ‘filth’ and ‘restore order’ in the cities (Potts 2006); and (iii) the World Bank-IMF Structural Adjustment Programs (SAPs) that unleashed a set of

hardships in urban areas to correct the so-called '*urban bias*'¹ and prevent rural-urban migration (Cowan 1994; Obeng-Odoom, 2010b). Indirect approaches often took the form of rural development. In Ghana, for example, rural development typified by rural electrification and water projects has been and is still high on the agenda of successive governments which try to reduce the *push factor* in rural-urban migration (Obeng-Odoom 2009; 2010b).

Today, the pendulum of thought has swung albeit rather radically: the agglomeration of people in cities is now touted as an imperative for development (World Bank, 2009), inverting past thinking that saw it as a drain on development (World Bank, 2000; Bryceson et al, 2009). Population migration and concentration are now deemed markers of progress along the developmental path and must, therefore, be given full expression without impediment². In this study, it is argued that whether viewed as a bad or good force, the analytical purchase of this '*population focal*' framing of urban conditions to Africa's situation is limited. While urban problems in Africa tend to be closely linked to population expansions, the underlying causes are usually structurally interwoven into the political economy settlement³ of their urban systems most of which were shaped and moulded from the dynamic interplay of indigenous, inherited and externally-imposed conditions, factors and ideologies. The mainstream population-heavy approach to urban policy in Africa framed around limiting (World Bank 2000; Bryceson et al. 2009; Kamete et al, 2001) or stimulating urban agglomeration (World Bank, 2009; Potts, 2009; Njoh, 2003), is, therefore, inappropriate as it serves as a convenient distraction by obfuscating the historical-institutional context of the Continent's urban problems— i.e. the enduring impacts of the programs,

¹ The then prevailing view that governments in developing countries were allocating a disproportionate share of public resources to urban areas and use "price twists" to favor urban dwellers at the expense of rural peasants (For a review see Lipton (1977) '*Why poor people stay poor: A study of urban bias in world development*' and also Bates (1981) and World Bank (1981).

² The likes of Richard Florida argues, however, what facilitates cities' prosperity and wealth is not population agglomeration per se. But the class of people it attracts. See his 'Creative Class' thesis (Florida, 2002; 2012)

³ The mechanisms related to the formation and transformation of their cities.

policies and ideologies of colonial and postcolonial governments and international bodies on the creation and magnification of urban problems in Africa.

The study draws on primary and secondary data on the factors underlying the creation of weak or structurally defective buildings in cities in Ghana to demonstrate the analytical value of the above proposition. It shows how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal capitalist policies of successive governments and programs of international bodies and their resulting transformations have shaped Ghana's informal settlement of building supply and customary land tenure systems into enduring impediments that undermine compliance and enforcement of safe construction practices, with repercussions for incidents of building collapse in the cities. The findings of the study give impetus to the growing challenge (See, Obeng-Odoom, 2010b; 2016, for instance) for change in mainstream framing of developing countries' urban conditions/problems to focus more on policy processes, institutional dynamics, and historical peculiarities instead of population characteristics or dynamics. The study puts the case for the need for the various global, national, and local actors working on the health of cities to be more reflective of the decisions they take today about urban infrastructure, land use and management as they could have serious unintended implications for development outcomes in the future and prove critical in either preventing or locking cities into unsustainable development pathways and expose them to increasingly intense and frequent urban shocks and stresses.

Background to the study

In the early morning of November 7, 2012, a six-story building being used as supermarket collapsed at Achimota, one of the suburbs of Accra, the capital of Ghana (figure 1 below). The building collapsed just when the supermarket was about to be opened to the public. The West African country's 2012 presidential and parliamentary elections were just a month away, so the politicians were crisscrossing the country wooing the electorates for votes. The gravity of the incident, however, forced them to

suspend their campaigns in commiseration with the victims and their families (Ametepey et al., 2015). When it became apparent that Ghana does not have all the required technical expertise to carry out rescue operation of that magnitude expeditiously, the President accepted support from the Israeli Government (a nine-member rescue team with special equipment and a sniffer dog) to help locate and remove both dead and living victims. Rescuers and volunteers worked tirelessly for four (4) continuous days (NADMO, 2014).

Fig 1: Rescuers at the scene of the Melcom Achimota collapse incident. Source: <https://www.lionnelweb.com/blog/collapsed-melcom-building-had-no-permit/>

According to the National Disaster Management Organization – the state agency that coordinated the rescue effort –eighty-one (81) Ghanaians were affected: fourteen (14) lost their lives, the remaining sixty-one (61) suffered various degrees of injuries (NADMO, 2014). The total economic loss (due to data paucity) is difficult to quantify. Nonetheless, according to Oteng-Ababio (2016), each of the families of the people who lost their lives reportedly received GHC 10 000 (USD 5320.56) as compensation from the government. The City authorities also reportedly established the Melcom Disaster Fund, with a seed money of GHC 35 000 (USD 18 622.10), to which Melcom Management

contributed GH¢ 25 000 (USD 13 301.40). Several merchandise worth millions belonging to Melcom, the company that was using the building as supermarket were also destroyed (NADMO, 2014).

That was not the first time a building had collapsed in the country. There had been several other incidents, which, however, did not garner media and political attention as the Melcom incident did (see NADMO, 2014; Asante & Sasu, 2018; 2015; Oteng-Ababio, 2016).

Fig 2: A collapsed building at Cantonments, Accra. The incident killed 2 people and trapped 19 others on 26.07.15. Source: <https://www.myjoyonline.com/news/2015/July-26th/one-more-dead-in-cantonments-building-collapse.php>

The phenomenon is yet to abate as buildings continue to collapse, maim and kill people in the country. An incident in point is the January 2017 collapse of a school building, which reportedly killed six children (Koranteng, 2017). What is remarkable about the incidents is its prevalence in urban settings— particularly, Accra, the capital and Kumasi, Ghana’s second biggest city and their environs (see Asante & Sasu, 2018; Arku, et al., 2016; Oteng-Ababio, 2016). However, the Ghanaian situation is not exceptional in what seems to be transpiring as a broader phenomenon in the Global South where buildings frequently collapse in cities and their environs.

Fig. 3: People gather to look at the debris from a building that collapsed in Nairobi, Kenya in June 2017. EPA/DAI KUROKAWA

The information is disparate and scattered. But what is known confirms a clear trend: that building collapses are becoming a common, tragic occurrence in cities in developing countries – particularly Africa and Asia. In Kampala, Uganda, Alinaitwe and Ekolu (2014) counted 54 building collapse deaths and 122 injuries in just four years (between 2004 and 2008). In Nigeria, Windapo & Rotimi (2012) compiled 112 cases between December 1978 and April 2008 in Lagos alone. In March 2019, a four-story multi-purpose building reportedly collapsed and killed twenty people at the Ita-Faji area of the Lagos Island district (Akwagyiram, 2015). Other cities in the country such as Port Harcourt, Abuja, Enugu and Ibadan have also experienced similar fatal incidents (Ayuba et al., 2012; Ede, 2010, 2010b; Fakere et al., 2012; Oloyede et al., 2010; Windapo & Rotimi, 2012; Dimuna, 2010 in Asante & Sasu, 2018; Ifedolapo, 2015; Adesanya & Olanrewaju, 2014, Akinyemi et al., 2016; Okolie et al., 2016, for

instance). By way of illustration, on August 17, 2018, a building collapsed and buried so many people (two were feared dead) at the capital, Abuja (Premium Times, 2018).

Fig. 4: Rescuers work at the scene of a building collapse in Ita Faji, Lagos, Nigeria, on 13.03.19. Photo by Israel Ophori/EPA-EFE

To put the scale of the problem in Africa's most populous country into perspective, 29 deaths and 76 injuries were reportedly recorded from 12 building collapse incidents across the country within just four months (February to May 2019 – see Adugbo et al., 2019). Other countries on the continent, too, have experienced similar fatal incidents in recent times. For instance, a World Bank report (Moullier, 2015) noted what it referred to as a particularly strong pattern of spontaneous building collapses in Kenya over the past 20 years predominantly in the cities. For instance, on June 13 2017, a 7-storey building reportedly collapsed in the capital, Nairobi (BBC, 2017) even as another 6-storey had collapsed, killed forty-nine (49) and injured several others in the City in April 2016 (Reuters, 2016).

Tchamba & Bikoko (2016), Alinaitwe and Ekelu (2014); Erling & Watermeyer (2009), to cite but a few studies, have reported on the situations of cities in Cameroon and some East African countries' including Uganda and Tanzania.

As noted earlier, this is not a uniquely African problem. It occurs in other rapidly urbanizing parts of the developing world as well.

Fig. 5: A building collapse scene in Bangladesh. Photo credit: Dhaka Tribune

In Asia – another hotbed for the phenomenon – some of the headline cases include the collapse of the Royal Plaza building in the city of Nakhon Ratchasima (Korat) in Thailand, which killed 137 people and injured another 227. In April 2013, an eight-story building collapsed at Dhaka, the capital of

Bangladesh. The incident led to 1,129 deaths and 2,515 injuries (Moullier, 2015; Hodgson et al, 2016). Around the same time, their neighbours in India, Mumbra, had also experienced, what was described as, the worst building collapse incident in the area. About 74 people died, including eighteen children. The incident location is a home to about one 1 million people. The year before (i.e. 2012), according to Moullier (2015), India saw more than 2,600 deaths and 850 injuries as a result of the spontaneous collapse of 2,737 building structures. Other headline cases in Asia include the Selangor incident in Malaysia, where an apartment collapsed and killed about 48 people. Selangor (home to over 6 million people) is one of the states on the west coast of Peninsular Malaysia, encircling the capital, Kuala Lumpur. In November 2015, a building collapsed in Lahore, the capital of Pakistani province of Punjab and killed about 45 people. Feifei (2014) and Lyu et al (2018) have also compiled some cases in China and the trend shows that they usually occur in urban settings.

Building collapse in the cities of developing countries poses great risk to the present and not-too distant future of our ever-urbanizing world. First, while some may not be able to cause high enough damage at a time to meet the criteria to be categorized as “disasters” in national and international databases, as noted by one World Bank study (Moullier, 2015), their accumulated impacts are usually just as much if not greater than those of large disasters that result from extreme events. Second, the 21st century is marked by the rapid growth and concentration of large numbers of people in cities (Gottdiener & Hutchison, 2006; United Nations, 2014) in developing countries: 2.5 billion more people are joining the world's urban population by 2050 – over 90% are to reside in developing countries, particularly Asia and Africa (United Nations, 2014), where, reportedly, buildings also collapse the most. The growing number of climate-related hazards (Moullier, 2015; Birkmann & von Teichman, 2010) portends an even higher disaster-risk as more buildings could collapse in such places as a result of hydro-meteorological hazards.

Clearly, building collapse in developing countries' cities constitutes one of the critical threats to a healthy and sustainable urban life, which, therefore, raises the need for an urgent conversation toward unravelling and addressing the range of agencies, motivations and causes that propel the creation of unsafe buildings in cities in developing countries and to that end, the reason buildings tend to collapse in such places. This study opened with the conversation on the subject from Ghana. Despite its prevalence in especially the country's cities, building collapse has remained a very much under researched issue in Ghana. The focus of development control scholarship in the country, Asante & Sasu (2018) note, has largely been on procedural issues related to building permit acquisition and compliance with planning regulations (Arku et al., 2016; Ahmed & Dinye, 2011; Boamah et al., 2012; Botchway et al., 2014; Kpamma & Adjei-Kumi, 2013; Yeboah & Obeng-Odoom, 2010), construction of unauthorized buildings (Somiah, 2014) and impediments to the implementation of the National Building Regulations, 1996 (Legislative Instrument [L.I.] 1630) (Ametepey et al., 2015).

Keteku-Atiemo's *'Rampant failure of buildings in an era of massive shelter development in Ghana'* focused on the need to empower informal building practitioners to reduce collapse incidents in the country (Keteku-Atiemo, 2006). Even though Danso & Boateng (2013; 2015) and recently Tutu & Bempong (2018) also looked at building collapse, their focus was on whether the quality of cement and concrete contribute to the problem. Asante & Sasu (2018) did a comprehensive review of the prevalence of the phenomenon in cities not just in Ghana, but also in the broader developing world context, but, nevertheless, did not address the underlying factors. Instead, they focused on the perspectives of the Kumasi City building inspectors on the phenomenon. The literature on the broader developing countries' context is like that of Ghana. The rampant occurrence of the collapses in urban settings has been widely noted (see Windapo & Rotimi, 2012; Ayuba et al., 2012; Ede, 2010b; Fakere et al., 2012; Oloyede et al., 2010 for a review of the case of Nigeria; Tchamba & Bikoko, 2016 for that of Cameroon; Fernandez, 2014; Muhumuza, 2013; Alinaitwe & Ekolu, 2014; Kwera, 2008; Wachira, 2015 for cases

in cities in Uganda, Kenya and Tanzania and other East African countries and Asante & Sasu, 2018 for cases in Asia and Latin America). Nevertheless, little effort has gone into unravelling the underlying causes.

There is, therefore, a clear gap in the literature on the factors underlying the collapse of buildings in the rapidly urbanizing parts of Ghana and the broader developing world cities' contexts, notwithstanding the dire public health implications for sustainable urban life. This study's inquiry into the case of Ghana could, therefore, not have been timely enough. Ghana, the West African country, is an exemplar for exploring the broader issue of building collapse in developing countries' cities because, first, as with other developing countries, Ghana has seen rapid growth with half of the over 24.2 million population living in urban areas (50.9% as per the 2010 census –it was 43.8% in 2000-GSS, 2012). Further, Ghana's construction sector, just like that of most developing countries (Wells, 2007; UN-Habitat, 2007; Ofori, 2007; Arnott, 2008), is dominated by informality – self-builders and small-scale enterprises, which may be an individual (Arku, 2009; Keteku-Atiemo, 2006; Boamah, 2010). With these similarities, it was envisaged that studying Ghana could offer some insights into the case of other developing countries similarly situated.

Table 2: Some of the reported building collapse incidents in Ghana Post-2000⁴.

Date	Type of building	Location	Damage
April 23, 2000	3-Storey Building	Madina, Accra	2 people missing 16 injuries; loss of property
December 13, 2002	Four-storey Building	Accra	Loss of property
December 15, 2006	4 – storey office building complex with car park	Asafo – Kumasi	Destroyed many cars. Loss of property
March 6 2008	2-storey building	Danyame-Kumasi	1 death Loss of property
August 14, 2008	2 – storey building	Kejetia – Kumasi	Destroyed 40 stalls and shop and merchandise. Loss of property
October 9, 2009	2–storey building uncompleted	Ashaiman – Accra	4 deaths Loss of property
January 31, 2010	5–storey hotel building under construction	Tarkwa – Western Region	3 deaths; loss of property
June 5, 2010	4 – storey building	Spintex Road, Tema	2 injuries; Loss of property
January 5 2011	two-storey building under construction	Antwirifu, Dormaa Ahenkro, Brong Ahafo	2 deaths; 3 injuries; loss of property
November,7 2012	5-storey	Achimota – Accra	14 deaths, 61 injuries
July 27, 2015	3-storey building under construction	Cantonments	1 death; 20 injuries; Loss of property.
February, 6 2016	Storey Building	Accra	4 injuries; Loss of property.
8 May 2017	Church building	Gbewe, Accra	20 people injured
19 November 2018	Two-storey building	Accra – North Industrial Area	1 death; 3 injuries Loss of property
29 September, 2019	School block	Dworlu – Accra	2 death; Loss of property
30 September, 2019	Not reported	Dworlu – Accra	2 deaths; 6 injuries Loss of property

Source: Owusu (2017); Asante & Sasu (2018) and media reports

⁴ These are just a few cases compiled from media reports and do not include incidents such as those that might have occurred in slum and other low income areas that did not garner media attention.

Initial assumptions about potential causes

Urban pathologists – scholars who study social problems in cities – have long maintained that the urbanization process of spatial concentration of people and their socio-economic activities affect the extent to which social problems occur and the particular forms they take in urban settings (Pitcher, 1997; Herbert & Smith, 1989; Legters, 1985; Haynes et al., 1985; Komorowski, 1985). This implies that the social problems experienced in cities have a uniquely ‘*urban*’ dimension and, therefore, have to be analysed and addressed, if they are to be dealt with at all, in the context of urban agglomeration (Haynes et al., 1985; Legters, 1985; Kulinski, 1985). Studies that approach the analysis of urban social problems this way are classified under the broad term urban pathology literature (Legters, 1985; Kulinski, 1985). The study turned profitably to the methods and ideas accrued in the pathology of urban processes literature to conceptualize the range of agencies and causes that underlie the creation of unsafe buildings in cities in developing countries, and to that end the reason most collapse incidents occur in such places.

The qualitative method of document analysis (Bowen, 2009) was deployed to explore contemporary as well as historic documents on housing and construction, media, scholarly and investigative reports on building collapses and other cognate materials on the growth and development of cities across otherwise diverse geographical locations. Some of the key materials relied upon include Beard (2015); Closs (2013); Hartwell (2001); Kidd (2002); Nevell (2011); Symonds (2005); Kemp (1989); Hurst (2001; 2006); Nicols (n.d); Mistry et al (2001); Menum & Mistry (2001); Thiruppugazh (2008); Yates (2002); Bikçe, & Çelik (2016); Ainuddin et al (2014); Wang (2014); Hodgson et al (2016); Ifedolapo (2015); BD (2007); Lyu et al (2018); Moullier (2015); Wisner et al (2003); Pelling (2003); Ojikpong (2016); Coen et al (2008); Sheuya (2009); Oosterbaan et al (2012) and Desai (2012).

Consistent with the claim by urban pathologists that the social, economic, environmental and other problems experienced in urban habitats are usually inextricably linked to the multifaceted processes of

urbanization, the literature showed that building collapse in the urban context is linked to urbanization processes and pressures. Accelerated growth and agglomeration of people in cities usually come with a cascading upsurge in the demand for buildings. This, in turn, engenders a range of agencies, motivations and causes that encourage suboptimal adaptation of construction processes and already built buildings (such as uncontrolled hasty constructions; non-engineered constructions such as adding appendages and/or extra floors atop old structures; conversion of buildings to uses unintended in original designs) leading to widespread creation of unsafe buildings in cities. Cities' managers will normally intervene by enforcing safe building and construction regulations against these practices. But, too often, in developing countries, institutional cultures such as corruption and political interference further undermine authorities' responsibilities. Add to that a dearth of building inspectors and other resources, and unsafe building practices multiply. In the end, huge stocks of structurally suspect buildings are created, sometimes in hazard-prone locations. This, then, can lead to disaster. (This is elaborated upon in chapter three and Boateng, 2016; 2018; 2019a; Boateng & Wright, 2019 with supporting cases and examples.)

Based on the foregoing, building collapse in cities in developing countries was theorized as the unintended maladaptive effect of inappropriate construction and building use practices propelled by the exigencies of accelerated demand for buildings subsequent to rapid urban expansions, in which weak regulation play key roles in contributing and reinforcing the prevalence of the inappropriate construction and building use practices that lead to the incidents. At issue is how urbanization-induced accelerated demand for buildings influence, shape and/or dictate construction processes and building use practices in cities and their environs in ways that tend to undermine safety, sustainability, wellbeing and longevity imperatives. The empirical focus of the study was to test the veracity of this theory of vulnerability for building collapse in cities in developing countries to the situation of Ghana.

Research questions

The study was guided by the following questions:

1. To what extent, and in what ways, do the urbanization-induced substandard construction and building use practices discussed in Boateng (2016; 2018; 2019a) and Boateng & Wright, (2019) contribute to the creation of unsafe buildings in Ghanaian cities?
2. What insight(s) could be mined from Ghana to think about other developing countries similarly situated?
3. What set of concepts and analytical frames could the overall findings contribute to the broader literature on **(a)** building safety and **(b)** urban pathology in Africa?

Preview of methods and findings

The study's focus on exploring the influences in Ghanaian society that underlie the creation of unsafe buildings in the cities necessitated targeting what qualitative researchers (Payne & Payne, 2004; Polkinghorne, 2005) often classify as key informants—people in the country whose experiences place them in the position to illuminate on the subject in-depth. Consequently, qualitative frameworks for data collection became a natural fit. A semi-structured interview guide (appendix 1) was designed, based on the causal ideas established in Boateng (2016; 2018; 2019a) and Boateng & Wright (2019), for fieldwork in Ghana. The study combined both purposive and snowball sampling techniques – two of the widely regarded qualitative sampling techniques (Marshall, 1996; Saunders et al, 2009) to engage a total of thirty-two (32) multiple stakeholders in Ghana's construction sector including architects, building engineers; surveyors; contractors; regulators and researchers.

The chosen participants are affiliated to the following professional bodies and research institutes in Ghana: Ghana Institution of Engineers; Ghana Institute of Architects; Ghana Institute of Surveyors; Ghana Licensed Builders & Surveyors Association; Council for Scientific and Industrial Research Building and Road Research Institute and Construction Watch—a civil society organization focused on

exposing flaws in built structures in Ghana. The rest of them are affiliated to the Kumasi and Accra Metropolitan Assemblies- the two state bodies in charge of the management of the cities of Accra and Kumasi – the hotbeds of building collapses in Ghana (Asante & Sasu, 2018; Oteng-Ababio, 2016). The scholars the study engaged do research and publish on the topic in Ghana. They hold faculty positions in Ghana, Finland and Germany. The 32 participants apply to the study a combined experience of more than three centuries of practice in Ghana’s construction and urban sectors.

The study adopted multiple data collection methods including semi-structured focus group discussions (FGDs) and one-to-one (face-to-face) interviews; phone interviews; email exchanges; and WhatsApp messaging to gather the empirical information. These different methods of data collection (detailed in chapter 5) were employed to suit the different circumstances, schedules and locations of the various participants. The transcripts generated from the interviews, FGDs and the other mediums of engagement constituted the empirical or primary data for the study. However, a substantial amount of secondary materials (including Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah et al., 2012; Botchway et al., 2014; Ametepey et al., 2015; Arku et al, 2016; Asante & Sasu, 2018) and investigative and other reports on building collapse in the country (e.g. GhIE, 2012 and NADMO, 2014) and elsewhere (for instance, Lyu et al, 2018; Thiruppugazh, 2008; BD, 2007; The Guardian, 2016; Associated Press, 2016; Arya, 2000; Yates, 2002; Olajumoke et al, 2009; Alinaitwe & Ekoru, 2014; Hodgson et al., 2016; Masurkar & Attar, 2014; Moullier, 2015) were incorporated in the study to enhance its comparability potentials. (This is further discussed in the methodology chapter.)

Empirical data refute initial causal assumptions

In the course of data analysis, it became apparent that the analytical/causal framework established from the urban pathology literature was not adequately suited for engaging the deeper issues underlying the creation of unsafe buildings in cities in Ghana. Contrary to the discussions in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three, it was increasingly becoming clear from the

empirical data that the conditions that underlie the insufficient focus on putting up the best quality buildings possible in Ghana's cities are *not* generated by urbanization induced-building need pressures. They rather seemed to be *embedded* in the political economy settlement of the country's urban system, which is a product of the simultaneous interplay of colonial and postcolonial modernization and recent market-led neoliberal policies and ideologies that have shaped and continue to shape urban, housing and other policies of successive governments and programs of international bodies in the country.

In short, what emerged from the empirical data was that, far from being ruptures driven mainly by the demographic and economic expansion processes of urbanization, building collapse in cities in Ghana seemed to have an historical-institutional context – the factors that give rise to the risks just as much arise from both local problems (such as weak regulation) as they do from inherited and externally-imposed (underdevelopment) conditions (such as colonial and neoliberal urban policies). This, therefore, required that the phenomenon be analysed as the consequence of the larger historically and socially created socio-political-economic factors and developments underlying the pursuit and the provision of building needs and services in the country – of which, in the cities' context, the forces of urbanization are only one of such factors. Consequently, the '*methodology of accident research*' developed by political economists for studying public risks (Molotch, 1970; 1976; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Freudenburg et al., 2009) was turned to for support.

The political economists' methodology of accident research

Political economists who study accidents admonish that such phenomena must not be approached, seen or perceived as mere isolated events. Rather, they must be considered as windows for unpacking and dissecting the normal working of the social system (Obeng-Odoom, 2018). The roots of accidents, in this view, are to be found in larger socio-political-economic forces and, therefore, must be explained by reference to them (Tierney, 2007). Contrasted with simply starting by looking at the "accident," the political economist using accident research methodology investigates the underlying social conditions

and processes, which in most cases, may even be far removed from the event or accident itself (Molotch, 1970; Obeng-Odoom, 2018; Wisner et al, 2003; Tierney, 2007; Freudenburg et al., 2009). Thus, a political economy approach to accident searches for the roots of such phenomena in larger historical, political-economic factors, and, therefore, provides a framework and set of concepts that take a critical distance from immediate causes, and integrate or situate their build-up process(es) within the relevant series of historical factors (Obeng-Odoom, 2010c; 2018; Freudenburg et al., 2009).

In this sense, the approach provides a bridging framework that shows awareness of the way immediate crises are inseparably connected and/or deeply embedded in the societal structures and social systems that shape, structure and dictate access and the distribution of resources and exercise of power in society (Bankoff et al, 2004; Wisner et al, 2003). The approach connects accident vulnerability and losses with larger systems, processes and factors at local, national, and even global or international levels and, especially, how these scales/levels of emphases interact and reinforce one another and nurture or generate risks (Tierney, 2007; 2010). In this sense, it is more able to address the methodological problems associated with what Charles Gore, the British economic geographer, once described as methodological nationalism or spatial separatism⁵.

To put it simply, the methodology of accident research helps to untruss the deeper societal and political-economic underpins of hurtful events, disruptions and human insecurities that the media and policy makers usually overlook or insufficiently prioritize in policy and public conversations on such phenomena. The methods and ideas accrued in the literature on the framework were deployed to shed light on the historical-institutional context of the empirical data – i.e. to situate the influences of the creation of unsafe buildings in cities in Ghana within the relevant larger historical, political-economic factors, processes and developments.

⁵ The central or identifying feature of these analytical frameworks is the isolation and separation of internal (national) and external (global) processes and factors as determinants or influences of phenomena, with primacy usually given to the former. For a review see Gore (1996; 2010).

The factors behind the collapse of buildings in Ghanaian cities

These factors: the strain on the informal settlement of building supply systems; undisciplined and insecure customary land tenure system and weak regulation emerged from the data as critical to how the creation of unsafe buildings arise in Ghana and are thus central to establishing the grounds or *structural context* for the deleterious consequences of building collapses in the country's cities. First, *the strain on the informal settlement of building supply systems* in Ghana. Ghana's building supply market is driven by the informal sector dominated by low income developers (Owusu-Ansah et al, 2017; Asante et al, 2018) with adverse implications for safe and sustainable supply of building needs in the country. The rising cost of housing construction⁶ coupled with the socio-economic situations of the developers create path dependency or ratchet effects by limiting their capacity to invest in safer building materials, construction, highly skilled labourers and regular maintenance. Further to the above, without meaningful access to stable income or formal housing finance schemes, majority of the informal developers are unable to start and complete their buildings at a go. Every part of the construction process is done incrementally, in piecemeal (Grant, 2007; Asante et al, 2018)—a process which takes sufficiently long time (5 – 15 years or more) that the structures would usually be ripe for integrity or safety crisis long before they are even completed due to constant exposure of materials and every stage of the uncompleted structure to wetting and drying weather conditions.

The second structural influence of the creation of unsafe buildings in Ghana is the country's *undisciplined and insecure customary land tenure system*. While the state owns some lands in many urban areas in Ghana, customary tenure systems govern land transactions in the country (Grant, 2007; Ayee et al, 2008). The customary land tenure system is, however, very undisciplined and insecure

⁶The rising cost of housing construction in the country is partly fueled by a mixture of (mainly externally-driven) factors such the emergence of large-scale foreign banks-financed private real estate companies and their clientele (mainly Ghanaians abroad, staff of foreign embassies and trans-national corporations) in the Ghanaian construction sector; inappropriate colonial building laws and regulations, which encourage dependence on expensive foreign materials; exchange rate volatility and inflation which are driving up the prices of critical building inputs such as land and materials. More on this in the analytical and subsequent chapters

marked by widespread, intense disputes and uncertainties. This has meant that purchasers of land in especially the cities are perpetually exposed to or face huge risks of protracted litigation or loss of funds as the sellers may not be capable of transferring proper legal title to the purchaser. To avoid such problems, the common strategy widely adopted by developers is to circumvent the rather long and costly building permit acquisition process and commence projects as soon as they buy lands fearing that their application may be refused or delayed unnecessarily, which might make them lose their lands for failure or long delays in project commencement. Further to compromising compliance with permit regulations, land conflicts also contribute to the prevalence of other inappropriate construction practices such as outsourcing jobs to unqualified building practitioners and uncontrolled hasty constructions in the country. (How these dynamics play out are detailed in chapter 6).

It is against the backdrop of the above perilous construction climate that the cities are experiencing rising demand for buildings. The pressures of accelerated demand for buildings are exacerbating the already precarious construction climate by encouraging even more deleterious construction and building use practices manifesting as uncontrolled speedy/hasty constructions; construction of appendages and extra floors atop old structures and widespread conversion of buildings to uses unintended in original designs. The authorities will normally step in to uphold public health and wellbeing by bringing the problem under control. However, limited capacity – in terms of human resources and logistics and the spate of construction developments; political interference and the ever-intractable issue of corruption undermine the enforcement of building safety regulations in the cities. To summarize, the challenges of building regulations enforcement have increased in the cities where the quest to develop is undermining the need to be prudent. In the end, a conducive climate is created for the pursuit and the provision of building needs and services to play out in ways that lead to insufficient focus on safety imperatives and, hence, the creation of unsafe buildings waiting for their day.

The study, per the foregoing, argues that building collapse incidents in Ghana's cities result from the interplay of the inappropriate construction and building use practices influenced by the strain on the country's informal settlement of building supply systems, undisciplined and insecure land tenure system and weak regulation, in which the exigencies or pressures of accelerated demand for buildings in the cities triggered by rapid urban expansions generate further incentives, causes and motivations that contribute and reinforce the prevalence of the deleterious construction and building use practices, and, hence, the creation of even more unsafe and poorly maintained buildings in such places. At issue here is how accelerated demand for buildings, in the context of rapid demographic and economic expansions in the cities, act on or worsen the prevailing structural influences of adverse construction processes and building use practices in the Ghanaian society in ways that lead to the creation of structurally incompetent buildings in the cities.

Contrasted with existing studies (for instance: Asante & Sasu, 2018; Kuta & Nyaanga, 2014; Olajumoke et al., 2009, Adewole et al., 2014) that explore the causes of building collapse in developing countries without any coherent engagement with the underlying *historical-institutional* dynamics, the study integrates or situates their build-up processes within the relevant series of historical factors, policies and developments that have shaped them into the structural conditions that recurrently generate vulnerability for such risks. The key historical-institutional issues underscored here relate to how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal housing and other urban policies of successive governments and international bodies (particularly the World Bank and IMF) and their resulting transformations have shaped and moulded Ghana's informal settlement of building supply and land tenure systems into enduring impediments that undermine compliance and enforcement of safe construction practices in the cities. In sum, the study argues that, while closely linked to the demographic and economic expansion processes of urbanization, the phenomenon of building collapse in cities in Ghana has an historical-institutional context—the factors

that give rise to the risks just as much arise from both internal problems (such as weak regulation) as inherited and externally-imposed (or underdevelopment) conditions (such as colonial and neoliberal urban policies).

Snapshot of study contributions to knowledge on topic and practice

First, the study joins the growing wave of dissent (see, for instance, Obeng-Odoom, 2010; 2016) from the mainstream population focal approach (Bryceson et al., 2009; Ravallion et al., 2007; Todaro & Smith, 2006; World Bank, 2000 cited in Obeng-Odoom, 2010a) around which questions on Africa's and, broadly, developing countries' urban conditions are framed. The abnormal or over-urbanization thesis' intent focus on population tends to create the impression that urban problems are solely or even mainly derived from population characteristics, especially the size of urban populations (Molotch, 1976; Obeng-Odoom, 2016). The empirical evidence from Ghana does not bear out this claim. This thesis will show that, while closely linked to population expansions, the influences of the creation of unsafe buildings in cities in Ghana are structurally interwoven into the political economy settlement of the country's urban system, which was moulded from and by the intersectionality of the ever-enduring forces of colonial/historical and contemporary-modern policies and the more recent world system neoliberal-capitalist ideas that in untold ways have shaped and continue to shape the design and implementation of urban policies and other agenda of successive governments and international bodies in the country. The building need pressures induced by rapid urban expansions only worsen or exacerbate the scale of the problem by encouraging the creation of even more unsafe buildings in the cities and, hence, the reason most collapse incidents occur in such places.

Second, the study's historical-institutional approach to building collapse takes a critical distance from what could be termed as the '*internal focal approach/paradigm*' that the scholarly discourses on building collapse in developing countries have traditionally followed. Studies that follow the approach tend to frame such risks as unintended unfortunate isolated events, accidents or incidents that result

from problems ‘*internal*’ to developing countries. They place emphasis on how micro issues such as ignorance of safety imperatives underlying the construction processes, carelessness, negligence, greed, and indiscipline on the part of builders, contractors as well as regulatory blunders influence inappropriate construction practices such as outsourcing jobs to unqualified people, utilization of standard-noncompliant materials, cutting down safety specifications in designs among others (See Asante & Sasu, 2018; Kuta & Nyaanga, 2014; Olajumoke et al., 2009, Adewole et al., 2014, for instance). By giving primacy to *national* and *individual* factors *internal* to developing countries (as though their national economies and societies, construction culture and practices are isolated, separated and not implicated upon by any outside influences or whatsoever), the studies suffer what Charles Gore described as methodological nationalism or separatism (Gore, 1996; 2010).

Further to contributing to understanding of the range of agencies, causes and motivations underlying the collapse of buildings in Ghana’s cities, the study will argue also that the internal focal approach to building collapse in developing countries could increase our learning only so much. There is even more to learn from engaging how the ‘*micro*’ problems highlighted in the approach are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at local, national, and even global levels in nurturing and generating the inappropriate construction practices and behaviours. Thus, the study will suggest that, it is more insightful to perceive the influences of the deleterious construction practices that influence collapse incidents in developing countries as structurally interwoven into the political economy settlements of their construction sectors, which were shaped from and by the intersectionality of both internal, external and inherited conditions, factors and ideologies. In this sense, the study’s originality lies in its rigorous (re)interpretation and problematization of the micro-causal approach within a political-economic framework that explains the historical-institutional context of building safety challenges in developing countries by illuminating

how the ‘*micro*’ factors that give rise to such risks just as much arise from internal, inherited and externally imposed conditions.

Taken together, the study argues that the factors that give rise to vulnerabilities for building collapses in developing countries are partly subordinated to and enmeshed in broader processes that are expressions of international, national and local socio-political-economic factors and developments. This analysis shows that the frequently asserted view that, as with developed countries, vulnerability for building collapses in developing countries could be addressed administratively through the enforcement of technical or engineering regulations or codes (Moullier, 2015; Soane, 2016; Asante & Sasu, 2018) has shakier basis than is commonly assumed. Interventions to reduce such risks must be broad, more-wider reaching and involve initiatives that address more than just direct compliance and enforcement of technical regulations. They must also target structural issues including the broader socio-political-economic conditions, processes and systems that underlie and shape access and distribution of resources and the pursuit of building needs in ways that generate risk or force some people to build themselves into inadvertent disasters. In this sense, the study adds to the growing voice for a city-wide approach to urban policy making such as urged by Jennifer Robinson (See, for instance, her *ordinary cities approach* –Robinson, 2006).

The study goes to great lengths in amplifying the historical-institutional context of the phenomenon under the admittedly vainglorious presumption that the lessons may nudge the various global, national, and local actors working on the health of cities to be more reflective of the decisions they take today about urban infrastructure, land use and management as they could have huge inadvertent implications for development outcomes in the future and prove critical in either preventing or locking cities into unsustainable development pathways that will expose them to increasingly intense and frequent urban shocks and stresses. Finally, the study could claim some modest contributions to the rather limited

literature on socio-cultural factors⁷ and safety in the construction sector. Two important but distinct foci for safety are decipherable in the construction sector: **(a)** safety in the context of the construction process and **(b)** safety regarding the dangers that completed structures pose to the public. The former dimension of safety relates to health and safety management concerns in the course of physical construction or at construction sites, while the latter pertains to the health and safety concerns of completed structures. Currently, the theoretical conversations on socio-cultural factors and safety in the construction sector focus only on the former dimension of safety (He et al., 2016; Tutt et al, 2013; Jia et al., 2016; 2017; Rowlinson & Jia, 2015; Rowlinson et al., 2016). The latter is barely engaged. There are two main gaps with the current state of the literature that the study aims to fill.

The first is that the principles of health and safety in the construction sector, as argued elsewhere (Boateng, 2019b; 2019c), apply to not only those who are engaged in work; they also apply to those who are placed at risk by work activities, including members of the public. Therefore, limiting the analysis of the impact of socio-cultural factors on safety in the construction sector to only worker safety, as being pursued currently (Pink et al, 2010; Peckitt et al, 2004), obscures the impact of the factors on another vantage area of safety in the sector: the dangers posed by completed structures such as buildings to public health. The findings from Ghana corroborate the view that socio-cultural factors just as much affect worker safety as building safety and that a socio-cultural grounding for building safety in the construction sector is warranted. Evidence is led in chapter 6 in showing how informal settlement of the supply of building needs; customary land tenure system; incremental culture of building construction; poor building maintenance culture, high cultural emphasis on homeownership and other similar socio-cultural factors influence inappropriate construction practices and, hence, the creation of unsafe buildings and to that end, the occurrence of building collapses in Ghana. In this sense, in terms

⁷ The concept ‘socio-cultural factors’ is used in the thesis in the broadest sense to capture the social, economic, political/institutional and cultural influences of construction and building use practices.

of literature contributions, the study extends the ongoing conversation on socio-cultural factors and safety in the construction sector from the domain of worker safety (Pink et al, 2010; He et al., 2016) to structural safety—an important aspect of safety in the sector that the conversation, thus far, has had nothing or little to say.

The second literature gap the study attempts to fill relates to the current engineering focal approach to dealing with building collapse. In the unfortunate event of building collapse, moved by the losses (lives and properties), attention is usually directed mainly at unravelling the immediate causes – the engineering or technical defects disclosed by the event (Tsang & Wenzel, 2016; Masurkar & Attar, 2014). Such matters tend to be considered as primary and paradigmatic – the impact of socio-cultural factors tend to be deprioritized. The engineering focal approach intent focus on technical factors and de-emphasis of socio-cultural factors seem wholly plausible – after all building safety imperatives—statutory or otherwise—usually embody technical or engineering demands (Watt, 2007; Health & Safety Executive, 2015). Indeed, the approach provides robust analytical methods and precise calculation tools for arriving at the actual (technical) causes of collapse incidents. Institutionally, some of the technical lessons learned from major building failures or collapses have been incorporated as codes and standards over the years (Parfitt, 2012; Subbarao, 2016; EN 1991-1-7, 2006; US-DoD, 2002; General Services Administration, 2000 in Kwasniewski, 2010).

However, as noted elsewhere (Boateng, 2016; 2018; 2019c), while important, engineering considerations are not the only or even the primary considerations that influence construction decisions, practices and processes. Rather, socioeconomic, culture and other factors tend to play impactful roles and, therefore, influence not just the engineering components, but also the eventual structure that may emerge. Indeed, as widely noted in the social production of landforms literature (Smiley et al, 2014; Kaminsky, 2018; Lawrence & Low, 1990; Low, 1996; Rapoport, 1969; 1973; Moffat & Kohler, 2008; Hall, 1997), buildings are essentially socio-cultural artefacts or products. What this means is that

whatever might be the challenge to structural integrity or safety, the wider socio-cultural influences of poor construction practices and processes are what may cumulate to undermine it. In this sense, approaching building collapses without recourse to the wider societal influences of dangerous construction and building use practices (i.e. the engineering focal approach) limits the potential for a theoretically comprehensive understanding of the complex circumstances that collectively lead to the incidents and any systematic search for the technical as well as the social lessons needed to avoid repetition.

The findings from Ghana strongly corroborate the view that it is difficult to think adequately about building safety in isolation from the wider socio-cultural or societal influences of the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices. Chapter six sheds light into this by showing how socio-cultural factors such as informal settlement of the supply of building needs; customary land tenure system; incremental culture of building construction; poor building maintenance culture, high cultural emphasis on homeownership undermine compliance and enforcement of building regulations and encourage other inappropriate construction practices, and, thus, the creation of structurally defective and poorly maintained buildings in Ghana, with repercussions for collapse incidents. By bringing into sharp focus the impact of socio-cultural factors on building collapse, the study does not simply broaden the scope of building safety concerns for a deepened focus on such factors just for the sake of it. Rather, it deepens awareness and provides systematic insights into how they operate, shape and dictate the demand and supply, design, construction, utilization and adaptation of buildings as well as the regulation of the underlying processes and culminate into the technical/engineering problems that later become the focus of forensic investigations when collapses or failures occur.

In this sense, in departure from, but complementary to the engineering-heavy approach, the study offers an intricately connected analytical grounding for building collapse that embraces a diversity of

factors: the social, economic, political and cultural influences of unsafe construction and building use practices. It, thus, projects broad and interdependent analytical conception of vulnerability for building collapse that extends, connects and discusses how such phenomena, while usually marked by engineering defect(s), are deeply embedded and inseparably connected to wider societal factors. At the study's core is the recognition that whereas every collapse incident may be the inevitable consequence(s) of flaws in the system of professional engineering practice, holistic understanding of the underlying causes lies with the enduring socio-cultural influences of suboptimal construction practices and processes. This insight, which the study brings to the fore, takes the issue of building safety beyond the traditional domain of focus: engineering (technical) solutions and highlights the importance of nontechnical interventions as a pre-emptive way of dealing with building collapse. For instance, in chapters 6, 7 and 8, the study shows that the intractable insecurities and conflicts associated with Ghana's customary land tenure system are central to understanding the prevalence of many of the inappropriate construction practices underlying building safety problems in the country – a rather insightful finding likely to be concealed in any technical/engineering focal study. The study would suggest, therefore, that resolving land title problems could be a pre-emptive way of improving building safety in cities in Ghana.

It may be necessary to point out beforehand that the study's attempt to bring to the fore the importance of socio-cultural factors to building safety discourses in the construction sector is not a repudiation of the need for technical or engineering measures to reduce building risks. On the contrary, the study takes the centrality of technical and engineering imperatives to the construction process very seriously—the reason it laments the absence of a comprehensive framework that offers insight into the complex processes and factors that culminate to undermine such imperatives. The study simply highlights the need for a deeper level of analysis that grounds building safety interventions within a comprehensive understanding of the vulnerabilities they are supposed to reduce.

Plan of thesis

After this detailed overview, which constitutes chapter 1, the remainder of the thesis follows accordingly: Chapter 2 considers the literature on building collapses in the Global South, shedding insight into the causes and the relevant gaps in the literature. Chapter 3 explains the conceptual foundation of the study and theorizes building collapse in the urban context. The chapter capitalizes on the knowledge and methods accrued in the urban pathology literature for this enterprise. Together, the first three chapters ground the empirical literature gap the study explored. Chapter 4 explores the approaches to safety in the construction sector. The chapter reviews empirical and theoretical studies; research and essays by experts on the approaches to safety in the construction sector. The chapter makes an expanded case for the significance of the study—its contributions to the ongoing scholarly conversation and broader knowledge on the topic.

After explaining the concepts and theories, the next chapter (5) discusses how they were studied. The chapter explains and justifies the design, methods and the data used for the study. Some ethical and other methodological issues are also addressed. The analysis of the empirical data is structured into the next two chapters: 6 and 7. Chapter 6 analyses the first part of the empirical data on the general challenges of building safety in Ghana, while chapter 7 focuses on the situation in the cities. Chapter 8 discusses the implications and application of the study findings. In chapter 9, everything is brought together: the main conclusions are discussed; the limitations of the study are noted, areas or opportunities for further research, too, are highlighted.

CHAPTER TWO

BUILDING COLLAPSE IN DEVELOPING COUNTRIES: AN OVERVIEW OF THE LITERATURE

The chapter considers the literature on building collapses in the Global South, shedding light into the causes, and the relevant gaps in the literature. The chapter finds that the literature follows what could be conceptualized as an *internal focal paradigm or approach* emphasizing on individual and national factors such as carelessness, negligence, greed, and indiscipline among builders and practitioners; corruption and other regulatory challenges. The key marking of the tenor of the literature is that the causes of the inappropriate construction practices underlying the creation of unsafe buildings in developing countries are constructed as ‘*internal*’ problems. Thus, building collapse incidents is framed as unintended unfortunate isolated events, accidents or incidents resulting from problems ‘*internal*’ to developing countries. Despite the overwhelming scholarly and other evidence (see Wells, 1998; 2001; 2007; Wells & Wall, 2003, for instance) suggesting that the present political economy settlements of the construction sectors of developing countries are the creations or products of not only internal national processes and factors, but also of decades of colonial and postcolonial modernization and the recent world system-neoliberal-capitalist order, these historical-institutional factors are not, if any at all, coherently and systematically engaged with.

It will be argued that the extant internal focal literature on building safety in developing countries hides more than it reveals as it suffers many of the analytical and methodological issues Charles Gore raised in his critique of methodological nationalism or separatism (Gore, 1996; 2010) as an incomprehensive approach to social inquiry. The chapter will suggest that there is even more to learn from examining how the ‘*micro*’ problems highlighted in the internal focal literature are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at

local, national, and even global levels in nurturing and/or generating the inappropriate construction practices and behaviours.

Causes of building collapse in the developing world: What does the literature say?⁸

The construction literature on developing countries underscore a combination of problems that lead to the creation of unsafe buildings, with attendant implications for building collapses. The recurrent issues include problems with the technical competence of building practitioners; materials (standards and utilization) and enforcement of safe building and construction regulations. These factors frequently feature in the literature as critical to the creation of unsafe buildings, and in many cases, in hazard prone locations, which then lead to collapse incidents in the event but also even in the absence of physical hazards. These factors are explored in detail below.

Technical competence of building practitioners

Modern construction, depending on the size, use and type of structure, can be sophisticated and highly technical. The construction stage, for instance, is critical and delicate, elaborate and demanding, and, hence, requires high technical skills and professional experience. A properly executed construction program, Alinaitwe & Ekolu, (2014) note, would generally involve four stages: They consist of architectural planning and concept design; engineering /structural design and specifications; construction planning and works including, planning and management of resources especially materials, technologies and equipment, workforce and labour and adherence to the governing laws and regulations (Ricketts, 2001; Alinaitwe & Ekolu, 2014; Soane, 2016). The highly complex nature of the building process demands qualified, skilful and experienced engineers, architects, contractors and other practitioners.

⁸ Though discussed here as *causes*, the empirical evidence from Ghana (see chapter 6) suggests that, they are better considered as *effects* as they are outcomes of the interactions between broader structural problems.

However, the studies on developing countries' construction sector point to widespread involvement of low-skilled and in some cases unqualified people in the construction and supervision of buildings (Olajumoke et al, 2009; Ayuba et al., 2012; Ede, 2010; Fakere et al., 2012; Oloyede et al., 2010; Dimuna, 2010 in Asante & Sasu; Soane, 2016; Kumar, 2016; Alinaitwe & Ekolu, 2014; Tchamba & Bikoko, 2016). Thus, most of the personnel who are at the front line of the informal sector-driven construction sectors of developing countries (Lizarralde, et al, 2013; Miekle, 2011; Wells, 2007; Ofori, 2007; Arnott, 2008) do not have the requisite skills (in some cases none at all) to engage in the rather technically complex endeavour of building construction and supervision. The most common explanations attributed to this state of affairs are explored below.

Shortage of construction engineering skills in the developing world

One argument that is commonly raised to explain the widespread involvement of unqualified or low-skilled building practitioners in construction activities which lead to safety challenges in developing countries is a dearth of qualified building practitioners— a problem observers say has been escalated by the ongoing massive infrastructural developments in the new mega-cities growing rapidly in those parts of the world (See, for instance, Soane, 2016; Kumar, 2016; Matthews et al., 2012). It is estimated, for instance, that the population served by a single engineer in Africa is up to thirteen thousand (13,000) people compared to hundred (100) to three hundred (300) people in most developed economies (Alinaitwe & Ekolu, 2014). For the civil engineering profession, the number of engineers serving a given population is even much smaller. For example, one civil engineer in local government in South Africa serves a population of thirty-three thousand (33,000) (Alinaitwe & Ekolu, 2014). These numbers are again much higher for other African countries, with estimated national engineering skills gap hovering around 30 to 50% across the continent (Alinaitwe & Ekolu, 2014).

A combination of reasons including brain drain, limited capacity of educational institutions in developing countries to train enough engineers and the diversion of engineering skills from construction

into highly paid sectors such as information technology, software and finance (Kumar, 2016; Matthews et al, 2012) are normally attributed to the problem.

Accelerated demand for infrastructure in developing countries

Some decades ago, most of the world's largest urban agglomerations were located in the advanced world. However, a significant number of today's rapidly expanding cities are concentrated in the Global South (Satterthwaite, 2017; UN, 2016). The fastest growing urban agglomerations are medium-sized cities and many of the cities with less than five hundred thousand to 1 million people are in Africa and Asia (UN, 2014). Of the world's 31 megacities (that is, cities with ten million or more people) in 2016, twenty-four (24) were located in the developing world. Developing countries are undergoing remarkable urban transformation which has come with massive demand for infrastructure including buildings (Tibaijuka, 2013; Soane, 2016). One key explanation that features in the literature as underlying the involvement of unqualified and low-skilled personnel in construction activities in developing countries is related to the accelerated demand for infrastructure in those parts of the world.

Some observers of the construction sectors of developing countries (see Kumar, 2016; Soane, 2016; for instance) argue that the ongoing infrastructural developments in the new mega-cities growing rapidly in those parts of the world have brought a rush of builders who are not competent and in some significant cases have little to no professional training into construction activities. This has been worsened by the fact that very few developing countries have strong licensing frameworks to certify builders, or designers and protect the integrity of their construction sectors (Kumar, 2016; Soane, 2016). Olajumoke et al (2009) revealed a widespread development in Nigeria where financially resourced individuals with little to no professional training are taking advantage of the accelerated demand for buildings in the country's urban settings and are now doing and supervising major constructions. In 2006, the Council for the Regulation of Engineering in Nigeria (COREN) established a committee to inquire into some buildings that had collapsed in 2005 in Port-Harcourt – the fifth largest city in Nigeria.

One of the otherwise not so shocking findings of the committee (given what is happening in the broader developing countries' urban settings) was that in all the cases, not a single registered engineer was involved in the construction. The investigations established that the construction of one of the collapsed buildings was supervised by a pharmacist. The committee recommended that he be prosecuted (See Olajumoke et al, 2009). A similar incident happened in Uganda. On 1st September 2004, a new 5-storey building collapsed in Kampala, killed eleven (11) and injured over twenty-six (26) people. Investigations into the incident revealed that there was no professional architect or engineer, retained to supervise the construction. The site workers who were acting as 'engineers' were only technicians and artisans, and not qualified engineers (Alinaitwe & Ekolu, 2014).

Qualification of practitioners and building collapse: Summary of key highlights

While institutions with standards on a par with the ones in developed countries exist in most developing countries, their numbers and capacities are not commensurate with the total population, and, consequently, the demand from the construction industry cannot be met. Thus, quantitatively, there are insufficient construction engineers graduating to meet demand in developing countries. The Engineers for Africa 2012 study found evidence of shortages of engineers in all the countries for which data were available: South Africa, Rwanda, Mozambique, Malawi and Tanzania (Matthews et al, 2012). To make matters worse, a significant percentage of them often leave their countries in search for greener pastures in the advanced countries while a good number of those who stay behind also divert their skills into other well-paid sectors such as information technology, software and finance (Kumar, 2016).

Related to the above is the rapidly emerging problem regarding the establishment of private institutions and deemed universities which dole out engineering degrees without ensuring the required quality. Kumar (2016) touched on the situation of India, but the problem is also discernible in the Sub-Saharan Africa. For instance, the 2012 Engineers for Africa report on *Identifying engineering capacity needs in Sub-Saharan Africa* noted that even though some of "the universities are able to churn out the

engineers in numbers... many of them do not have the skills to be able to operate” (Matthews et al, 2012: 4). The troubling scale of the problem is exemplified by the Kenyan Engineering Board refusal to recognize the engineering degrees of hundreds of students from three of the country’s universities in 2011 (Matthews et al, 2012). The Board said the decision was taken largely because the universities had low quality curricula, duplicated courses and lacked qualified lecturers (Nganga, 2011).

The increased involvement of construction firms from the advanced world in the construction sectors of developing countries has not yet helped much with skills development and upgrade through the so-called process of knowledge transfer. Globalization of construction and market deregulation have led to increased presence of construction firms from the Global North or advanced capitalist countries in the construction sectors of developing countries (Raftery et al, 1998; Ofori, 2000; Najjir et al, 2012). At the onset of these developments, one of the key claims that marked its celebration was that while there could be some short term problems such as the big construction firms from the developed countries growing at the expense of the indigenous ones, in the long run, the process will pay off through technology transfer and lead to overall improvement of construction practice in developing countries (Strassman and Wells, 1988; Raftery et al., 1998). Some studies suggest that the construction sectors of some countries benefitted from this process. For instance, Strassman and Wells (1988) found that contractors in Japan and South Korea benefitted from technology transfer from their US counterparts. Moavenzadeh and Hagopian (1984) argue that foreign contractors heavily influenced the development of the construction industries of some poorer countries. Ofori (1996) and Ofori and Chan (2000) show that both local and foreign contractors in Singapore have benefited from the latter’s operations.

However, most of the countries in the Global South (Sub-Saharan Africa in particular) have not appropriately adapt policies to fully leverage the increased participation of advanced construction firms in their construction sectors to solve their skills gap problems (Osabutey et al., 2014). In any event, the foreign firms usually undertake large and complex projects (Moavenzadeh, 1978; Turin, 1973; Drewer,

1980). And not only could the informal developers in the developing countries not afford their services, but also such firms rarely involve the local artisans (that the informal developers usually hire – See Mitullah & Wachira, 2003, Adewole et al, 2014; Ayodele et al., 2011; Adenuga, 2012) in their projects. They normally import personnel from their countries of origin and in a few cases a handful of top professionals trained in their host developing countries (Moavenzadeh, 1978; Turin, 1973; Drewer, 1980; Cockburn, 1970) – whose services are often beyond the pockets of the informal developers. (The professionals in developing countries usually undertake projects owned by the government, corporate organizations (banks, industries), and a few wealthy individuals – Adewole et al, 2014; Fagbenle & Oluwunmi, 2010). In the end, little space or opportunity is created for knowledge transfer to affect local skills development and improve the overall construction climate in the developing countries.

Building materials and incidents of building collapse in developing countries

It seems every study or report on building collapse in any developing country mentions the materials used to construct the building as one of the reasons. Thus, problems with building materials feature prominently in the discourses on building collapse in those parts of the world (For a review, see Adewole et al, 2014; Adesanya & Olanrewaju, 2014; Fernandez, 2014; Alinaitwe & Ekolu, 2014; Yardley, 2013; Kenny, 2012; Wong, 2008; Goering, 1998; Babatunde, 2013; Fagbenle & Oluwunmi, 2010; Ayuba et al., 2012; Ede, 2010b; Fakere et al., 2012; Oloyede et al., 2010; 2010b Windapo & Rotimi, 2012; Kwera, 2008; Tchamba & Bikoko, 2016 in Asante & Sasu, 2018; GhIE, 2012; NADMO, 2014).

The literature on how the problem plays out can be grouped under three main interlocking themes: the use of sub-standard or inferior *versions* of industrially manufactured materials; poor handling of the good *versions* of the industrially processed materials and cutting down materials specifications in designs. Cost cutting considerations feature prominently at all levels.

Widespread use of sub-standard or inferior versions of industrially processed materials

In developing countries, local or indigenous building materials are highly unpopular. A combination of reasons is attributed to this. First, while abundantly available and usually affordable, there are concerns that local materials have low strength, demand frequent maintenance and involve a lot of labour. Also, houses built with local materials are said to wear or erode easily (Danso, 2013; Batchelder et al., 1985). Further, today, the built environment⁹ has become one of the expressive symbols of the so-called ‘modern culture’. Influenced by the ‘modernization’ fad, developing countries have very much embraced the industrially manufactured materials produced in the advanced world– they are considered ‘prestigious’. Indigenous materials, traditional building systems and technology are spurned as backward, primitive (Magutu, 2015; Atolagbe, 2010). Even more, most developing countries have stringent building codes and regulations that prohibit the use of certain traditional or indigenous building resources especially in urban centres (Pelling, 2003; Tibaijuka, 2009; Moullier, 2015). Of course, just like the many others, these regulations too are sparingly enforced. Nonetheless, they still create psychological barriers to the use of local or indigenous building technology and other resources and thereby reinforce the widespread dependence on the industrially processed inputs.

The overall effect of the foregoing has been that there is high reliance on industrially processed construction materials (Atolagbe, 2010; Atolagbe & Fadamiro, 2014; Oruwari et al, 2002; Magutu, 2015). Factories have been established in most developing countries to produce these types of construction materials to feed their construction industries (Elkhalifa, 2016; Adewole et al, 2014). However, with an ever growing urban population and the centrality of buildings to the realization of key national and private development plans (from agriculture and industry to health and education and

⁹ The term ‘built environment’ broadly denotes aspects of our surroundings that are built by humans, that is, distinguished from the natural environment. See McClure, W. R., & Bartuska, T. J. (Eds.). (2011). *The built environment: a collaborative inquiry into design and planning*. New Jersey: John Wiley & Sons Inc.

as building construction resources are needed for the expansion of housing and the upgrading of existing ones in both rural and urban areas – UN-Habitat, 1991; Tibaijuka, 2009), the demand has increased. The inability on the part of the local factories to produce enough affordable materials to meet the ever-rising demand has meant that the huge portion of building materials are imported to offset the ever-widening supply gap (Oruwari et al., 2002).

For instance, according to the UN-Habitat, the total value of import of building materials from the advanced to developing countries increased, in real terms, by 85 percent between 1975 and 1985, with South Asia increasing its import more than threefold. During the same period, tropical Africa and South-East Asia increased the imports of building materials from 36 percent and 58 percent, respectively (UN-Habitat, 1991 in Tibaijuka, 2009). The figures could be much higher today because around 2009, the percentage of imported materials in Africa alone hovered around 60 percent (Tibaijuka, 2009). In Ghana for instance, it is estimated that up to 80% of the country's building materials are imported (See Tamakloe, 2012; Oxford Group, 2017)¹⁰.

The problem with industrially processed materials, however, is that they are usually expensive, sometimes prohibitively expensive (due to tax components, volatility of exchange rates and inflation – when imported and high production cost even when manufactured locally – the raw materials are imported and other costs such as energy are also usually high as well). This, therefore, increases the cost of building construction (Akanni et al, 2014; Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007). Further to this, the construction sector of developing countries is informal sector-driven

¹⁰ There are concerns that the over reliance on imported materials is stifling the use of indigenous/local materials, which usually are also context appropriate and affordable; impeding local construction materials producing industries. Further, the high cost of the imported building inputs, critics argue, creates balance of payment problems and increases the cost of building construction and, hence, impedes the capacity of the many low-income people in developing countries to access housing needs (Anosike, 2009; Mekson, 2008; Mohammed, 2008; Njoku, 2007; Akanni, Oke & Omotilewa, 2014). These concerns are at the pinnacle of the ongoing movement or advocacy for the use of 'alternative', 'indigenous', 'low cost' construction technology and materials in developing countries (Atolagbe, 2010; Atolagbe & Fadamiro, 2014; Oruwari et al, 2002; Magutu, 2015; Akanni et al, 2014; Mpakati-Gama, Wamuziri, & Sloan, 2012).

(Lizarralde, et al, 2013; Miekle, 2011; Wells, 2007; Ofori, 2007) dominated by low-income people. For instance, over 90% of the annual building output in Ghana is delivered by the informal sector (UN-Habitat, 2011; Boamah, 2010). This makes the already expensive industrially processed materials even more unaffordable.

Dealers in building and construction materials in developing countries are therefore faced with a market context where the majority has little interest in affordable local materials but at the same time does not have enough purchasing power for the costly industrial alternatives. They respond to the dilemma by importing (nowadays, mainly from China¹¹) cheaper but sub-standard or inferior *versions* of the highly preferred industrial materials and/or reduce the quality of the locally manufactured versions in order to be competitive. This way, they could satisfy their customers' taste for the industrially manufactured materials at prices they can afford. Thus, the dynamics of price/cost and culturally upheld taste for '*foreign*' materials play out in ways that lead to non-optimal focus on quality and safety imperatives.

The importation and manufacturing of substandard building materials is a very topical issue in construction discourses¹² in developing countries (Dominica, 2018; Than, 2013; Awale, 2015;

¹¹ The European Commission's 2017 Report on the EU customs enforcement of intellectual property rights ranks China as the main source of counterfeit materials in the world (See European Union, 2018).

¹² It seems the problem with the importation of substandard and noncompliant building materials is not a problem for only developing countries. The developed world is also facing similar issues. For instance, a survey of the building industry, conducted by the Australian Industry Group (Ai Group) found that 92% of Australian building and construction companies utilize nonconforming products somewhere in the supply chain (Australian Industry Group, 2013) imported mainly from China. The related safety and other concerns forced the Australian Senate to conduct hearing on non-conforming building products in Australia circa 2015 (Commonwealth of Australia, 2017). Some developers have suffered huge costs as a result of using substandard materials in the country. A case in point happened at the 150 Collins Street, Melbourne. In 2015, finishing touches were applied to Westpac's prestigious new Melbourne headquarters at 150 Collins Street Melbourne. The stunning \$180 million project stands out amongst the other banking offices in the precinct due to the glass façade (see picture in Johnson, 2015; SGI Architectural, n.d.) that envelops the entire structure. The project however encountered a major setback when it was deemed that the glass used, imported from a Chinese supplier, to be substandard and of low quality when compared with Australian glass (Johnson, 2015). The glass exhibited irregular iridescent blue streaks and perimeter bands caused by defects in the application of a heat-reflecting metallic sputter coating. The developers were forced to pay for the replacement of the glass – at a cost of \$18 million for the materials alone. The Construction Forestry Mining and Energy Union (CFMEU) advised that the entire ordeal could have been

Gbonegun, 2017; NREH, 2016; Nhlabatsi, 2014). The production and importation of such materials is done easily given that developing countries usually have weak regulatory systems (read corruption, more on this in later sections) to check their quality and suitability for local environmental conditions (Moullier, 2015). In the end, standard non-compliant materials deficient in chemical and/or physical properties like size, weight, density– which ultimately reduce load bearing capacity i.e. strength and also the life of buildings as they deteriorate faster –end up at construction sites for use and then lead to collapse incidents.

Reduction of required inputs or materials specified in designs

Clients or developers usually do not have access to infinite resources and as a result, however paramount safety considerations may be to the overall construction process, economy or budget considerations feature strongly at every stage of procurement (Blockley, 1980). It is estimated that building materials constitute the greater percentage of the total cost of projects (Yalley & Kwan, 2008 in Danso, 2013). In developing countries, the cost of building materials relative to total project cost is said to hover around 40-80% (Agbola & Onibokun 1990; Ifesanya 2007; Atolagbe & Fadamiro, 2014). And since the materials and/or a significant percentage of the inputs for their manufacturing are usually imported, the cost component could end up becoming even higher.

Therefore, even where the right standard-conforming versions are procured, the high costs create perverse incentives for unethical practices where builders/ clients and contractors tend to cut corners – reduce the ratio/quantity needed during construction– to protect profit margins or cut down cost – a practice, which, observers say, is very widespread (Adewole et al., 2014; Adesanya & Olanrewaju, 2014; Escaleras et al, 2007; Akinyemi et al, 2016; Oke & Abiola-Falemu, 2009; Ede, 2010b; Fakere et al., 2012; Oloyede et al., 2010; 2010b Windapo & Rotimi, 2012; Kwera, 2008; Tchamba & Bikoko,

avoided if better quality local glass had been chosen to begin with. This project is just one example of what is becoming a very common situation in the building industry (See SGI Architectural, n.d.; Johnson, 2015).

2016 in Asante & Sasu, 2018). Further to the above, developing countries usually do not have enough testing facilities where the integrity of most building materials and components could be verified against established standards (Moullier, 2015; Kumar, 2016). For instance, in the case of Haiti, prior to the 2010 earthquake, there was only one materials testing laboratory, which was unable to provide testing for most of the construction materials in the country (See Moullier, 2015).

Even more, sometimes, specimens of materials sent to the laboratories have better strength than those at production sites, therefore, the “as built” does not always meet the design specification for the material (Oke, 2011). Builders and contractors are able to get away with it as regulators are rarely able to monitor construction activities at sites to ensure that the materials being used are of the right strength due to human resource and other challenges (Shaw et al, 2016; Moullier, 2015; Lewis, 2005; Arku et al, 2016). Corruption and bribery also add to the problem where contractors and builders use political connections to get building inspectors to turn blind eyes to construction and building practices that deviate from code specifications (Lewis, 2005; Moullier, 2015; Berlinski, 2011), which then lead to inadvertent catastrophic outcomes in the event but even in the absence of physical hazards.

For instance, studies suggest that widespread practices of diluting industrial cement with too much sand, using fewer and lower quality steel and other similar sub-standard, corners and cost-cutting practices on the part of builders led to the massive collapse of buildings when an earthquake struck Marmara in Turkey in 1999 (see Escaleras et al, 2007; Özerdem, 1999). The reported official casualty toll was 17, 127 deaths and 43, 953 injuries. Monetary losses were estimated between US\$9 and \$13 billion, with industrial facilities accounting for \$2 billion, buildings \$5 billion, infrastructure \$1.4 billion and economic losses almost as high as physical ones since it took months for factories and industrial facilities to return to their pre-disaster production levels (Özerdem & Barakat, 2000). Similar practices have been found to have accounted for building disasters in many other developing countries (Akinyemi et al, 2016; Oke 2011; Fagbenle & Oluwunmi, 2010; Fernandez, 2014; Ayuba et al., 2012;

Ede, 2010b; Fakere et al., 2012; Oloyede et al., 2010; 2010b Windapo & Rotimi, 2012; Kwera, 2008; Tchamba & Bikoko).

Poor handling of standard-compliant materials

In the advanced world, for whose construction materials and building technology developing countries have developed a seemingly irreversible taste, construction is machine-intensive – guided by high-powered software, sophisticated machines, which, therefore, enhance accurate modelling, measurements and specifications (Mlinga & Lema, 2000; Wells & Wall, 2003; Tutu & Bempong, 2018). Importing these resources into the developing world where – for reasons of high equipment cost (Wells & Wall, 2003) and the need for employment creation in the populations faced with high unemployment rates – construction processes and practices are labour intensive (Alinaitwe & Ekolu, 2014; Alinaitwe, et al., 2003; Heidor & Bondinuba, 2017) will inevitably lead to poor workmanship, more errors. The likelihood of poor workmanship and mistakes in execution is exacerbated by the fact that the many informal artisans (such as bricklayers, foremen, draftsmen, iron benders, welders) who are at the forefront of building construction and supervision in developing countries are usually not sophisticated enough.

It is suggested that the resort to such practitioners is influenced by the relatively high service charges of formally trained professional building practitioners (Adewole et al., 2014; Adesanya & Olanrewaju, 2014; Akinyemi et al, 2016; Oke, 2011; Alinaitwe & Ekolu, 2014). With some practical skills but limited understanding of the physics of the strength of materials such as the grade/compressive strength of concrete and the factors that affect it such as mix ratios, water-cement ratios, purity of the aggregates, the artisans mishandle the materials leading to safety gaps during execution. This may explain the widespread cases of building collapse even when standard-compliant materials are used. For instance, the inquiry into the BBJ building collapse that killed eleven (11) and injured twenty-six (26) others in Kampala, the capital of Uganda in September 2004 established that the materials for the construction

(especially the cement, aggregates, steel) were of adequate quality and conformed to the national standards or specifications. The problem was with their technical utilization: incorrect implementation of concrete technology onsite led to low concrete strength. As it turned out, there was no professional architect or engineer retained to be responsible for the supervision of the construction work. The site workers who were playing ‘engineers’ were only technicians and artisans, and not qualified engineers (Alinaitwe & Ekolu, 2014). Oke (2011) made similar findings in Nigeria.

Building materials and building collapse in developing countries: Summary of key highlights

A fundamental determinant of the performance of buildings, aside from design and construction practice, is the quality of building materials. Resilient building design is based on assumptions regarding the strength and performance of constituent materials (Moullier, 2015; Engebø et al., 2017). However, in developing countries, the literature suggests that low public interest in indigenous materials has created an enduring taste for expensive industrially processed building materials in a socio-economic context where the majority of builders who patronize these expensive materials are not well off and therefore do not have high enough income to support their acquired taste. Faced with a people with little preference for affordable local building materials but at the same time do not have sufficient purchasing power for the costly industrially manufactured alternatives, dealers in building and construction materials in developing countries respond to the dilemma by importing and/or manufacturing cheaper but sub-standard or inferior *versions* of the highly preferred industrial alternatives in order to be competitive. This is easily done in view of developing countries’ well-documented weak capacity for guaranteeing the integrity of construction materials by enforcing set standards (due to inter alia widespread institutional corruption, lack of and/or inadequate testing laboratories). In the end, a conducive climate is created in which the demand and supply and utilization of building construction materials play out in ways that undermine quality and safety imperatives.

Even when standard-compliant materials are procured, short term cost considerations encourage adverse cost or corners cutting practices such as reducing the quantity of materials needed to achieve the required strength, outsourcing building construction and supervision services to cheap but unsophisticated craftsmen leading to safety gaps during project execution. The wide-spread use of cheaper, non-conforming products across the building and construction sectors of developing countries is evidence for how cost or economic considerations can all too often take precedence over quality and safety imperatives— an issue that is well-documented in construction discourses (Green, 2011; Vee & Skitmore, 2003; Lo et al., 2007; Henriod & Lanteran 1988; Friedman 1956; Carr 1982; Drew et al., 2001; Grogan 1992; Winch, 2000). For instance, as noted by Tam et al (2000), a lot of the careless designs and inadequate construction practices that lead to collapses are not due to the inevitable difficulty with technology or its lack thereof. They, however, result from the growing socio-economic and other pressures on the players in the construction industry to reduce costs or cut corners.

Enforcement of safe building and construction regulations

Above all, the building must be structurally sound and located in a safe place to be used for whatever purpose for which it was constructed. Further, while buildings enhance life, they also pose safety and environmental risks. The clearest evidence for this is the enormous material and human losses that come with spontaneous building collapses and also those that are due to physical hazards like earthquakes, tsunami, flooding, cyclones among others (Escaleras et al 2007; Lewis, 2005; Kenny, 2012). Society, therefore, devises or have devised safety protections to, if not entirely prevent, reduce to the barest minimum, the potentiality of buildings affecting life and the environment adversely. Generally, these cultural safety precautions inform the organization of social life regarding the pursuit and the provision of building needs and services. Thus, the safety precautions (usually expressed as statutory and non-statutory demands –building regulations and codes) undergird where buildings should be sited, how they should be or are designed, built, managed and even demolished and the appropriate personnel who

could undertake each of the different activities listed (Watt, 2007; Arku et al, 2016; Health and Safety Executive, 2015).

However, as noted in previous sections, since the construction process is heavily influenced by competing interests including safety counterweighting considerations such as economy (Green, 2011; Vee & Skitmore, 2003; Lo et al., 2007; Henriod & Lanteran 1988; Friedman 1956; Carr 1982; Drew et al., 2001; Grogan 1992; Winch, 2000; Shaw et al, 2016), developers and building practitioners could be dissuaded from the bigger picture regarding their need to pay sufficient attention to safety imperatives and frequently to their eventual detriment, but also at the detriment of public health. The duty to uphold public health through the enforcement of building safety imperatives usually lies with public authorities in charge of development control. Advanced countries have relied in large part on effective and efficient building regulatory systems, which have been incrementally improved over time (Moullier, 2015; Soane, 2016; Subbarao, 2016) to ensure building safety. Indeed, in a range of developed countries, building codes are even considered as just the minimum acceptable standard of construction. Voluntary standards exceeding code requirements have been developed for several aspects of building performance, including energy efficiency and disaster resilience (See Moullier, 2015).

The low rate of building failures in advanced countries compared to developing countries, shows the value of the enforcement of resilient building programs. For instance, in the past 10 years, countries with more advanced building code systems experienced 47 percent of disasters globally, which, however, resulted into only 7 percent of global disaster fatalities (Moullier, 2015). Reference to and comparison of some disaster incidents may help put the importance of regulation enforcement in a global and better perspective. In 2003, earthquakes struck the cities of Paso Robles in California, and Bam in Iran. The earthquakes had similar magnitudes and struck within three days of each other. However, the death toll was two (2) in Paso Robles as opposed to more than forty thousand (40,000) — nearly half the city’s population—in Bam (Moullier, 2015; Kenny, 2009). In the wake of the Kobe

earthquake in January 1995, Japan took extensive measures to strengthen seismic resistance of buildings and other infrastructure in the country. Rubber blocks were installed under bridges; buildings were spaced farther apart to prevent domino-style tumbling. They introduced extra bracing, base isolation pads, hydraulic shock absorbers. During subsequent earthquakes in the country years after, videos from Tokyo showed skyscrapers swaying gracefully like cornstalks in the wind. Not one collapsed (Berlinski, 2011).

In contrast, in January 2010, an earthquake struck Haiti and destroyed nearly hundred thousand (100,000) buildings. Hospitals, schools, government buildings, jails, hotels, churches, whole neighborhoods—all crumbled, entombing everyone inside (Berlinski, 2011). It is instructive to note that California's Loma Prieta earthquake, the "World Series earthquake" of 1989, was as big as the one in Port-au-Prince. It, however, killed so few people by comparison—only sixty-three (63). This was because California just like Japan, has one of the strictest building codes in seismic zones, which are, and this is important, strictly enforced (Wang, 2014; Berlinski, 2011; Moullier, 2015). Issues are often raised on the suitability or propriety of the building codes used in developing countries (Pelling, 2003; Aini et al., 2005; Thiruppugazh, 2008). There is no doubt that developing countries could use some improvements in their building codes and regulations. However, in the main, most developing countries have some moderate to good building codes and regulations on their books. The problem, however, is that they exist only as that – good regulations and codes on paper. They are rarely complied with or enforced (Lewis, 2005; Moullier, 2015; Berlinski, 2011; Kenny, 2012; Asante & Sasu, 2018; Anbarci et al., 2007).

Reasons for low implementation of building regulations in developing countries

Various reasons are attributed to the compromised compliance and implementation of building regulations in developing countries. One of them is the costly and often long and complicated nature of the permitting process. In most developing countries, the transaction costs for development permits

application are not only expensive, but also the approval processes are often long and very complicated. For example, in South Asia in 2014, it took an average of 14 procedures and 196 days to get a construction permit. Formal permitting fees averaged a staggering 12.8 percent of the overall cost of construction in the region. By comparison, the aggregate regulatory fees paid for planning and construction approvals is equivalent to 1.7 percent of the overall cost of construction in the OECD countries. This fee is only 0.6 percent of the construction cost in Japan (Moullier, 2015). To further illustrate the pattern, in some countries in the Middle East, West Africa, and South Asia, governments resort to high permitting fees as de facto backup tax instruments. In Haiti, for instance, according to Moullier (2015), close to a decade after the 2010 devastating earthquake, building authorities have continued to charge developers construction permit fees equivalent to 16% of the cost of construction.

This could be similarly high elsewhere, reaching as high as 20% in Madagascar and 25% in Serbia. In the city of Mumbai, India, the formal cost of going through a planning and construction permitting process is equivalent to 46% of the construction cost (Moullier, 2015). The costly, long and complicated permitting process has been self-defeating and counterproductive because not only has it failed to generate more revenues to the local authorities, it also further undermines compliance with appropriate safety standards by encouraging or forcing developers to circumvent the process altogether and undertake construction practices that compromise public safety. Not only are developers frequently circumventing the permitting processes for, among other things, the reasons discussed above, but also studies (Moullier, 2015; Lewis, 2005; Asante & Sasu, 2018; 2015; Yeboah & Obeng-Odoom, 2010) suggest that the local authorities at the front line of risk reduction in developing countries through the planning process and development control are unable or fail to enforce the relevant laws.

A key reason for this is the lack of or inadequate qualified technical staff. As noted by Lewis (2005), financial resources and personnel are required to vet permit applications and return feedback to applicants in an expeditious manner and similarly for monitoring the activities of developers at

construction sites and ensure that they are building up to code and specifications of approved permits. However, the local authorities are usually understaffed and under resourced (Shaw et al., 2016; Moullier, 2015; Lewis, 2005; Asante & Sasu, 2018; 2015) and many of them are yet to make effective use of private sector technical resources to augment governmental regulatory manpower (Moullier, 2015). This combination of factors constrains regulatory capacity, which has been worsened by wide scale construction activities especially in the cities (Soane, 2016). This has meant that local planning and building agencies are often unable to conduct plan reviews of building projects expeditiously or carry out building inspections thereby creating a climate for the prevalence of deleterious construction and building use practices which result in disastrous outcomes (Moullier, 2015; Lewis, 2005; Asante & Sasu, 2018; 2015).

The ever-intractable issue of corruption adds to the problem. Studies on corruption usually report the construction industry as the most corrupt sector of the world economy (Kenny, 2007; Escaleras et al, 2007). On the anniversary of the Haiti earthquake, Nicholas Ambraseys and Roger Bilham published an extraordinary study in *Nature*. Using data from Transparency International's Corruptions Perception Index, they found that 83% of all deaths from building collapses in earthquakes in the past 30 years took place in countries that were "anomalously corrupt"—i.e. countries that were perceived to be more corrupt than you would predict from their per-capita income (Berlinski, 2011). Particularly, in most developing countries, contractors and other building needs and services providers have little to no trouble at all in finding willing accomplices to their substandard construction practices in the form of unscrupulous public officials tasked with the regulation of construction activities and development control.

Studies suggest that developers easily obtain building permits through bribes and political favours or pay inspectors to turn blind eyes to designs and building practices that deviate from code specifications (Lewis, 2005; Moullier, 2015; Berlinski, 2011). Both public and private sector corruption

undermine all aspects of regulation enforcement and compliance leading to the construction of inferior public infrastructure, private buildings, and housing units which ultimately fail, often in the face, but even also in the absence, of physical hazards leading to a greater death toll than would occur in the absence of corruption (Lewis, 2005; Berlinski, 2011; Moullier, 2015; Kenny, 2009; 2012; Escaleras et al, 2007).

Chapter two: Conclusion.

The chapter reviewed the literature on the causes of building collapse in developing countries. The factors include the outsourcing of construction services and supervision to low-skilled and unqualified people, utilization of standard-noncompliant materials, cutting down of safety requirements in designs and lack of enforcement of building regulations and codes. First, in respect of the involvement of unqualified or low-skilled building practitioners in building construction and supervision, some of the key issues explored include brain drain, limited capacity of educational institutions in developing countries to train more qualified engineers and the diversion of engineering skills from construction into highly paid sectors such as information technology, software and finance. It was found that this combination of factors has created a huge construction engineering skills gap, which, coupled with the absence of effective regulatory frameworks to protect the integrity of the built environment profession, has brought a rush into the sector a flood of people without proper professional training who are offering building construction and supervision services.

The scale of the problem has been escalated by the accelerated demand for buildings in the new mega-cities growing rapidly in those parts of the world (See, for instance, Soane, 2016; Kumar, 2016; Matthews et al, 2012). The second issue that underlies building collapses in developing countries relates to materials. A crucial factor in building performance, aside from design and construction practices, is the quality of building materials. Resilient building design is based on assumptions regarding the strength and performance of constituent materials. However, there seems to be widespread utilization

of inferior construction materials in developing countries evidenced by the ever-bourgeoning literature and media reports on incidents of building collapse in those parts of the world due to substandard materials (Adewole et al, 2014; Adesanya & Olanrewaju, 2014; Fernandez, 2015; Alinaitwe & Ekolu, 2014; Divjak, 2008; Yardley, 2013; Fagbenle & Oluwunmi, 2010; Fernandez, 2014; Ayuba et al., 2012; Ede, 2010b; Fakere et al., 2012; Oloyede et al., 2010; 2010b Windapo & Rotimi, 2012; Kwera, 2008; Tchamba & Bikoko, 2016 in Asante & Sasu, 2018).

The nexus between building materials and collapse incidents was explored against the backdrop of how cost considerations all too often take precedence over quality and safety imperatives. In a range of developing countries, wholesale importation of building technology coupled with the ‘modernization’ fad have created an enduring taste for expensive industrially manufactured building materials in a socio-economic context where the majority of builders who patronize these costly materials are generally not well off and therefore do not have high enough income to support their acquired taste. This has meant that dealers in building and construction materials in those parts of the world are faced with a people with little interest in the otherwise affordable local building materials, who, however, do not have enough purchasing power for the highly preferred costly industrial alternatives. They, therefore, respond to the dilemma by importing and/or manufacturing cheaper but sub-standard or inferior *versions* of the highly preferred industrial alternatives in order to be competitive. Even in cases where standard-compliant materials are procured, they end up in the hands of low-skilled, unqualified practitioners not trained to work with published industry guidelines and specifications leading to safety gaps during project execution.

While ignorance, negligence, carelessness, indiscipline and greed on the part of individual builders, contractors and other construction actors are often mentioned as fundamental to the resort to these safety-undermining practices and behaviours, regulation failure is considered as even more critical to the sustenance, prevalence and reinforcement of the inappropriate construction practices and

behaviours. The criticality of regulation is such emphasized that, concerned by the pervasiveness of collapse incidents in developing countries, the *Proceedings of the Institution of Civil Engineers Forensic Engineering* journal published a themed issue in 2016 (Subbarao, 2016) to foster conversations on the need for “concentrated attention by governments, national and local, on initiating, legislating and enforcing measures to improve construction standards” (Soane, 2016, p. 127) in those parts of the world. The reason regulation is considered crucial in building safety discourses is that building regulations go beyond demanding that builders acquire prior permits for projects. They normally also specify approved materials, design, and personnel to use in the construction of every building (Kuta & Nyaanga, 2014; Asante & Sasu, 2018; Watt, 2007; Health and Safety Executive, 2015).

However, too often, in the developing world, corruption, political interference, resource challenges – both human and logistics - tend to undermine enforcement, which, then, create room for careless, indiscipline, negligent and/or greedy developers, contractors and other building practitioners to undertake deleterious construction practices and create unsafe buildings. Whether viewed as due to individual factors such as carelessness, negligence, greed, and indiscipline; as the consequences of regulatory blunders or the interplay of both, the key marking of the tenor of the literature is that the causes of the inappropriate construction practices underlying the creation of unsafe buildings, and, to that end, the rampant collapse of buildings in developing countries are constructed as ‘*internal*’ problems. Thus, building collapse incidents are framed as unintended unfortunate isolated events, accidents or incidents resulting from problems ‘*internal*’ to developing countries. There is little, if any at all, coherent or systematic engagement with historical-institutional factors. For instance, the impact of inherited conditions (such as colonial policies) and externally imposed factors (such as the neoliberal ideology, which beginning from the 1980s shaped and continue to shape the political economy

settlements of the construction sectors of many developing countries - Wells, 1998; 2001; 2007; Wells & Wall, 2003) are inadequately engaged with.

In addition to contributing to understanding of the range of agencies, causes and constraints underlying the collapse of buildings in the country's cities, the perspectives this study brings from Ghana suggest that the above '*internal focal approach*' to building collapse in developing countries hides more than it reveals and, therefore, could increase our learning only so much. There is even more to learn from examining how the '*micro*' problems highlighted in the approach are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at local, national, and even global levels in nurturing and/or generating the inappropriate construction practices and behaviours. Thus, the internal focal approach's de-emphasis of external and inherited conditions limits the potential for comprehensive understanding of the influences of the inappropriate construction practices and behaviours that generate vulnerabilities for such risks in developing countries.

Evidence will be led from Ghana to show that building collapse in developing countries have historical-institutional context – the factors that give rise to the risks just as much arise from both *internal* problems (such as regulatory failure, negligence) as they do from *inherited* and *externally-imposed* or *underdevelopment* conditions (such as colonial and externally imposed neoliberal urban policies). Thus, it would be suggested that the influences of the deleterious construction practices that give rise to vulnerabilities for building collapses in developing countries are simultaneously enmeshed in broader processes that are expressions of international, national and local socio-political economic factors, conditions developments and ideologies.

CHAPTER THREE: THEORIZING BUILDING COLLAPSE IN THE URBAN CONTEXT: INSIGHTS FROM THE URBAN PATHOLOGY LITERATURE

The previous chapter considered the literature on building collapses in the Global South, shedding light into the causes, and the relevant gaps in the literature. This chapter explains the conceptual foundation of the study and theorizes building collapse in the urban context. The chapter capitalizes on the knowledge and methods accrued in the urban pathology literature for this enterprise. It draws on contemporary as well as historic documents on housing and construction, media, scholarly and investigative reports on building collapses and other cognate materials on the growth and development of cities across diverse locations to confer insight into the range of agencies, motivations and causes that underlie the creation of unsafe buildings in developing countries, with its attendant repercussions for collapse.

In summary, it was found that accelerated demand for buildings triggered by urban expansions provides the context for how the creation of unsafe buildings arise in developing countries' cities and are thus central to understanding the deleterious consequences of building collapses in those parts of the world. The rest of the chapter elaborates on this.

Pathology of urban processes

Entering the 20th century, approximately 50 percent of the world's population were living in cities of twenty thousand (20,000) or more, with several mega-metropolises of twenty million (20,000,000) population or more (Pitcher, 1997). The growth and concentration of more and more people in cities has been even more profound in the 21st century with about 54 percent of the world's population currently living in urban areas. Two centuries ago, Peking (today's Beijing) was the only city in the world with a population of a million people. Today, almost five hundred cities are that big and many are much bigger (Berlinski, 2011). The projections are that, by 2050, urbanization combined with the overall growth of world's population could add 2.5 billion more people to urban populations (UN,

2014). “The future of the most of humanity”, David Harvey once argued, “now lies, for the first time in history, fundamentally in urbanizing areas. The qualities of urban living in the 21st century will define the qualities of civilization itself” (Harvey, 1996: 403). Cities and urban habitats will thus be crucial to humankind progress.

The problem, however, is that there are claims that increased growth and concentration of people come with a parallel increase in crime and violence, pollution, disasters and catastrophes, poverty and many of the other social problems humanity is grappling with (Kirmeyer, 1978; Pitcher, 1977; Legters, 1985; Kulinski, 1985). This view is at the heartland of urban pathology discourse. Urban pathologists have long contended that the urbanization process of spatial concentration of people and their social and economic activities affect the extent to which social problems occur and the particular forms they take in urban settings (Pitcher, 1997; Herbert & Smith, 1989; Legters, 1985; Haynes et al., 1985; Komorowski, 1985). This implies that the social problems experienced in cities have a uniquely ‘urban’ dimension and, therefore, have to be analysed and addressed, if they are to be dealt with at all, in the context of urban agglomeration (Haynes et al., 1985; Legters, 1985; Kulinski, 1985). But, really, do urbanization processes *pari passu* come with reduced quality of life?

The population growth and social pathology thesis: A brief overview

Concerns about the relationship between population growth and social pathology¹³ date back to famous demographers such as the English cleric and scholar, Thomas Robert Malthus. Nevertheless, such concerns burgeoned when the ecologist, John B Calhoun presented the results of a macabre series

¹³As noted by Kulinski (1985), in the objective interpretation of pathological phenomena, the problem of value judgment is inescapable. What is considered normal or even beneficial for one group in a given historical and geographical situation may be pathological for another group in another environment, which, thus, expresses a different set of value-judgment. Nonetheless, as also noted by Legters (1985), in its widest implication, pathology could refer to any departure from whatever norm of social health held by the commentator and, as such, functioned as a residual category holding all manner of social frictions, dislocations, malfunctioning, and mistakes that might, at least, from the standpoint of the commentator in question, require fixing. Applying Legters’ insight, since buildings are constructed to stand and serve some purpose such as residential, economic, their collapse, which come with not just the loss of the building but other losses including material and human, could be construed as pathological.

of experiments conducted at the National Institute of Mental Health (NIMH) in a 1962 edition of *Scientific American* (Calhoun, 1962). Calhoun had placed several rats in a laboratory in a converted barn where; protected from disease and predation and supplied with food, water and bedding, they bred rapidly. The one thing they lacked was space, a fact that became increasingly problematic for what Calhoun liked to describe as his “rat city” and “rodent utopia” teemed with animals. Unwanted social contacts occurred with increasing frequency, leading to increased stress and aggression (Ramsden, 2009).

Following the work of the physiologist Hans Selye, it appeared that the rats’ adrenal systems offered the standard binary solution: fight or flight (Selye, 1936). But in the sealed enclosure, flight was impossible leading to, among other things, spiralling violence; ‘rape’; cannibalism; infanticide – what Calhoun termed as ‘behavioural sink’. These activities (the infanticide, cannibalism, among others) are abnormal for rats in usual, low density situations, and from the viewpoints of most human cultures, are undesirable or pathological (Gillis, 1974). Their numbers fell into terminal decline and the population tailed off to extinction (Ramsden, 2009). Those who survived did so at some great psychological cost: they became asexual and utterly withdrawn, clustered in a vacant huddled mass. Even when reintroduced to normal rodent communities, these “socially autistic” animals remained isolated until death (Ramsden, 2009).

Calhoun’s experiments with rats and mice proved extremely influential – heightening the so-called population density-pathology discourse. His findings resonated with a variety of concerns, including population growth, environmental degradation and urban violence. Just like Calhoun, most of the studies that later explored what is usually referred to as population density-pathology hypothesis involved nonhuman animals (Christian et al, 1960; Morris, 1952; Sugiyama, 1967; Leyhausen, 1965; Southwick, 1967; Morris, 1968; Lorenz, 1966; Wynne-Edwards, 1965; Ardrey, 1966 in Newman & Hogan, 1981). However, there have been a number of *sociological* (Schmitt, 1966; Galle et al., 1972;

Levy and Herzog, 1974, 1978; Schroeder, 1942; Simmel, 1957 in Newman & Hogan, 1981) *public health* (Farr, 1873; American Public Health Association, 1946, 1960, 1974; Galle et al., 1972; Schorr, 1966; Langer, 1964; Loomis, 1970 in Newman & Hogan, 1981) and *psychological* (Sommer, 1969; Dabbs, 1972; McDowell, 1972; Baxter and RozeUe, 1975; Willis, 1966; Dabbs, 1972; Barash, 1973; Patterson, 1973 in Newman & Hogan, 1981) and other studies that focused on human beings.

Some of the early objections to the high population-pathology nexus or hypothesis were that it is both difficult and risky to generalize directly from the behaviour of even one animal to that of another (Freedman, 1974; 1975) let alone human beings who possess culture to free themselves from biological constraints over the development and maintenance of behaviour systems (Alland, 1972; Fischer, 1975) and technology to enable them deal with adverse effects of population growth (Gillis, 1974). In respect of the studies that focused on human beings, there have been claims that most of the aggregate data that suggest pathological implications of high population density are based on correlative findings, which bear little causal relationship (Schmitt et al., 1978; Galle et al., 1972; Ward, 1975; Kirmeyer, 1978; Choldin et al., 1975; Wilner and Baer, 1970; Booth and Johnson, 1975; Choldin and Roneck, 1975; Freedman, 1975; Schmitt et al., 1978 in Newman & Hogan, 1981).

Some urban economic and geography (Clark, 1951; 1967; Rees, 1968; Berry et al, 1963; Berry & Horton, 1970; Newling, 1966; Muth, 1969; Amson, 1972; Edmonston, 1975 in Newman & Hogan, 1981); ecological (Newman, 1975; Real Estate Research Corporation, 1974); transportation engineering (Harwood, 1977; Dyckman, 1965; Pushkarev & Zupan, 1977; Cheslow, 1978; Fels & Munson, 1974; Bay Area Transportation Study Commission, 1969 in Newman & Hogan, 1981) and architectural psychology (Gehl et al, 1977, 1978; Lynch, 1977; Berg & Medrich, 1980; Dewar & Yutenbogaardt, 1979 in Newman & Hogan, 1981) studies suggest that high population density could even lead to positive outcomes.

A mid-level critique of the high population-pathology hypothesis is that the proponents usually base their claims on linear causal studies, which usually fail to establish determinate relationships. Such studies, the critics argue, assume that initial conditions determine effects. Thus, if high population density exists, then it should have high pathological effects: similar causes have similar effects (See, Sengel, 1978, for instance). Such linear claims, the critics further contend, ignore the interactions of the components in the system. Structure and process generate effects, not initial conditions. Thus, knowing only that high population density exists does not enable one to predict the development of a social pathology.

Taken together, the criticism against the high population density-pathology thesis pertains to its claim of a *simple direct* connection between high population density and social pathology not a total disavowal that high population growth could influence pathological outcomes (Galle et al., 1972), even though there also is the critique that some pathological outcomes could be generated independently by factors other than population growth (Galle et al., 1972; Choldin, 1978). Thus, it is usually unclear if not difficult to decipher sufficiently that pathological outcomes were solely or directly caused or influenced by population characteristics – such as growth rate, size, pattern or rural/urban economic development experiences. In some cases, pathological outcomes are independently generated by factors other than population-related characteristics (the probability of pathology is only enhanced by population related characteristics – for a review, see Galle et al., 1972; Choldin, 1978, for instance). Therefore, today, the focus of population-social pathology conversations has now shifted away from simply identifying the pathological consequences of say high population growth towards factors that mediate the effects (Ramsden, 2009).

Synthesis of competing claims and application to study

The literature on the nexus between population growth and pathological outcomes could be grouped under three schools of thoughts: high density-pathology, high density-social advantages and the ‘weak’

high density-pathology schools of thoughts. At the two extreme ends are studies that assert direct negative (e.g. Calhoun, 1962; Thiessen, 1964) and direct positive impacts (e.g Newman & Hogan, 1981) of high population density. The third school of thought, which has fairly wide acceptance today—the ‘weak’ high density-pathology school—takes the critical position that the supporting evidence for the claim of *direct* relationship between high levels of population density and social pathologies is not unequivocal (Galle et al., 1972; Sengel, 1978; Choldin, 1978; Ramsden, 2009). These studies argue that such relationships are usually mediated by series of factors, which suggests complexity and, therefore, unamenable to a two-variable linear presumption of direct relationship. High density *per se* does not appear to produce adverse outcomes (Choldin, 1978; Sengel, 1978). But this critique may apply but not to the high density-pathology school of thought only; it also may apply to the high density-social advantages school of thought: If high density *alone* does not cause pathological outcomes, then it is axiomatic that that alone cannot also cause positive outcomes.

Where does all this leave the researcher seeking to understand social problems against the backdrop of rapid demographic expansion of urban settings? Pitcher (1997) suggests a focus on identifying the specific features of cities which contribute to the appearance or occurrence of the social problem(s) in question (Pitcher, 1997). Here, two of the main foregrounds of the ‘weak’ high density-pathology nexus are of analytical relevance. First, as noted earlier, it is usually unclear if not difficult to attribute pathological outcomes solely or directly to high population growth. Second, in some cases, pathological outcomes could be independently generated by factors other than population-related characteristics (the probability of pathology is only enhanced by them – Galle et al., 1978; Komorowski, 1985). Indeed, it is well established in the urban pathology literature that not all pathological phenomena are created by crisis (i.e. are antecedents of negative/pathological urban processes). Some urban pathologies are created or generated by what may be considered as ‘benign’ urban processes (Kuklinski, 1985).

The combined implication of these perspectives is that it is not enough to just assert a covariance in the trend of rapid upsurge and concentration of people in urban habitats and a social or an urban pathology and run with it. The complexity of the underlying interrelationships between urban expansions and social pathology means that an analysis of the total configuration or components of the urban system and the dynamic relationships among them is conditional to arriving at the negative impact of urban expansions in any given situation. Thus, as counseled by Kuklinski (1985), the challenge is not to outline pathological issues in urban settings vis-à-vis urbanization. But rather, there is the need to analyse the mechanisms of the web of cumulative causal factors underlying the pathologies in question. Without such an explanatory grounding, Sengel (1978), for instance, notes, it tends to be difficult to interpret correlations.

Thus, the relationship between urban expansions and social pathology is dynamically interactive and thus complex, and not amenable to a simple two-variable linear analysis which presumes a direct relationship. The investigator, therefore, must attend to the complex dynamics of how the growth and concentration of people in urban habitats and the resultant transformations interact with other relevant processes of the urban system (the benign and not so benign ones) and generate vulnerabilities and/or enhance those generated by other elements and contribute to the occurrence of the social problem or pathological outcome under review. The insight here, as noted by Sengel (1978), is that a formulation of the problem in question around general systems concepts may help discern the relationship between urban expansions and social pathology in urban settings. How could this insight help in understanding building collapse in the urban context? The rest of the chapter is directed to address this. But before that, the chapter detours to explain the key analytical concepts on which the study hinges: urbanization and the urban context and their application in the study.

Conceptual foundation: Urbanization and the urban context

The main conceptual wheel around which the study (and particularly this chapter) turns (or to borrow from Corbin & Strauss, 2012: “the central or core category” of the study) is urbanization and of course, the setting of interest is the urban context. Urbanization and the division between urban and rural have remained the subjects of academic and policy debates. Just like scholars, most countries around the world define an urban area, a town, and a city somewhat differently¹⁴ (McGranahan & Satterthwaite, 2014). This is despite supranational efforts to provide a certain degree of standardization (Szabo, 2015). There, however, exist some helpful definitions. For instance, Kingsley Davis defined urbanization as “the proportion of the total population concentrated in urban settlements, or to a rise in this proportion” (Davis 1965: 41).

Following the UN guidelines, the Organization for Economic Cooperation and Development (OECD) defines urbanization as “(1) increase in the proportion of a population living in urban areas; (2) process by which a large number of people becomes permanently concentrated in relatively small areas, forming cities” (OECD 2012 in Szabo, 2015: 20). While the first aspect of this definition implies that urbanization is a direct result of demographic processes, the second part considers urbanization as a broader phenomenon. Other complementary definitions touch on the social (and a-spatial) aspect of urbanization. Bhatta (2010), for example, referred to urbanization as “a social process, which refers to the changes of behaviour and social relationships that occur in social dimensions as a result of people living in towns and cities” (Bhatta in Szabo, 2015: 20). Definitions like this are more appealing to cultural sociologists and demographers, as they imply that people’s behaviour, norms, and family patterns change through the process of urbanization. Urbanization is also considered as part of the modernization process (Gilbert, 1999).

¹⁴ Contextualizing the urban concept in Ghana: Since the beginning of formal censuses in Ghana, the official definition of ‘urban’ has been settlements with 5,000 or more people (See Obeng-Odoom, 2010).

While the definitions suggested above provide some perspectives for thinking about the concept, the manner it is deployed in this study falls with Szabo's (2015) definition of it as a process of population concentration, which has important demographic, economic, social and environmental ramifications. Here, both the *process* and the *impact* of urbanization are of analytical interest. Szabo (2015) definition evokes an image of urbanization as not just a process of population concentration, but, even more importantly, as one that impacts on society in significant ways. The impact of urbanization is usually a mixed bag of benign and not-so benign developments such as incentivizing industrialization, wealth and employment creation or engendering crime and violence, pollution, disasters and catastrophes, poverty and many of the other social problems that humanity is grappling with. Following Szabo (2015), urbanization is deployed in this chapter to analyse how the *process* of demographic and economic expansion in urban areas *impacts/affects* construction processes and practices in ways that lead to the creation of unsafe buildings and to that end, building collapses in such places. The chapter, in this sense, aligns with the broader scholarly conversation on the influence of urbanization processes and pressures on the social and spatial distribution of vulnerability to humans –the urban pathology discourse (Herbert & Smith, 1989; Pitcher, 1977; Choldin, 1978; Haynes et al, 1985) introduced earlier.

Theorizing building collapse in cities: Lessons from the urban pathology literature

The synthesis drawn from the debates on the pathologies of urban processes was that the investigator seeking to understand social problems in the urban context must explore it at the cross-cutting edges of the complex dynamics of how the growth and concentration of people in urban habitats and the resultant transformations interact with other relevant processes of the urban system (the benign and not so benign ones) and generate vulnerabilities and/or enhance those generated by other elements and contribute to the occurrence of the social problem or pathological outcome under review. Thus, the problem needs to be formulated around general systems concepts in order to discern the relationship between urban

expansions and the urban pathology in question. This section applies this insight to theorize the causes of vulnerability for building collapses in cities in developing countries.

To what extent does rapid growth and concentration of people in urban habitats affect construction and building use practices and the regulation of such practices and processes in cities and contribute to the occurrence of collapse incidents in such places? What roles do other urban factors connected to the demand and supply, design, construction, utilization and adaptation of buildings as well as the regulation of such practices and processes play in generating vulnerability for building collapses? What relationships exist (if any) among the different web of urban factors connected to building construction, building use and the administration of construction activities and how do such relationships play out and contribute to the occurrence of building collapses? These questions and their corollaries are the heart of this chapter. The chapter is grounded in document analysis of secondary literature on housing and construction, media and investigative reports on building collapse as well as other cognate materials on the growth and development of cities. As established in chapter two, more buildings collapse in developing countries than in advanced countries (see Soane, 2016; Moullier, 2015; Asante & Sasu, 2018). A simple keyword search for “incidents of building collapse”; “building collapse in developing countries”; “incidents of building collapse in developing countries” returns various scholarly and media reports on the phenomenon in particularly Africa and Asia and countries like Nigeria, Kenya, Uganda and Ghana; China, India, Turkey and Bangladesh as some of the places where they mostly occur.

In qualitative document analysis (Bowen, 2009), the approach the study adopted, the basis for materials selection is not to fulfil the representative requirements of statistical inference but to provide substantial contributions to the understanding of the structure and character of the phenomenon under investigation (Polkinghorne, 2005). This presupposes that the investigator must strategically target where s/he could access the appropriate materials that could illuminate on the phenomenon under review. Applying this methodological insight, in searching for materials, cases and examples to

illustrate arguments and support analysis, the review purposively focused or targeted the two regions and the countries mentioned above. Key search terms like “building collapse in Nigeria”; “incidents of building collapse in China”; “building collapse in Ghana”; “incidents of building collapse in Kenya” “the collapse of buildings in India” returned the cases used to illustrate arguments. Nonetheless, additional materials, examples and cases are drawn from other developing regions and countries to provide a wider context, as appropriate.

Further, historical methodologists have long counselled social scientists to explore contemporary questions always in comparison with the relevant aspects of past societies (See Tuchman, 2003, for instance). This methodological standpoint has its roots in sociological traditions including the works of C. Wright Mills (Mills, 1959). The broader philosophical point of historic methods is that the issues or problems of the day usually have precedents, analogues, and examples in the past. In this sense, the application of historic methods helps investigators to identify and establish awareness of the interconnectedness and the larger relationships between the events, issues and factors underlying the phenomenon being studied. The chapter juxtaposes the situation of today’s urban experience regarding building collapses to that of two historic urbanizations that commonly feature in social scientific discourses on urbanism: Ancient Roman and 18 and 19th century Britain urbanizations. In so doing, it offers a comprehensive insight that places the phenomenon of building collapse in the cities’ context within the historical and contemporary discourses on the topic.

The chapter will make the following claims: That the demographic and economic expansion process of urbanization usually comes with a cascading upsurge in the demand for buildings, which, in turn, creates a range of agencies, motivations and causes that encourage unhealthy construction and building use practices and, hence, widespread creation of defective or unsafe buildings. Cities’ authorities would normally intervene to uphold public health and wellbeing. However, institutional cultures such as corruption (especially in developing countries) further undermine their (usually under resourced)

capacity to exercise efficient oversight and ensure development control by enforcing construction and building use regulations against the accelerated or widespread suboptimal construction and building use practices. In the end, an adverse climate is created in which the pursuit and the provision of building needs and services play out in ways that undermine public safety –manifesting as incidents of building collapse.

Thus, the findings suggest that building collapse in developing countries' cities is the unintended effect of inappropriate construction and building use practices induced by accelerated demand for buildings subsequent to rapid urban expansions in which deficient construction governance and urban management play key roles. At issue is how urbanization-induced accelerated demand for buildings influence, shape and/or dictate the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices in urban settings in ways that tend to undermine safety, sustainability, wellbeing and longevity imperatives. A proviso is offered beforehand that the parallels drawn between contemporary and historic urbanizations do not assume simplicity or disregard the meaningfulness of contextual differences. In no simple sense can we read the developments then as neatly similar to that of today. The parallels are drawn only in respect of how the demographic and economic expansion processes of urbanization create incentives, causes and motivations for deleterious adaptation of construction processes and buildings in ways that tend to undermine wellbeing, sustainability and safety imperatives.

The chapter is structured under two overlapping themes: the pressures of accelerated urban building needs and deficient construction governance and urban management. After a thorough discussion of each of the themes with case examples, the key causal findings and their underlying sub-causes are integrated into a conceptual framework (represented by text boxes interconnected by directional arrows) that depicts their mutually reinforcing relationships. Thus, each of the causal factors is linked to its effect(s) in a way that illustrates how the factor influences (and is also influenced by) other factors and

contributes to the pathological outcome – i.e. the collapse incident. In so doing, the chapter graphically illuminates the complex dynamics, processes, events and conditions that come together to generate vulnerability for the occurrence of building collapse in urban settings. The first factor to be analysed is the pressures of accelerated urban building needs.

The pressures of accelerated urban building needs and building collapse in urban settings

This theme explores how growths in urban populations and their resulting transformations propel accelerated demand for buildings, which, in turn, leads to suboptimal adaptation of construction processes and buildings and, hence, the creation of unsafe buildings in urban settings with repercussions for collapse incidents. The overall insight is that a high growth in urban populations, which also comes with corollary developments such as increased economic activities, usually occasions building need pressures and incentivizes suboptimal construction and building use practices and, for that matter, widespread creation of defective buildings. Such buildings collapse in the event, but also even in the absence, of physical hazards. The nexus between rapid demographic and economic expansions in urban settings and building collapse is explored under two sub-themes: suboptimal constructions engendered by the pressures of urban building needs and suboptimal building use practices influenced by urban political economy pressures.

(a) Suboptimal constructions engendered by urban building need pressures

Buildings are of utmost importance to society and are one of humankind's most ancient pursuits. They are complex assets, with links to culture; livelihoods; health; education; security; social and family stability (Sparke, 2004; Barakat, 2003; Smiley et al., 2014). Society's response to building needs is heavily influenced by social changes such as population pressures. At the micro level, families seek new bigger homes, apartments or adapt old ones to make more spaces for new members as the size grows. Similar dynamics play out at the macro level as population growth also comes with increased need for buildings for housing and other purposes (Lawrence & Low, 1990).

The challenge in the urban context, however, is that the exigencies of upsurge in the demand for buildings subsequent to accelerated growth in urban populations usually influence urban dwellers to respond to building needs in ways that lead to insufficient focus on safety, wellbeing and longevity imperatives. The less emphasis on safety, sustainability and wellbeing considerations manifests as widespread suboptimal or unsustainable construction practices, such as increased use of substandard materials, reducing the required inputs and siting buildings in dangerous locations, which, in turn, lead to shoddy works and in many cases building in hazard-prone zones, and, thence result in collapse incidents in the event or even in the absence of physical hazards. This conception of vulnerability for building collapse in urban settings just as much reflects the situation of contemporary urbanization as historic ones. For instance, studies show that while the early Romans were indefatigable builders (evidenced by the many infrastructures they left behind: Beard, 2015), increased building need pressures propelled by accelerated growth in Rome's population proliferated adverse construction practices, which led to collapse and other catastrophic incidents such as conflagration (Closs, 2013).

Not just Rome, similar developments were evident in the 18th and 19th century Britain. In the case of Britain, the rapid factories-driven industrialization of the late 18th and early 19th centuries propelled a phenomenal rise in populations in many of its industrializing cities (Nevell, 2011; Hartwell, 2001), which led to the so-called "housing question" (Kemp, 1989; Engels, 1935). For instance, between 1773 and 1821, housing need in Manchester alone grew from 3,446 to 17,257 and nearly 50, 000 houses by 1851 (Kidd, 2002). The attempt to meet the astronomical rise in building needs led to a widespread decline in the quality of construction –many dwellings in the new and growing towns and cities were poorly designed and/or constructed, and with shoddy materials (Nevell, 2011; Symonds, 2005; Kemp, 1989). For instance, the rapid growth in the urban population meant that there was pressure on urban lands leading to the piling of stories on old stories as the use of banned construction materials also

ratcheted up. This led to widespread creation of structurally suspect buildings and collapse incidents (Hurst, 2001; 2006).

Fast forward to contemporary times, the housing deficits experienced in Hong Kong because of high growth in Hong Kong's urban population and influx of migrants in the 1960s occasioned widespread suboptimal and illegal constructions, which also led to several incidents of building collapse (Buildings Department, 2007). Further, studies suggest that Chinese cities are experiencing significant suboptimal construction and building use practices resulting in several cases of shoddy work failures – a development that has been linked to building need pressures occasioned by the country's ever-growing urban population (He & Wu, 2016). Lyu et al (2018), for instance, show how accelerated demand for buildings due to high influx of rural migrants incentivized dangerous building practices such as the construction of extra floors atop old buildings by landlords in the City of Wenzhou led to the collapse of four (three six-stories, and one two-story) residential buildings. The incident, which occurred on October 10, 2016, killed twenty-two (22) migrant labourers. Other cities in China have experienced similar incidents (See Feifei, 2014 for instance).

While the fundamental point here pertains to how the pressures of upsurge in building needs subsequent to accelerated growth in urban populations influence the proliferation of dubious construction practices and for that matter widespread creation of unsafe buildings, economic factors also play impactful roles. Thus, the unsustainable manner in which building needs and services are pursued and provided in the context of accelerated growth in urban populations is just as much influenced by population pressures as economic incentives and pressures. As noted by Watt (2007), the building process involves design, construction, utilization and adaptation of the structure in response to future needs. However, at every stage, economic and safety considerations fiercely compete such that if the right balance is not achieved, structural integrity could be adversely affected (Blockley, 1980). The point here is that developers could not have access to infinite resources or money, therefore,

however paramount safety considerations may be to the design process, the designer may as well have to give economy a firm thought. Effectively, the resources available for the project could pose a powerful counterweight to safety and structural integrity considerations.

Construction practitioners are enjoined to uphold the safety, health, and welfare of the public against all other considerations. “For the building and designing professions” Mason notes, “the incalculable value of human life demands nothing less than the highest moral considerations from those who might risk it otherwise” (Mason in Vee & Skitmore, 2003: 117). Thus, engineers, architects, project managers and contractors have a fundamental duty of professional conscience (Drew et al., 2001; Fleddermann, 1999). However, their work is also a business, which must survive – it is a way of earning a living. As noted by Blockley (1980), naturally, the pressures of business are ever-present and sometimes can become so great that engineers may easily lose the wider view of their role in society and see their function only in a straightforward materialistic business sense.

High emphasis on economic returns or cost of inputs could undermine safety considerations and lead to the creation of structurally defective buildings with repercussions for collapse incidents. Indeed, there is the growing concern in the construction sector that a lot of the careless designs and inadequate construction practices that lead to problems are not due to the inevitable difficulty with technology or its lack thereof. They result from the growing socio-economic and other pressures on the players in the construction industry to reduce costs or cut corners (Atkinson, 1999; Ogunlana, 2010; Tam et al., 2000). Tam et al (2000) argue, for instance, that some players in the construction industry consider ‘quality versus time versus cost’ in a zero-sum way and, therefore, whenever there is a choice among the three, usually quality is the first to be sacrificed. There is the tendency to focus mainly on immediate gains—meeting production schedules, quota and cost targets (the ever-present iron triangle problem in construction project management –Atkinson, 1999; Ogunlana, 2010) relegating safety, sustainability, and well-being imperatives to the background which then lead to unintended disastrous outcomes.

For instance, as noted by Alinaitwe and Ekolu (2014), hurriedly conducted construction has the danger of not giving time and attention to quality control testing and inspection of newly constructed elements, prior to progression or casting of subsequent floors. Thus, uncontrolled speedy construction directly implicates on poor workmanship. While universal,¹⁵ these problems are more pronounced in the developing world where regulation is usually weak. An exemplifying incident in point is the collapse of the six-story building that reportedly killed about 49 people in April 2016 in Nairobi, the Kenyan capital. The report was that the building did not have occupancy permit. Apparently, there is high demand for buildings in Nairobi (Reuters, 2017; Manyira, 2018), and the owners of the facility are part of the many developers in the city who bypass regulations to cut down cost and maximize profit. The accounts on the incident pointed out that the structure had been “shoddily” built within a few months and the 126 single rooms were being rented out at a monthly rate of \$35 (£24)¹⁶ (The Guardian, 2016; Associated Press, 2016). In Uganda, it was established that similar problems regarding uncontrolled speedy construction and poor workmanship led to the collapse of the BBJ building that killed eleven (11) people and injured twenty-six (26) others in Kampala, the capital in September 2004 (See Alinaitwe and Ekolu, 2014).

A subtle dimension of the problem relates to how socio-economic inequalities associated with urbanization processes impede certain segments of the urban population from accessing housing in planned areas thereby exposing or forcing them to undertake construction practices that increase disaster risk and insecurity. The key underlying issues include high cost of urban land and unfavourable mortgage and credit schemes. Urban lands are now under pressure everywhere as a result of increased demand and speculation (Moullier, 2015). There are two major consequences related to excessive and

¹⁵ Similar problems are even discernible in the developed world though. For example, concerns have been raised in Australia about the proliferation of structurally suspect buildings in the country’s cities. Experts say that the development is driven by estate developers’ quest for profit at the expense of longevity (see Dow, 2016)

¹⁶ While this fee may not be considered exorbitant in advanced countries, in developing countries’ context, it is substantial.

speculative land prices with adverse implications for building safety. First, for low-income urban dwellers, the high cost involved in buying or renting a piece of land absorbs the bulk of financial resources available for housing. This, in turn, limits their capacity to invest in safer building materials, construction, and skilled labourers, even where these would be available at a reasonable price. Second, a significant portion of the population who are usually not creditworthy and cannot afford buildings in planned locations due to high cost of mortgage schemes are forced to construct and/or patronize low cost but unsafe tenements and often in hazard-prone zones (Wisner et al, 2003; Moullier, 2015; Lyu et al, 2018; Pelling, 2003; Pelling & Wisner, 2012).

For instance, in the Philippines, high land prices are considered as one of the main reasons driving about 40 percent of people to live in informal settlements, which are often unsafe (Moullier, 2015). A detailed investigation found that the average cost of a house in an informal settlement costs roughly 10 percent of the price of a comparable unit in the formal sector. Creating structurally suspect buildings and in hazard prone zones only increases insecurities and vulnerability and the experience is that such developments often lead to disastrous outcomes (Wisner et al, 2003; Moullier, 2015; Lyu et al, 2018; Pelling, 2003; Pelling & Wisner, 2012). This was true of the case of Ancient Rome and 18th century Britain. For instance, Nicols (n.d.) found that not only did the housing pressure in Rome lead to many people taking accommodation on the streets but also, it led to the construction of poor-quality tenements—the rents for safer alternatives were too high. In the case of 18th century Britain, as the population grew, space was at a premium within the cities; therefore, stories were piled on old stories to create housing for lower class people (Hurst, 2001; 2006).

The downside of such developments, however, is that they come with public health challenges. What happened in Hong Kong in the 1960s exemplifies this point. High growth in Hong Kong's urban population in the 1960s (driven by natural increase and high influx of migrants) created a large cohort of urban poor in need of housing. Without enough resources to access the relatively safer but costly

dwelling, they heavily patronized the many unauthorized buildings that were being constructed. The scale of the development overwhelmed the authorities who could not control it until the structures began collapsing starting from the 1990s through to 2002. By 2001, the collapses had become very intense forcing the Buildings Department to conduct a series of clearance operations leading to the removal of over 255, 000 unsafe buildings (Buildings Department, 2007). Similar dynamics underlined the recent collapse of four buildings in the Wenzhou City of China on 10th October 2016, which killed twenty-two (22) migrant labourers and injured six (6) others (See Lyu et al, 2018).

(b) Suboptimal building use practices influenced by urban political economy pressures

The previous section underscored how urban crisis such as rising urban housing deficits and urban poverty encourage a range of agencies, causes and motivations for the supply and use of buildings to play out in ways that place inadequate focus on safety, wellbeing and sustainability imperatives, and thus result in the creation of unsafe buildings and lead to disastrous outcomes. However, as noted earlier, not all pathological phenomena are created by crisis. Some urban pathologies are created or generated by what may otherwise be considered as ‘benign’ urban processes (Kuklinski, 1985). This view of pathologies of urban processes is true of building collapse in the urban context.

The growth and agglomeration of people in cities attract investments and generate commercial activities – which, in turn, leads to benign outcomes such as increased wealth creation, employment opportunities and overall economic transformations in cities. However, these same developments and processes amplify infrastructural demand to support the increased economic activities. The urbanists’ account suggest that such developments usually encourage the conversion of especially residential buildings to commercial uses. This development is very pervasive in many of the mega cities growing rapidly in the developing world including Cairo in Egypt, Lagos in Nigeria, Johannesburg in South Africa, Rio de Janeiro in Brazil, Buenos Aires in Argentina, Santiago in Chile, Hanoi in Vietnam, Accra

in Ghana and even smaller cities like Bolivia's Cochabamba (See, for instance, Sutton & Fahmi, 2001; Quang & Kammeier, 2002; Barredo & Demicheli, 2003; Oosterbaan et al, 2012; Coen et al, 2008).

The discourses on the development usually focus on its adverse implications for urban planning and housing deficits as it reduces the quantity of buildings for residential purposes (see, for instance, Oosterbaan et al, 2012; Adarkwa & Oppong, 2005; Cobbinah & Niminga-Beka, 2017). The implications of the development for the many building collapse incidents occurring in those parts of the world is seldom explored. However, since such structures originally were not meant for commercial use, the design considerations, relative to their fit for purpose, would normally not include the subsequent additional imposed loads associated with the new use. Therefore, using them commercially could exert further pressure on the structural members and cause fatigue and eventual collapse just as attempts to make the necessary structural adjustments to suit the new purpose, if not properly done, could also lead to structural integrity erosion and eventual collapse. The pathological effects of inappropriate commercialization of buildings (as factories, wholesale, retail and other services) are being felt in many parts of the developing world including Pakistan, Bangladesh, China and Nigeria where such practices have led to fatal incidents.

However, the infamous collapse of Rana Plaza in April 2013 in the Savar Upazila of Dhaka District, Bangladesh, which killed 1,129 and injured 2,515 people, manifests all the trappings of this rather disturbing urbanization-induced building use practice. Dhaka has become one of the world's most populous and rapidly urbanizing places, driving up the price of land and straining the country's power systems. The shortage of land and a propensity for flooding in Bangladesh has prompted many factory owners to build up, rather than out – thus, additional unapproved floors are often hastily added to old structures with little considerations for structural integrity. For instance, in the case of Rana Plaza, the original approval for the building was five stories. However, at the time of the collapse, a ninth story was being added (see Schwier in Hodgson et al, 2016). Furthermore, to keep up with the increased

demands of Western retailers, factory owners convert residential and other buildings into makeshift garment factories – due to the high cost involved in putting up new buildings and limited access to utilities, thereby creating even more risks of collapse (Ifedolapo, 2015). The inappropriate commercialization of buildings in urban settings in developing countries bears watching for as the places continue to urbanize, more and more buildings may be indiscriminately converted to commercial uses.

The pressures of accelerated urban building needs: Summary of key highlights

The section sought to conceptualize the impact of accelerated building need pressures on building collapse in urban settings. The insights from the various cases explored corroborate many of the issues raised in the pathologies of urban processes literature. It has been established that rapid demographic and economic expansions in urban settings accelerate the demand for buildings for not just accommodation, but also economic activities and other purposes. The exigencies of the astronomical rise in the demand for buildings create a range of agencies, motivations and causes that encourage inadequate consideration for safety and sustainability imperatives in the pursuit and the provision of building needs and services. This manifests as proliferation of shoddy works; building in dangerous locations and the conversion of buildings to uses unintended in original designs leading to widespread creation of unsafe stock of buildings and sometimes in hazard-prone locations, which, in turn, collapse in the event but also even in the absence of physical hazards.

Deficient construction governance and urban management

The literature on the collapse of buildings in urban settings suggests that the problem goes beyond urbanization-induced building need pressures propelling adverse construction and building use practices in cities. Even more is the failure of cultural protections. As mentioned elsewhere, buildings play critical roles in the lives of humankind. We use them for shelter, business, religious ceremonies

and for learning (Smiley et al., 2014; Sparke, 2004; Barakat, 2003). Buildings are also expressions of the people and society that built them –they are a reflection of a society in so many ways – their sense of living and sense of worth and form part of their identity (Habraken, 1988; Lawrence & Low, 1990; Low, 1996; Rapoport, 1969; 1973; Moffat & Kohler, 2008; King, 1980). Buildings have aesthetic value, expressing the creative impulse of humans (de Botton, 2008). As Bennett (2007) puts it, the building structure demonstrates the astonishing capacity of humanity to express its desires and aspirations in concrete form. The beauty and growing strategic importance of global cities today owe substantial credit to the glamorous and breathtaking buildings springing up to accommodate the massive numbers of people thronging into such places as well as providing the needed infrastructure to support commercial activities. All told, buildings enhance humankind’s life.

Nevertheless, they also pose enormous risks to life and the environment. Society, therefore, devises or have devised cultural protections to reduce the potentiality of buildings affecting life and the environment adversely. Generally, these cultural safety precautions inform the organization of social life regarding the pursuit and the provision of building needs and services. Thus, the safety precautions (usually expressed as statutory and non-statutory demands–building regulations and codes) undergird how buildings should be or are designed, built, managed, repaired, maintained, occupied and even demolished (Watt, 2007; Arku et al, 2016; Health and Safety Executive, 2015). Advanced countries have relied in large part on effective and efficient building regulatory systems, which have been incrementally improved over time (Moullier, 2015; Soane, 2016; Subbarao, 2016) to ensure building safety. However, as established in chapter two, the same cannot be said about most developing countries.

A review of the literature on the developing world suggests that, sometimes, the regulations themselves even contribute to building safety problems. In some developing countries, the codes are

colonial inheritance and/or imported wholesale from the advanced world¹⁷ and, therefore, not fully appropriate for local conditions (Schilderman, 2004; Salazar, 1999). For instance, the usage of British building standards was found to have contributed immensely to hurricane losses in Jamaica (Pelling, 2003) and the collapse of a four-story building at Kuala Lumpur on October 19, 1968 (Aini et al., 2005). Even more important is the failure of implementation or non-enforcement of regulations. The point here is that most developing countries have some moderate to good building codes and regulations on their books. The problem, as observed in chapter two, however, is that they exist only as that – good regulations and codes on paper. Studies upon studies have reported that rarely are building regulations enforced in those parts of the world (Asante & Sasu, 2018; Moullier, 2015; Berlinski, 2011; Lewis, 2005; Soane, 2016; Kenny, 2012; Yeboah & Obeng-Odoom, 2010; Arku et al., 2016 – to cite but a few). Various reasons are proffered to explain this of which bribery and corruption feature prominently.

In most developing countries, once again as underscored in chapter two, contractors and other building needs and services providers have little to no trouble in finding willing accomplices to their substandard construction practices in the form of unscrupulous public officials tasked with the regulation of construction activities and development control. Studies suggest that developers easily

¹⁷ Another dimension of the problem with the use of inappropriate building standards in developing countries is the penchant to dismiss traditional building technology and impose so-called ‘modern’ ones. The response to the Maharashtra earthquake typifies this problem (Salazar, 1999; Schilderman, 2004). Salazar (1999) shows how such practices prepared the ground for disaster in Maharashtra. As observed by Tipple (2005) in *Housing and Urban Vulnerability in Rapidly-Developing Cities*, the people’s traditional ‘Wada’ form of housing, developed in its full form, is earthquake resistant as it has a wooden frame holding up the roof. The wooden frame does not only protect the masonry walls from buckling under earthquake loads, but also it provides a good chance that the roof will not fall and kill the occupants. With the growth of modernity, however, the traditional building system and division of labour had begun to break down and poor construction was becoming the rule. Thus, the seeds of the disaster were sown by increasing the vulnerability of the house form through policy changes and the regard the people had for the more ‘modern’ concrete technology. When the earthquake struck, many recently built traditional houses fell down but the mason’s houses remained standing. The government’s relief teams concentrated on concrete and steel construction after the earthquake, despite advice on how effective local traditional construction could be if well built (Tipple, 2005). This further destroyed their building traditions and imposed alien built forms and land subdivision patterns. The new houses were much smaller than the old because of the more expensive technologies. This led the occupants to add rudimentary extensions and use space in their (now dangerously weakened) pre-disaster homes, increasing their vulnerability. Thus, vulnerability was increased by the so-called higher technology (Salazar, 1999; Tipple, 2005).

obtain building permits through bribes and political favours or pay inspectors to turn blind eyes to designs and building practices that deviate from code specifications (Lewis, 2005; Moullier, 2015; Berlinski, 2011; Lewis, 2005; Soane, 2016; Kenny, 2012). Thus, both public and private sector corruption undermine all aspects of regulation enforcement and compliance. This leads to the construction of inferior public infrastructure, private buildings, and housing units, which ultimately fail, often in the face, but even also in the absence, of physical hazards leading to greater death tolls than would occur in the absence of corruption (Lewis, 2005; Moullier, 2015; Berlinski, 2011; Lewis, 2005; Soane, 2016; Kenny, 2012).

Furthermore, and as with the critical role that political clientelism play in land and access to housing (Rakodi, 1997; Fox, 2013), regulation enforcements efforts in developing countries are frequently undermined by “*big men*” or individuals with strong social and political connections and influence. They easily get away with non-compliance on their personal properties, as well as on the properties of others in their locality or elsewhere who seek their intervention (Asante & Sasu, 2018; Yeboah & Obeng-Odoom, 2010; Arku et al, 2016). For instance, some cities’ officials interviewed for a study in Ghana bemoaned that most of the structures that had collapsed in their jurisdictions had been earmarked for demolition. However, due to political interference, the developers were allowed to continue construction (See Asante & Sasu, 2018). Other impediments relate to the ‘political economy’ of noncompliance and the politics of regulations’ non-enforcement. The point here is that, in many ways, the large-scale ongoing construction developments in most cities in developing countries overwhelm the usually under-resourced capacity of the regulators to exercise efficient oversight and ensure development control (Shaw et al., 2016; Moullier, 2015; Lewis, 2005; Asante & Sasu, 2018; 2015). In such situations, as observed by Thiruppugazh in *Urban vulnerability reduction: regulations and beyond*, regulation noncompliance and the politics of regulations’ non-enforcement create a win-win situation for the parties involved: the officials could escape the regulatory pressures/overload, the

builders would maximize profits through noncompliance (compliance imposes further costs) and the public would get cheaper dwellings (Thiruppugazh, 2008).

In the end, a thriving climate is created for the pursuit and the provision of building needs and services to play out in ways that are deleterious to public safety. The Hong Kong case exemplifies this point. The high growth in Hong Kong's population in the 1960s created a large cohort of urban poor in need of housing. Without enough resources to access the relatively safer but costly dwellings, they heavily patronized the unauthorized ones that were being constructed. The scale of the unauthorized constructions overwhelmed the city's managers who could not control it until the structures started failing from early 1990 through to 2002. By 2001, the collapses had become very intense forcing the Buildings Department to do a series of large-scale 'blitz' clearance operations (BD, 2007). By 2006, they had removed more than 255 000 of such structures.

Chapter Three: Conclusion

The chapter turned to the methods and ideas accrued in the urban pathology literature to theorize building collapse in the urban context. It has shown that demographic expansion in urban areas, fuelled by migration and natural population growth, does not just create building need pressures and adverse conditions for frenzy gratification and supply of the same; it also impinges the capacity of the urban economy to deliver them in a sustainable manner. Further to the development overwhelming the capacity of cities managers, in the developing world, institutional cultures such as corruption and political interference also compromise their capacity to exercise oversight and ensure development control by enforcing building safety regulations against the accelerated widespread poor construction and building use practices.

In the end, a precarious climate is created in which the pursuit and the provision of building needs and services play out in ways that are deleterious to public safety –of which some manifest as incidents of building collapse and just like the public, the authorities also become aroused only when collapses

ensue and begin to undertake firefighting measures by demolishing unauthorized structures as the Buildings Department did in Hong Kong in 2006 (Buildings Department, 2007). Another case in point is Kenya: The Nairobi authorities swiftly began demolishing unauthorized structures right after the April 2016 collapse incident that killed close to 50 people (BBC Africa, 2016). This firefighting measure of demolition so-called unauthorized buildings right after a collapse incident is also common in Ghana (See, for instance, Ghanaweb, 2012). They are usually done in response or to assuage the usual spasm of high level but generally short-lived public outrage.

Based on the foregoing, as summarized into figure 3, building collapse in the urban context could be theorized as the unintended maladaptive effect of inappropriate construction and building use practices engendered by the exigencies of accelerated demand for buildings, subsequent to rapid urban expansions, in which deficient construction governance and urban management play key roles in contributing and reinforcing the prevalence of the inappropriate construction and building use practices that lead to the creation of unsafe buildings and, to that end, the occurrence of collapse incidents.

Fig. 6: Conceptual framework of influences of vulnerability for building collapse in cities in developing countries

Thus, the incidents are a pathological feature of urbanization: the unintended outcome of the interplay of the inappropriate construction and building use practices in urban settings driven by accelerated demand for buildings subsequent to rapid demographic and economic expansions in such places. At issue is how urbanization-induced accelerated demand for buildings influence, shape and/or dictate the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices in ways that tend to undermine safety, sustainability, wellbeing and longevity imperatives. Taken together, the insight here indicates how the demographic and economic expansion process of urbanization generates building need pressures in urban habitats, which, in turn, encourage insufficient focus on delivering the best quality buildings possible and utilization of buildings in ways that tend to undermine or compromise structural integrity. Chapter 5 addresses how this and the insights drawn from chapter two informed the design of the interview guides used for the empirical data collection; the analysis and the overall development of the thesis.

CHAPTER FOUR

THE APPROACHES TO SAFETY IN THE CONSTRUCTION SECTOR

The empirical focus of the study was to unravel the web of factors underlying the rampant collapse of buildings in cities in developing countries using Ghana as entry point. However, the study also had a theoretical focus of gauging the implications of the findings for the broader literature on safety in the construction sector. The first three chapters have provided an expanded insight into the issue of building collapse in the urban context and the empirical literature gap the study explored. This chapter explores the theoretical foundations of dealing with safety in the construction sector. This is necessary to situate the potential contribution of the study's empirical focus of exploring building collapse in cities in developing countries to the ongoing theoretical conversation and broader knowledge on building safety/collapse. The chapter commences with an exploration of the key arguments and some general critiques of the extant approaches to dealing with safety in the construction sector after which it narrows down to the theoretical insight gap being explored.

Approaches to safety in the construction sector: A general overview

Broadly, the theoretical literature on safety in the construction sector could be categorized under two main approaches: construction safety and forensic structural engineering. The first captures the body of literature that addresses the fatalities, failures, accidents and other cognate safety concerns inherent in the construction process, while the second broadly refers to the body of literature focused on the safety or the integrity of built structures – their defects, failures; their causes, consequences and remedies. Let's take turns to explore them in detail.

The construction safety approach¹⁸

The construction of structures is integral to human activity – an old industry that dates back to the Paleolithic Age between 40,000 and 12,000 B.C., when humans inhabited in caves or built structures on level ground (Zhou et al, 2015). It provides, among other things, places for shelter, business, religious ceremonies and learning (Merritt & Ricketts, 2001; Ricketts, 2001; Smiley et al., 2014; Sparke, 2004; Barakat, 2003). The construction industry produces the built environment, creates employment and generates wealth. The construction process, nonetheless, involves hazardous activities including working at heights; exposure to hazardous implements, materials and environments; demolition; frame erection; lifting operations; scaffolding and groundworks (Peckitt et al, 2004). The industry is regarded as one of the most unsafe (Perttula, et al, 2006; Pinto et al, 2011; Zhou et al, 2015). Reference to some accident data may help put the hazards in the construction sector in a better and global perspective. It is estimated that the construction sector employs just about seven percent (7%) of the world's workforce, but it, nonetheless, accounts for thirty – to forty percent of fatalities. In the US, the construction industry ranks as the fourth most fatal among all industries. One third of all workplace fatalities in the UK occurs on construction sites and the industry is responsible for a fatal injury rate over four times the average level of all industries. China recorded over two thousand five hundred (2,500) fatalities in the construction industry in 2007 alone and in Korea, the sector records the highest percentage of fatalities among all sectors (Zhou et al, 2015).

Our understanding of the aetiology of accidents in general has evolved over the years. Nonetheless, it may suffice to say that hitherto, (though still important) not only in the construction sector, but safety research broadly, was forensic or remedial in approach. It involved retroactive analysis of how past accidents had occurred and application of the knowledge gained for preventing the recurrence of the

¹⁸ Note that most of the theoretical underpins of construction safety are co-opted from other sectors of safety and risk management (for instance, normal operation studies – high reliability organizations, resilience engineering) and applied to worker safety in the sector.

specific error(s) that caused them—the so-called Learning From Experience (LFE) or Operational Feedback System (OFS) process (Dechy et al, 2012; Dien, 2012). Safety research was, thus, task or activity-based and backward-looking (Pidgeon, 2010). At the heart of the forensic approach were technical issues—the immediate physical/actor events, errors, violations, processes and conditions – what Dekker (2015) calls the ‘*Eureka part*’ (see figure 4: factor domain A). Much of the knowledge used to design, construct, manufacture, and operate engineered facilities and products were obtained through learning from failures.

The problem, however, was that causes of accidents were known only after the fact. Second, it led to what is described in accident research circles as “tokenism”— as it only provided insights to address specific errors. Further, what mainly featured in post-accident investigations were usually the immediate errors and breaches, which, however, were just the triggering conditions for the manifestation of the accident/failure (Reason, 1990; 2000; Perrow, 1984; 1981). It was realized that the triggering factors (also called active failures) were rarely the principal instigators of failures. Instead, the real causes were weaknesses created by fallible decisions made earlier in the organizational and managerial spheres. Indeed, risks and safety management studies increasingly reported human and organizational factors as the major causes of accidents (Reason, 2000; 1990; Hopkins, 1999; 2000; Branford et al., 2009).

In risk and safety management circles, the case was made for the consideration of accidents as the products of complex interacting systems highlighting organizational and managerial systems and factors as the main causes of failures. Technological disasters could not be ascribed to isolated equipment malfunction, operator error or random acts of God any longer (Pidgeon, 2011). The undergirding principle or understanding was that if we can get the organizational factors right, the technical causes of accidents would be dealt with *fortiori*. Moreover, while there were differential technical causes of accidents, across otherwise diverse locational, socio-economic and cultural contexts,

organizational failures revealed by different investigations and analyses of different accidents seemed remarkably similar/recurrent. A focus on organizational rather than technical or physical causes, therefore, offers the best opportunity for generalization – transference of learning from one enterprise or industry to another (Hopkins, 2000).

With the realization that while there is always a technical/physical explanation for a failure, the reasons they occurred were often procedural, safety and risk management studies took a revolutionary turn focusing on the identification and neutralization of latent failures—workplace, managerial, and organizational factors that combine with triggering events for failures to manifest (figure 4: factor domain B)¹⁹. Studies that approach accidents, risk and safety management this way are classified under the broad rubric of *systems thinking* or *theories*. Here, there is the acknowledgment of the constraints and influences that systems foist onto individuals who work within them and therefore the aim is not to blame them for errors. Instead, the approach strives to uncover and address the systemic deficiencies that provoke the errors and/or fail to prevent them from resulting in accidents. By this, systems thinking focuses on addressing or repairing deficiencies to prevent future accidents, rather than just reprimanding the frontline actors, and, thus, leaving the deficiencies that promoted their adverse actions unaddressed (Reason, 1990; 2000; Hopkins, 2000).

Authorities such as Heinrich (1931), Turner (1976; 1978; 1979) and Blockley (1980; 1999) are widely acknowledged in safety and risk management circles for pioneering and affording the pathway to the organizational view of accident causation and prevention variously applied, adapted and/or dissented in influential works like Pidgeon, (1986); Pidgeon et al., (1988); Perrow (1981; 1984); Reason (1990; 2000); Rasmussen (1997); Hopkins (2000); Leveson (2004; 2011; 2012); Dekker (2011; 2014);

¹⁹It is noted that some systems theories focus on factors beyond organizational and managerial levels and, therefore, address factor domain C of figure 3. Examples of such studies include the following: Rasmussen, J. (1997). Risk Management in a dynamic society: a modelling problem. *Safety Science*, 27(2/3), 183 – 213 and Reason, J. (1997). *Managing the risks of organizational accidents*. New York: Routledge.

Hollnagel (2012). The systems approach (also called systems thinking) has been well received in multiple fields of safety and accident investigations including the construction sector (McDermott et al, 2018; Toole, 2002; Fang et al, 2004; Fonseca et al, 2014; Nadhim et al, 2016; Mohamed, 2002; Choudhry et al, 2007; 2007b; Gilkey et al, 2012).

Nonetheless, increasingly, the reliability of systems thinking for safety and risk management is being challenged. First, accident analysis methods underpinned by the tenets of systems thinking are criticized for being reactionary: They are applied retroactively to identify incident characteristics with the hope of learning from them (Jenkins et al., 2010; Salmon et al., 2016). Undoubtedly, this provides the opportunity to learn from previous accidents to prevent future ones (Dekker and Leveson, 2014; Moura et al., 2016). However, relying on extreme events for safety learning, as noted elsewhere (see Grant et al., 2018), is both inappropriate and inadequate. In this sense, just like the technical/forensic approach it supplanted, systems thinking also faces both moral and ethical dilemmas for building on safety innovation upon the foundations of hardships and adversities. The gravity of this concern is exemplified by movements within safety science toward a focus on accident prediction (e.g. Salmon et al., 2016) or studying cases in which catastrophic outcomes were avoided (e.g. LaPorte et al, 1991; Weick et al, 1999; Hollnagel, 2014; Trotter et al., 2014).

Further, instead of declining over time, there are concerns that, incident rates have reached a plateau or increased in multiple fields that are applying systems thinking such as road, rail and aviation (See Grant et al, 2018, for instance). Finally, it is contended elsewhere (see for instance, Levitt, 2014) that the systems theories' de-emphasis of blame could unintentionally create a shield for 'bad apples' to escape responsibility and accountability. Construction safety scholars applying systems theories largely focus on organizational, managerial processes and workplace factors (Fang et al, 2004; Choudhry et al, 2007; Gilkey et al, 2012) and tend to ignore or deprioritize wider societal factors (factor domain C: figure 4). But, today, there is a groundswell of scholarship that takes a wider societal perspective to the study of

safety in the construction process (e.g. He et al, 2016; Tutt et al, 2013; Jia et al, 2016; 2017; Rowlinson & Jia, 2015; Rowlinson, et al, 2014; Pink et al, 2010; Peckitt et al, 2004).

Figure 7: Evolution, scope and focus of construction safety research.

Forensic structural engineering

The centrality of structural collapse to safety concerns in the construction sector could be traced as far back to 2200 B.C., when the King of Hammurabi of Babylon passed a law prescribing penalty for houses collapsing and killing their inhabitants (Zhou et al, 2015). Thus, the understanding about the danger of building accidents and their consequences are a marked feature of the construction sector. Strangely, however, such risks are seldom engaged in the discourses on safety in the sector. The scholarly conversations on safety in the construction sector, as the previous section shows, largely focuses on the health and safety management concerns in the course of construction or at construction sites (McDermott et al, 2018; Chen et al, 2018; Zhou et al, 2015; Tutt et al, 2013; Jia et al, 2016; 2017; Rowlinson & Jia, 2015; Rowlinson, et al, 2014; Pink et al, 2010; Peckitt et al, 2004; Hinze et al, 2013).

The safety or integrity of built structures has largely been consigned to the domain of forensic structural engineering (Heywood, 2010; Ratay, 2010; Delatte, 2009; Douglas & Ransom, 2013).

The collective knowledge and wisdom of humans can increase only by the discovery of new facts and the proper dissemination of the findings already known. In their endeavour to modify, control the environment and develop complex systems, humans generally prefer to take a cautious approach as any mistakes or misunderstandings of the physical world often lead to disastrous consequences. Such incidents constitute ‘lessons’ learnt which are passed on to avoid repetition in the future (Dechy et al, 2012; Dien, 2012). Therefore, it is important to evolve scientific methods for investigating the causes of disasters and disseminate the information effectively to the concerned fraternity. The branch of engineering that does this is forensic engineering (Subbarao, 2016; Noon, 2001; Carper, 2001).

The foremost precept of forensic engineering is that failures are consequences of flaw(s) in the system of professional practice rather than isolated incidents that could have been easily avoided (Subbarao, 2016; Heywood, 2010). Therefore, the discourses on structural failures, accidents or incidents are often framed around technical causes. Forensic structural engineers rely mostly on the actual physical evidence found at the scene, verifiable facts related to the failure, and apply well-proven scientific principles and methods to interpret them to arrive at the relevant conclusions or the technical/physical causes of the accident (Heywood, 2010; Ratay, 2010; Delatte, 2009; Carper, 2001; Noon, 2001). Failure investigation is, thus, approached from the perspective of physical causation and the given object as designed and constructed in the light of technical knowledge and professional procedures (Carper, 2001; Noon, 2001). The scientific principles assist forensic engineers to explain logically and identify the technical or physical cause/s of structural failures through careful collection of verifiable physical evidence, the application of fundamental engineering principles, and the development and testing of hypotheses in a manner that avoids preconceived notions or bias (Heywood, 2010; Brady, 2012).

The analysis or study of building collapse usually follows this engineering approach (Olajumoke et al, 2009; Masurkar & Attar, 2014; Kwasniewski, 2010; Fu, 2009; 2010). In the unfortunate event of a collapse incident, horrified by the associated destructions, attention tends towards the immediate factors: the engineering or technical causes disclosed by the incident. Such matters tend to be seen as primary and paradigmatic (Blockley, 1980). The key strength of the approach is that it provides robust analytical methods and precise calculation tools for arriving at the actual (technical) cause or the proximate engineering shortcoming(s) defined and revealed by the collapse. Institutionally, some of the technical lessons learned from major building failures and collapses have been incorporated as codes and standards over the years (Parfitt, 2012; Subbarao, 2016; EN 1991-1-7, 2006; US-DoD, 2002; General Services Administration, 2000 in Kwasniewski, 2010)

Nonetheless, the approach does not provide complete explanations for structural incidents. The reality of some types of failures and accidents is such that the event itself may destroy the physical evidence on it or parts of it. For instance, the defective part responsible for the failure might be lost or obscured from discovery in the accident debris. Clean up or emergency repair activities may also inadvertently destroy or obscure important evidence. Further, some of the technical evidence associated with collapses may be perishable – some of it highly perishable (Ratay, 2010). For instance, snow could melt just as fracture surfaces could corrode. Thus, the forensic/technical approach can be deficient on certain levels as there can be observational gaps, which could adversely affect the success of the investigation.

Chapter four: Conclusion

The review evokes two important but distinct foci for safety in the construction sector –safety in the context of the construction process and safety regarding the dangers that built structures pose to the public. The scholarly discourses on safety in the construction sector tend to focus on the first –failures, fatalities, and other safety concerns inherent in the construction process or at construction sites

(McDermott, et al, 2018; Chen et al, 2018; Zhou et al, 2015; Tutt et al, 2013; Jia et al, 2017; Rowlinson & Jia, 2015; Rowlinson, et al, 2014; Pink et al, 2010; Pickett et al, 2004; Hinze, et al, 2013), and rarely engage the second. The second– that is the study of the health and integrity of completed structures (structural defects, failures; their causes, consequences and remedies) –has largely been engaged in the domain of forensic structural engineering (Subbarao, 2016; Heywood, 2010; Ratay, 2010; Delatte, 2009; Douglas & Ransom, 2013). The key strength of forensic structural engineering is that it provides robust analytical methods and mechanisms for arriving at the actual (technical) cause and in respect of building collapse–the proximate engineering shortcoming(s) defined and revealed by the collapse. However, the approach is inadequate for reliable structural failure analysis for the following three points: its ex-post facto nature, factor domains and inadequate consideration of the social context of structural failures

a. The ex post facto nature of the approach

Forensic structural engineering is by design retrospective or ex post facto in focus, which means that the causes of failures could only be known after the fact or after the harm has already been caused, and, hence, from a prevention point of view, unreliable and inadequate for examining structural safety. It may be argued that a systematic compilation of lessons from previous catastrophic failures may over time or eventually provide a compendium of knowledge for preventing future events. Indeed, as observed earlier, institutionally, some of the technical lessons from major structural failures have been incorporated as codes and standards over the years (Parfitt, 2012; EN 1991-1-7, 2006; US-DoD, 2002; General Services Administration, 2000 in Kwasniewski, 2010). While plausible, this argument does not attenuate the moral and ethical concerns inherent in building on safety innovations upon the foundations of hardships and adversities.

b. The factor domain (the scope of factors considered)

In the investigation of accidents, the undergirding method or model of causality –the assumptions about how different factors interact to cause or prevent accidents, i.e., the accident “mechanisms”– determines the scope in the sense of the factors (or factor domains) that are considered. Thus, the model or method directs the investigation or analysis to look at certain things (and not at others). Accident models are very important because they assist investigators/analysts to locate the most important ‘*causes*’ and proffer ‘*solutions*’ to avoid similar occurrences (Lundberg, 2009). The challenge, however, is that no accident causation model or method could confer insights or solutions to problems that are not within the factor domains of the model. This argument finds support in the mantras ‘What You Look For Is What You Find’ (WYLFIFYF) and ‘What You Find Is What You Fix’ (WYFIWYF) (Hollnagel, 2008; Lundberg et al, 2009). You cannot find, let alone fix, what you do not look for. This fundamental limitation of accident models is the reason Woods & Cook advised safety and risk management analysts/scholars to pay attention to “second stories” (Woods & Cook, 2002) –look beyond the usually simplified, narrow and distorted lenses of models so they may “discover multiple contributors” (p. 137).

However, as shown earlier, forensic structural investigations tend to focus on the actual physical proximate technical or engineering causes of failures – the immediate physical/actor events, errors, violations, processes and conditions (Heywood, 2010; Ratay, 2010; Delatte, 2009; Douglas & Ransom, 2013) – what Dekker calls the ‘*Eureka part*’ (Dekker, 2015). This has also meant that the repertoire of interventions that have evolved from the approach for addressing vulnerability for structural risks have skewed towards technical or engineering solutions, mainly. However, we now know better, thanks to the methods and knowledge accrued in other fields of safety and risk management (Pidgeon, 2010; 2011; Reason, 2000; Hopkins, 2000; Perrow, 1984; 1981; Pidgeon et al, 1986; 1988) that not only are physical or technical explanations for accidents usually unsatisfactory, but also the technical or

engineering focal interventions that emerge from them rarely resolve the principal instigators of failures or accidents.

Built environment scholars studying safety in the context of the construction process understand this better; hence, the shift of the emphasis of construction safety research from immediate technical factors to organizational factors (McDermott et al., 2018; Choudhry et al, 2007; 2007b; Gilkey et al, 2012). And as shown in figure 4, quite recently, there is a growing body of literature that takes an even wider societal perspective to the study of construction safety (See, Tutt et al, 2013; Jia et al, 2016; 2017; Rowlinson & Jia, 2015; Rowlinson, et al, 2014; Pink et al, 2010; Peckitt et al, 2004; He et al, 2016 for instance)

c. The social context of structural failures

This critique is at the core of this study. The *hard* scientific focus and legal context of the need for forensic investigations to establish exact causes and apportion liability (Douglas & Ransom, 2013) is at the heart of the focus of forensic structural engineering discourses on immediate technical causes— after all safety imperatives— statutory or otherwise—usually embody technical demands (Watt, 2007; Health and Safety Executive, 2015). But, while important (as revealed in chapters two and three), engineering considerations are not the only or even the main influences of construction decisions, practices and processes. For instance, in chapter two, it was found that the widespread usage of substandard construction materials in developing countries is linked to the enduring taste for expensive industrially manufactured building materials in a socio-economic context where the majority of builders who patronize these costly materials are poor and, therefore, do not have high enough income to support their acquired taste. Thus, cultural dynamics (and here acquired taste for foreign products) play a role in the non-optimal focus on quality and safety imperatives regarding the type of materials used in the construction of buildings.

Further to the above, in chapter three (see also Soane, 2016), it was established that the rampant collapse of buildings in urban habitats is not just a matter of engineering but of the rapid demographic and economic expansions in such places, which encourage unsafe construction processes and building use practices leading to the creation of structurally defective buildings and in some cases in areas that are vulnerable, such as low-lying coastlines. The broader point here is that socioeconomic, culture and other factors tend to play impactful role in construction decisions and processes (Hewitt, 1997), and, therefore, influence not just the engineering components, but also the eventual structure that may emerge. Built structures are, thus, not just collections or assemblages of physical materials based on only architectural and/or engineering considerations, processes and specifications. Rather, they emerge from a much more complex interactive processes and level of actions between people and their environment.

Smiley et al (2014) capture this point even better: “The built environment, and the methods used to create it, reflect and embody the history, norms, values, social relations and level of development of the society in which they exist” (p. 808). As an object of study, the built structure then becomes a point of spatial articulation for the intersection of multiple competing forces: forces of economy; forces of society, and forces of culture. Indeed, it has long been discussed in the social production of built forms literature that buildings, and for that matter the entire built environment, are essentially socio-cultural products or artefacts (Habraken, 1988; Lawrence & Low, 1990; Low, 1996; Rapoport, 1969; 1973; 1980; 1982; Moffat & Kohler, 2008; King, 1980; Smiley et al., 2014). A bad brick, lintel or joist is made, it is purchased subject or not to architects and planning requirements and/or procedures. The choice of materials may reflect personal economy; it may also reflect image and a person’s sense of pride. The constructed structure, in this sense, is conceived not only as a product of structural integrity but also, of socio-cultural means. This means that whatever is the challenge to structural integrity or

safety, the wider socio-cultural influences of adverse construction practices and processes are what may cumulate to undermine it.

In this sense, approaching structural failures without recourse to the wider societal influences of dangerous construction and building use practices denies the potential for a theoretically comprehensive understanding of the complex circumstances that collectively lead to the incidents and any systematic search for the technical as well as the social lessons needed to avoid repetition. The overall effect of the critique raised is that the engineering focal approach is not adequately suited for identifying or analysing pathways to avoid structural incidents as it offers limited insights into the social context or the wider influences in society that generate vulnerability for such risks (and in the specific context of this study building failures/collapses). As an answer to research question 3a (i.e. What set of concepts and analytical frames could the overall findings contribute to the broader literature on building safety?), chapter eight addresses the implications of the study findings on building collapse in cities for this gap in the literature on safety in the construction sector.

CHAPTER FIVE: METHODOLOGY

The four preceding chapters were directed at exploring the conceptual, theoretical and other cognate materials on the topic. The enterprise was relevant in showing evidence for the significance of the study and its potential contributions to the ongoing scholarly conversation on the subject. Having discussed the theory and concepts, this chapter explains how they were studied, the data used as well as the people/institutions from whom the data were collected. Thus, the chapter describes and provides explanations for design, methods and sources of data for the study; how they were collected and analysed.

Study approach: Qualitative

The study's objective of unravelling the influences of the creation of unsafe buildings in Ghana's cities with its attendant implications for building collapses necessitated a focus on key informants (Payne & Payne, 2004; Polkinghorne, 2005) –people whose experiences place them in the position to shed light on the subject in-depth. Consequently, qualitative data collection frameworks became a natural fit. The following key institutions: the Accra and Kumasi Metropolitan Assemblies; the Ghana Institute of Architects (GIA); the Ghana Institution of Engineering (GhIE) and Construction Watch were purposively targeted for resource persons and other relevant information on the topic. The justifications for selecting or including them in the study are explained below.

The Accra and Kumasi Metropolitan Assemblies are the two state bodies in charge of the management of Accra, the capital and Kumasi, Ghana's second biggest city. These two cities are the hotbeds of building collapses in Ghana (Asante & Sasu, 2015; 2018; Oteng-Ababio, 2016). The Assemblies were included in the study to explore the regulatory but also other dimensions of the problem. The Ghana Institution of Engineers (GhIE) is an autonomous professional body of engineers in Ghana. The Institution was included in the study for two reasons: As a body of engineers, it was envisaged that it could be a good access point to practicing building and construction engineers in the

country who can speak to the topic. Second, when Melcom Achimota shopping mall collapsed (the incident captured in the background section of the study), the President of the Institution empanelled a committee of experts to investigate the causes. However, the Report was not available online. Aside from providing access to resource persons, it was envisaged that involving them in the study will also be a strategic way to have access to the Report on the incident – a strategy, which eventually worked out.

Third, in respect of the Ghana Institute of Architects, it emerged from the interviews with the Kumasi City authorities that they had conducted similar studies on the topic. Here too, the motivation to involve them in the study was to have access to both their research reports and members for interviews. Fourth, the Construction Watch is a civil society organization focused on exposing flaws in built structures in Ghana. They also were included in the study to gain access to both resource persons for interviews and their monitoring reports on infrastructure safety in the country. The study participants also included some scholars who research and publish on building safety, planning and development control in cities in Ghana –they hold faculty positions in Ghana, Finland and Germany. As crucial stakeholders of Ghana’s construction sector who have engaged many of the players in the sector (such as practitioners, builders, regulators), there is no question that they have accumulated some funds of insights upon which the study could profitably draw. Finally, informal contacts (detailed in the next section) were used to access other built environment practitioners from institutions like the Ghana Institute of Surveyors, the Ghana Licensed Builders & Surveyors Association and the Council for Scientific and Industrial Research Building and Road Research Institute (CSIR-BRRI). Clearly, the multiple stakeholders who participated in the study are important actors in Ghana’s construction sector and, therefore, had relevant insights on the topic that could be tapped.

Methods of data collection:

The study combined purposive and snowball sampling techniques – two of the widely regarded qualitative sampling techniques (Marshall, 1996; Saunders et al, 2009) to select the final participants. Contacts of key persons were secured from the various institutions mentioned above. After interviewing the initial participants, they were asked for their contacts with other potential candidates (their colleague practitioners) who may have knowledge on the topic. Through this, a total of forty-seven (47) potential informants including civil engineers; structural engineers; architects, surveyors; contractors and purveyors of building materials were contacted. Out of the forty-seven (47), seven (7) declined participation. With the remaining forty (40), eight (8) did not participate fully – as at the time of writing, they had not responded to some probes or follow up questions sent to them. As a result, their perspectives were not included in the final data used for the analysis.

This, however, did not affect the study in any significant way as a pattern of saturation had clearly emerged already from the insights gathered from the final thirty-two (32) who fully participated. Further to the above, it is widely suggested in qualitative methodology circles (see Creswell 2007; Saunders et al. 2009, for instance) that in a general study of this nature, engaging twenty-five (25) to thirty (30) participants in-depth is adequate. The thirty-two (32) participants apply to the study a combined experience of more than three centuries of practice in Ghana's construction sector and elsewhere. The distribution of the study participants as captured in table 2 below is divided accordingly: twelve (12) officers from the Kumasi and Accra Metropolitan Assemblies—the administrative authorities of the cities of Accra and Kumasi, respectively; seven (7) architects; two (2) surveyors; five (5) engineers (civil & structural); three (3) contractors and three (3) researchers.

Table 3: Details of participants, fieldwork and other activities

Participants	Number	Participants combined number of years in practice	Medium of Engagement
Architects	7	55	FGD; WhatsApp messaging & Phone interview
Surveyors	2	30	WhatsApp messaging & Phone interview
Engineers (Civil & Structural)	5	50	FGD; Face-face interviews; WhatsApp messaging & Phone interview
Regulators: Kumasi & Accra cities' authorities	12	129	One-one interviews & Focus group discussions
Researchers	3	43	Emails; WhatsApp messaging & voice notes
Contractors	3	27	WhatsApp messaging & phone interview
Total:	32	334	

The study adopted multiple data collection methods including semi-structured focus group discussions (FGDs) and one-to-one (face-to-face) interviews; phone interviews; email exchanges; and WhatsApp messaging (both voice notes and texts) to gather the empirical information. The first sixteen (16) participants (12 representatives from both the Accra and Kumasi cities authorities; 1 representative each from the Ghana Institution of Engineers and the Construction Watch and 2 from the Ghana Institute of Architects) were engaged through three (3) focus group discussions and seven (7) one-to-one interviews. The remaining sixteen (16) were engaged through a combination of the other mediums noted above. The different methods of data collection were employed to suit the different circumstances, schedules and locations of the various participants so they could participate in the study at little

inconveniences to them²⁰. The different sessions of data collection varied widely – from approximately one (1) and close to two (2) hours of face-face, phone interviews and FGDs to three (3) days, and in some cases a couple of weeks of email and WhatsApp exchanges.

The long period of data collection delayed the writing. Nonetheless, the time lag was also an opportunity for intensive review of the data to unravel and establish the deeper connections and meanings – something, which is critical to the success of a qualitative study (Polkinghorne, 2005; Hammarberg et al., 2016). The engagements with the informants covered some of the general problems (regarding materials and utilization; workmanship and regulation) established in chapter two (the ‘*internal focal literature*’) as central to building safety challenges in developing countries. With the prevalence of the incidents in cities, the guiding questions in the semi-structured interview guide were based on the urbanization-induced inappropriate construction and building use practices established in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three²¹. However, specific follow up or probing questions were asked, as appropriate.

Data structuring, management and analysis

Qualitative research process is iterative– a back and forth process. Analysis begins contemporaneously with data collection. In respect of the face-to-face, phone interviews and focus group discussions that were tape-recorded²², after each session, the recordings were carefully listened and compared with the notes taken to gain immediate clarity, familiarity, and meaning as well as fresh memory of the data. During transcription, attention was paid to, and analytic notes made on, details

²⁰ After many unsuccessful attempts to hold face-to-face interviews and FGDs with some of the participants during fieldwork in Ghana (from September 25 to November 18, 2018), I proposed to engage them through WhatsApp and phone calls provided it was in order with participants, to which most of them obliged. So, after interviewing them by phone and WhatsApp, as I would in a face-to-face interview, I asked for more contacts as potential interview candidates.

²¹ See attached interview guide – appendix 1

²² All the participants, whether interviewed either by phone or face-face, agreed for the conversations to be tape-recorded when requested except one senior official at the Building Inspectorate Division of the Accra Metropolitan Assembly, in whose case copious notes were taken.

such as repeated expressions and phrases that seemed related to the study. This technique was necessary to allow the issues most important to the interviewees to become the central focus of the study. Similar techniques were applied to the other responses generated through the other forms of engagement.

The transcripts generated from the interviews, focus group discussions and the other forms of engagement were read together several times before inclusive coding was began – that is, searching and grouping of extracts related to the overall focus of the study (Potter, 2003). The salient themes that emerged were compared with the ones established through the findings of the literature review condensed into the theoretical framework (in chapter three) upon which the study was relying. The themes established from the transcripts and the notes, in the light of the theoretical frameworks, were further compared with the socio-economic statistics; policy documents, and other cognate reports and studies on housing, land management, urban developments in Ghana and elsewhere to provide a broader context for the findings. In the course of this exercise, it became apparent that the analytical framework derived from the pathology of urban processes literature (in chapter three and Boateng, 2016; 2018; 2019a; Boateng & Wright, 2019) was not adequately suited for shedding light on the deeper issues to which the empirical materials were pointing.

In contrast with the findings in Boateng (2016; 2018; 2019a) and Boateng & Wright (2019) and chapter three, it was increasingly becoming clear from the empirical data that the conditions that underlie the insufficient focus on delivering or constructing the best quality buildings possible and, to that end, the creation of unsafe buildings in Ghana's cities context were *not* necessarily generated or caused by urbanization induced-building need pressures. They rather seemed to be *embedded* in the political economy settlement of the country's urban system – the product of the simultaneous interplay of colonial and postcolonial modernization and recent market-led neoliberal policies and ideologies that have shaped and continue to shape urban, housing and other policies of successive governments and programs of international bodies in the country. The building need pressures induced by rapid urban

expansions only worsen or exacerbate the scale of the problem by encouraging the creation of even more unsafe buildings in the cities.

In summary, what emerged from the empirical data was that, far from being ruptures driven solely or even mainly by the demographic and economic expansion processes of urbanization, the creation of unsafe structures in cities in Ghana seemed to have a historical as well as socio-political context, which, therefore, required it to be analysed as a consequence of the larger historically and socially created socio-political-economic factors and developments underlying the pursuit and the provision of building needs and services in the country— of which, in the cities’ context, the forces of urbanization are only one of such factors and processes. Consequently, the ‘*methodology of accident research*’ developed by political economists (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Freudenburg et al., 2009) was turned to for support.

The political economists’ methodology of accident research: A brief overview

Political economists who study accidents admonish that such phenomena must not be approached, seen or perceived as mere isolated events. Rather, they must be considered as windows for unpacking the normal working of the social system. To the political economists, accidents afford insights into social realities that ordinarily pass unnoticed, therefore, the analysis of their underlying range of factors and agencies must always be placed within the relevant socio-political-economic and historical context (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Freudenburg et al., 2009). The political economists’ methodology of accident research framework searches for the roots of accidents in larger historical, political and economic factors, and, therefore, provides a framework and set of concepts that take a critical distance from immediate causes, and integrate or situate their build-up process(es) within the relevant series of historical factors (Obeng-Odoom, 2010; 2018; Freudenburg et al., 2009).

The approach, therefore, provides a bridging framework that shows awareness of the way immediate crises are inseparably connected and/or deeply embedded in the societal structures and social systems that shape, structure and dictate access to and the distribution of resources and exercise of power (Bankoff et al, 2004; Wisner et al, 2003). There is, thus, the effort to connect accident vulnerability and losses to larger systems, processes and factors at local, national, and even global or international levels and, especially, how these scales of factors interact and reinforce one another and nurture or generate risks (Freudenburg et al., 2009; Tierney, 2007; 2010). In short, the approach helps to untruss the deeper underpins of hurtful events, disruptions and human insecurities that are usually overlooked or insufficiently prioritized in policy and media conversations on such phenomena.

It was established in chapter two that the extant discourses on building collapse in developing countries follow what could be conceptualized, in the main, as '*internal focal approach*', and tend to frame such risks as unintended unfortunate isolated events, accidents or incidents, which result from '*micro*' problems '*internal*' to developing countries. The discourse focuses on individual issues such as ignorance, negligence, carelessness, indiscipline on the part of builders, contractors and other construction actors and regulatory problems such as corruption, political interference, long, costly and complicated permitting processes, limited capacity for regulations enforcement. The participants' responses corroborated most of the factors emphasized in the *internal focal literature* as central to building collapse in Ghana. However, as the responses were being analysed, it emerged that a fuller understanding of how the factors have become durable impediments to building safety in the country needs to be problematized against structural factors such as the prevailing strain on the informal settlement of building supply and the undisciplined and insecure customary land tenure systems.

The strain on the informal settlement of the provision of building needs in Ghana and the undisciplined customary land tenure system are, however, the creations or products of not just internal processes and factors, but also of decades of colonial and postcolonial modernization and the recent

market-led neoliberal policies and ideologies that have shaped and continue to shape urban, housing and other policies of successive governments and programs of international bodies in the country. Thus, it was becoming apparent that the influences of the inappropriate construction practices and behaviours underlying building collapses in Ghana have historical-institutional context – the factors that give rise to them just as much arise from both *internal* problems (such as regulatory failure, negligence) as *externally-imposed* and *inherited* or *underdevelopment* conditions (such as colonial and neoliberal policies). The study, therefore, profitably drew upon the methods and ideas accrued in the literature on the political economists’ methodology of accident research (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Wales, 2017; Freudenburg et al., 2009) to shed light and situate their build-up processes within the relevant series of historical factors, processes, developments and, not least, ideologies that have shaped them into enduring impediments to building safety in the country.

In the analysis, the political economists’ methodology of accident research is deployed to explicate how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have shaped Ghana’s informal building supply and customary land tenure systems into impediments to the compliance and enforcement of safe building and construction practices in the country. It is against the backdrop of the above *structural context* of precarious construction climate that the country’s cities are experiencing an ever-rising demand for buildings the exigencies of which are worsening or exacerbating the prevalence of inappropriate construction and building use practices and thereby encouraging the creation of even more number of unsafe buildings in the cities – the reason most collapse incidents occur in those parts of the country.

Thus, as would be discerned in the analytical and discussion chapters, while closely linked to the demographic and economic expansion processes of urbanization, the phenomenon of building collapse in cities in Ghana has an historical-institutional context –the underlying unsafe construction practices

and behaviours just as much arise from *internal* as well as *externally* imposed and *inherited* conditions, factors and ideologies. In this sense, the study pays heed to Charles Gore's invitation to social analysts to examine the causes of phenomena in the light of internal (national) and external (global) processes and factors since national economies and societies tend to be implicated by external factors, processes and developments (Gore, 1996; 2010).

Other materials and fieldwork activities

One key advantage of fieldwork, in addition to gathering empirical data, is that very useful information unavailable online or not sufficiently covered in the literature could be accessed. The fieldwork paid off in a similar way. As noted earlier, after the collapse of Melcom Achimota building on November 7, 2012, the Ghana Institution of Engineers (GhIE) empaneled a committee of engineers to ascertain what went wrong. An interim report was issued which formed the basis of a press conference held by the President of the Institution on November 15, 2012. The final report, however, was not available online. In honouring the invitation to participate in the study, in addition to assigning one of the Fellows of the Institution to the study, a soft copy of the final report on the Melcom incident was also emailed to me.

The GhIE report (cited in the study as GhIE, 2012), together with another one (NADMO, 2014) produced on the incident by the Research Unit of the National Disaster Management Organization (NADMO), proved useful to the framing of the study background in the light of the official or institutional accounts on the incident in contrast to the media and other private accounts the study had initially relied upon. Further, a busy schedule marked by impromptu events stalled most of the interview appointments made with the resource person from the Ghana Institution of Engineers. However, I took advantage of the unsuccessful appointments to participate in the Ghana Consulting Engineers Association (GCEA) 2017 Week Celebration, which was holding at the GhIE premises. I attended some of their technical sessions and workshops in which construction risks featured.

Reflexivity on researcher's position

Qualitative research process inevitably affects the inquiry and, therefore, demands that investigator role and experiences ought to be acknowledged, reflected upon, and reported. 'Objectivity' – the notion of bias absence – is not a meaningful benchmark for assessing a qualitative study as both the investigator and the investigated, the knower and the known, are *not* independent entities (Willig, 2013). What matters is critical subjectivity or reflexivity –i.e. researcher's "high-quality awareness" of potential bias (Reason & Rowan, 1981) and scrupulous account of the research stages (Liu & Fellows, 2015). My dual role as researcher and a Ghanaian conducting research in Ghana positioned me simultaneously as an 'outsider' and 'insider'. As a native and having engaged the literature, I was broadly aware (or assumed by the study participants to be aware) of some of the issues underpinning the problem being studied. At the same time, my researcher/outsider position required that, as much as possible, I defer to my informants as *experts* on the subject – by virtue of their academic, professional and other cognate experiences.

However, some of them frequently used phrases like "*my brother*"; "*as you know*"; "*chale*²³, *you know Ghana here*"; and statements like "*as you know, it is part of the problems in Ghana*" especially during the interviews and focus group discussions. They perceived me a *colleague* and a *fellow citizen*, and, hence, positioned and embedded me as ideologically and experientially exposed to the socio-cultural and professional constraints in which they operate. Their assumptions about my academic background might be because, as I have argued elsewhere (Boateng, 2016), scholars who research on Ghana's construction sector usually come from engineering, architectural science and/or other related fields. While this may not have created much of a methodological problem, it, perhaps, affected their disclosure of some vital and detailed insights, as they might have thought them insignificant and/or as

²³ *Chale* is a slang and a very popular Ghanaian icebreaker. See: <https://theculturetrip.com/africa/ghana/articles/20-slang-words-that-will-make-you-sound-like-a-ghanaian/> (Accessed 02. 08.19)

something that I already knew (or should know). To mitigate this positioning and its occurrence, I constantly reminded them that I have no formal training in engineering or architectural science nor the construction sector, and that I am a sociologist who has ventured into the area out of sheer interest and curiosity.

Limitations of study

First, the findings from Ghana do not appear to be culturally and/or geographically specific. As will be discerned in the later sections, they strongly seem meaningful to other developing countries similarly situated. Nonetheless, further research is needed for this validation and such an endeavour will be relevant for developing not just a stronger global understanding of the phenomenon, but also for unravelling contextual differences between and among cities and countries to inform well-targeted recommendations and interventions. Second, as will be discerned in the analytical and discussion chapters, the study participants point to a rather precarious construction climate in Ghana – especially in the cities, which brings into sharp focus why many buildings are also standing. Thus, given the prevalence of deleterious construction and building use practices in the country (especially, in the cities), shouldn't even more collapse incidents occur? Why are so many buildings also standing? Who is doing the right thing in so far as constructing buildings is concerned and why? Is there something going on that is not accounted for in the overall conversation on unsafe building construction and development control in the country? These issues are beyond the scope of the study and are, therefore, not covered. But they certainly would have added much depth to the study, if they were addressed. Nevertheless, they have been noted in the concluding remarks as opportunities for future research.

These limitations notwithstanding, the study makes some novel contributions to literature and policy and practice. Much has been written about Africa's speculative urbanism – the patterns, problems, and prospects. But much less is known about the foundations of the shaky buildings that characterize it. The study's attempt to engage the topic through a case study of Ghana could, therefore, not have been timely

enough. Additionally, the study raises enough discussion that interrogates established approaches to the study of building collapse or safety. First, as noted in chapter two, the scholarly discourses on building collapse in developing countries have traditionally followed what could be termed as *internal focal approach*. The approach tends to construct the phenomenon as ‘events’, ‘accidents’ or ‘incidents’ and, therefore, atomizes the underlying causes, for instance, as the mistakes, carelessness or negligence of individual building practitioners or clients/developers and/or regulatory blunders (Asante & Sasu, 2018; Olajumoke et al, 2009) without any coherent engagement with the underlying historical-institutional factors.

As outlined in the analytical and discussion chapters, the ‘*internal focal approach*’ hides more than it reveals. There is even more to learn from examining how the ‘*micro*’ problems highlighted in the approach are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at local, national, and even global levels in nurturing and/or generating the inappropriate construction practices and behaviours that result into the collapses. Stepping back from the *internal focal discourse*, this study projects an historical-institutional analytical conception of vulnerability for building collapse in developing countries that extends, connects and discusses how the underlying deleterious construction practices and behaviours just as much arise from *internal* as well as *externally* imposed and *inherited* conditions, processes and factors.

Trustworthiness, validity and reliability of findings

The foremost methodological hurdle for qualitative scholars is asserting the validity and reliability of findings as the terminologies available for such descriptions have evolved over the years to fit the requirements of quantitative research (Potter, 2003). Kvale (1995) describes the validation process in qualitative research as depending on the quality of *craftsmanship* throughout the investigation process, which includes a continual checking, questioning, and theoretical interpretation of findings. This

approach to validation places emphasis on quality control throughout the stages of knowledge production not just results inspection at the end of the production line. Thus, the researcher's effort and ability to account for the research process systematically and comprehensively is very critical (Patton, 2001). In this study, three main steps were taken to increase the quality, credibility, and trustworthiness of the data and the analysis/ interpretations: communicative validation; data triangulation and transparency.

Communicative validation: This involves a search for consensus, and/or variations and new ideas about interpretations of data or study findings through argumentations, discussions, and dialogue with informants (*member validation*) and the research community (*researcher validation*) (Kvale & Brinkmann, 2009). During the interviews, focus group discussions and other modes of engagements, participants were often asked for clarifications, denial or confirmation of statements made. This helped them to correct and clarify responses, and, therefore, ensured some level of credibility in data collection by avoiding runaway conclusions. Again, communicative validation was ensured through internal (intersubjective) peer reviews and interpretations. The central themes that emerged from the data and the interpretations generated from them were subjected to the rigorous scrutiny of my supervisory team and the larger intellectual community at University level scientific conferences and seminars²⁴, international conferences and publications in reputable international journals in the field. This process could reduce bias and thus increase the trustworthiness of the arguments.

Data triangulation: The second quality control measure used to enhance the validity of the study findings was data triangulation, which is using data from multiple sources to understand the topic. This helps to corroborate findings across data sets and thus reduce the impact of any potential biases that

²⁴ It is part of my University's PhD research requirements that students present their work to the scientific community where experts on the topic assess the study at what we call 'Milestone Seminars'. This is done three times in the course of the research and failure to pass could result in the withdrawal of the student's candidature. Also, the final report has been reviewed by two external examiners with expertise in the field whose rather critical feedbacks have been incorporated in the study.

may exist in a single data collection procedure (Bowen, 2009). Data collected through individual face-face interviews, focus group discussions, email exchanges, and the other mediums explained earlier from the multiple stakeholders (both private and public actors) operating in Ghana's construction sector provide a confluence of evidence that breeds credibility and integrity. During analysis, I compared and examined data both within and across the various data collection procedures in order to note responses and meanings that are shared *within*, *between* and *among* them. For example, as will be discerned in the analysis, the participants' responses are set against one another to examine category of relationships: contrast and corroboration, which were further compared to the broader theoretical and other discourses on the subject in Ghana and globally. These rigorous analytical comparisons within and between interview and the other data collection procedures and the multiple perspectives that emerged from them were attempts to provide precision, credibility, and trustworthiness.

Transparency: Detailed description of relevant steps, procedures, and decisions of the research process—is highly emphasized in qualitative methodology circles as important for enhancing the validity of results (Liu & Fellows, 2015; Kvale & Brinkmann, 2009). The high quality awareness (reflections) of my position as a researcher and 'insider' and the detailed documentation of how this position might have influenced the research process as well as the stated limitations of the study are profound testaments of the extent of my attempt to account and report on the research process transparently. Further, Polkinghorne (2007) suggests that a key proxy for qualitative study validity is the closeness of the distance between the meanings as expressed by the participants and the meanings as interpreted in the findings by the researcher. This is a re-state of Jonathan Potter's advice that research that employs qualitative approach should fundamentally make its claims accountable to the detail of the empirical materials, and the empirical materials should be presented in a form that allows readers to make their own judgments (Potter, 2003).

Thus, qualitative researchers need to exercise a great degree of caution regarding the position of their voices in the data. In analysing the data, I attempted to be as non-interventionist as I could by producing longer strings of ‘raw’ data (from the transcripts), while also being careful not to leave the reader stranded without knowledge of my interpretation. In so doing, I provide my readers with enough raw data for them to assess both the participants’ orientation to the phenomenon under study and the validity of the understandings/interpretations I generate from them. And it will be apparent to them that the interpretations clearly mirror the participants’ accounts on the causes or the influences of the creation of unsafe buildings in Ghana – particularly in the cities and to that end, the reason buildings tend to collapse in such places.

A comment on ethics

In the Informed Consent Form used for the fieldwork, participants were advised that they might not face any personal risk for participating in the study. Nonetheless, since the conversation may also involve illegal construction activities, some persons or institutions may feel offended and even threatened if the study uncovered their unethical or illegal activities. To avoid possible embarrassment to specific people and institutions as well as unwarranted/face-saving lawsuits, participants were advised not to mention specific names of persons or any institutions. In the alternative, if they had to share information on specific incidents, they should anonymize their response or frame them in a general way.

Nevertheless, some of the informants mentioned some specific incidents in their submissions. Where there is the need to reproduce such responses in full in the analysis, the incidents mentioned are blanked. Save to say that the study draws extensively on the National Disaster Management Organization (NADMO, 2014) and the Ghana Institution of Engineers investigative reports on the November 7, 2012 Melcom-Achimota incident (GhIE, 2012). However, where the tenor of the parts of the reports extracted to support arguments appears or sounds accusatorial or implicating, the response(s) of the (ostensibly)

implicated party or parties is/are also incorporated to balance the accounts for readers to make their own conclusions.

**CHAPTER SIX:
DATA PRESENTATION & ANALYSIS PART 1: A GENERAL GROUNDING FOR
BUILDING SAFETY CHALLENGES IN GHANA**

The study proposed to explore the range of factors that underlie the susceptibility of cities in Ghana to building collapses and gauge the implications of the findings for other developing countries similarly situated. It also proposed to examine what the overall findings from Ghana could mean for the broader literature on urban pathology in Africa and building safety. The first four chapters were directed at exploring the conceptual, theoretical and other cognate materials on the topic. The enterprise was relevant in showing evidence for the significance of the study and its potential contributions to the ongoing scholarly conversation on the subject. The preceding fifth chapter described and provided explanations for design, methods and sources of data for the study; how they were collected. The next two chapters analyse the data.

This chapter interprets the first part of the data –what emerged from the interviews and discussions with the study participants as the general challenges to building safety in Ghana. This is necessary for providing context or situating the creation of unsafe buildings in the cities – the main object of the study – within the broader issue of construction and building risks in the country. Overall, the chapter will argue that weak regulation, the undisciplined and insecure land tenure system and the strain on Ghana’s informal settlement of building supply systems provide the *structural context* for how the creation of unsafe buildings arise and are thus central to establishing the grounds for the deleterious consequences of building collapse incidents in the country. Contrasted with the existing *internal focal* studies that explore influences of building collapse in Ghana and the broader Global South context without any coherent engagement with the underlying *historical-institutional* dynamics, the chapter integrates or situates their build-up processes within the relevant series of historical factors, policies and developments that have shaped them into the structural conditions that recurrently generate vulnerability for such risks.

The key historical-institutional issues underscored here relate to how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal housing and other urban policies of successive governments and international bodies (particularly the World Bank and IMF) and their resulting transformations have shaped and moulded Ghana's informal settlement of building supply and land tenure systems into enduring impediments that undermine compliance and enforcement of safe construction practices in the cities. In sum, the chapter will argue that the influences of vulnerability for building collapse in Ghana has an historical-institutional context—the factors that give rise to the risks just as much arise from both internal problems (such as weak regulation) as inherited and externally-imposed (or underdevelopment) conditions (such as colonial and externally-imposed neoliberal urban housing policies).

The arguments are structured under the following themes:

- Compromised compliance and enforcement of building permit regulations;
- Outsourcing jobs to low-skilled and unqualified people;
- Use of standard non-compliant materials;
- Incremental process of self-building and poor building maintenance culture.

The first to be analysed is compromised compliance and enforcement of building permit regulations and the underlying causes.

Compromised compliance and enforcement of building permit regulations

As mentioned in chapter two, even as buildings enhance human life, they also pose risks to life and the environment. The clearest evidence for this is the enormous material and human losses that come with spontaneous building collapses and those that are due to physical hazards like earthquakes, tsunamis, floods, cyclones among others (Escaleras et al 2007; Lewis, 2005; Kenny, 2012; Moullier, 2015). For instance, the November 7, 2012 Melcom Achimota building collapse incident in Accra, the capital of Ghana, affected eighty-one (81) people: –fourteen (14) lost their lives, the remaining sixty-

one (61) suffered various degrees of injuries. Several merchandise worth millions belonging to Melcom, the company that was using the building as supermarket, were also destroyed (NADMO, 2014; Oteng-Ababio, 2016).

Most societies devise or have devised cultural protections to reduce the dangers associated with buildings. Such protections are usually grounded in some sets of laws and procedures (usually expressed as statutory and non-statutory demands –building regulations and codes (Arku et al, 2016; Watt, 2007; Health & Safety Executive, 2015). It is when the actors involved in the pursuit and the provision of building needs and services fail to comply with the regulations or the entrusted public institutions or state agencies do not enforce them that disasters arise. Ghana’s building permit regime or system is embodied in a larger framework on the physical development of towns and cities underpinned by several instruments including the Town and Country Planning Ordinance (Cap 84) of 1945; the Town and Country Planning Act, 1958; the Town and Country Planning Regulations, 1959; the 1992 Constitution; the Local Government Act (Act 465), 1993; and the National Building Code (L1. 1630), 1996. Metropolitan, municipal and district assemblies (MMDAs) operate within the framework provided by the National Building Code (L1 1630) and the Local Government Act (Act 462), specifically Section 46(1) – which empowers them to oversee developments in their jurisdictions and enforce the relevant laws on physical planning.

Every assembly has two departments for this purpose: A Town and Country Planning Department (TCPD) and a Development Control Division (DCD). The TCPDs oversee the permitting process. They receive, vet and approve or grant building commencement and modification permit applications. If an approval is given for a developer to commence a building project or modify an existing one, the Act further mandates the relevant assembly under whose jurisdiction the developer may be doing the intended development to inspect every stage of the process. For this requirement to be fulfilled, the regulation mandates developers to notify the assembly of the dates on which they intend to begin

construction and of the dates on which every stage of the construction will be ready for inspection. The Development Control Divisions or Departments (DCDs) of the assemblies are responsible for this stage by stage monitoring. These twin-measures, if complied with or enforced, afford the authorities the opportunity to comment on the proposed structure and ensure that the construction process conforms to the approved standards.

It also helps to ensure, among other things, the use of the right standardized materials and reinforcements to guarantee the safety of buildings, their occupants and the public (Oteng-Ababio, 2016). Not too long ago, the National Building Code (L1 1630) the Local Government Act (Act 462) and all the other scattered instruments underpinning building regulation in the country were unified into a single comprehensive document called the Ghana Building Code (GhBC) GS1207: 2018. In chapter two, it was found that while most developing countries have some good building codes and regulations, they are rarely complied with or enforced. The responses from the study participants suggest that similar problems exist in Ghana. However, in departure from existing studies that explain the underlying causes as only internal to developing countries, in honouring Charles Gore's call for a departure from such analysis, the analysis provided here situates them and their build-up processes within the appropriate historical-institutional context and, thereby, illuminates how the factors that give rise to noncompliance and non-enforcement of building regulations in Ghana are simultaneously internal and externally-imposed and/or inherited.

According to Lewis (2005), the problem with building disasters is not just about corruption, which manifests in various forms such as obtaining building permits through bribes and political favours or paying building inspectors to turn blind eyes to designs and building practices that deviate from code specifications. But also financial resources and trained personnel are needed to be able to inspect the work of contractors. Public officials employed to inspect building codes and grant permits are rarely well paid in any country and there is almost always the problem with understaffing. Where the rate of

housing growth is rapid, it is a daunting task to carry out proper building inspections even assuming the necessary political and ethical will (Lewis, 2005: 28). The insights from the study participants corroborate the observations of Lewis (2005) at all levels. These issues, namely inadequate resources—human and logistics, the scale of ongoing construction developments in especially the cities, cumbersome permit application procedures, political interference and corruption featured in the informants’ submissions as some of the key institutional challenges that impede compliance and effective enforcement of safe building and construction regulations in Ghana, which then lead to the creation of unsafe buildings that undermine public safety. These factors are analysed under the following sub-themes:

- Human resource challenges
- Logistical constraints
- Spate of development
- Political interference
- Long, costly and complicated permitting process
- Corruption
- Land conflicts

Human resource challenges

The ongoing environmental, climatic changes, and changes in the construction industry such as new building codes and regulations and building materials and general advances in building technology have meant that even the well-trained building practitioner is still under an increasing burden for more and new knowledge and skills to cope with and provide competent response to the demands that the ever-becoming complex construction industry place on them (Ricketts, 2001; Alinaitwe & Ekolu, 2014; Soane, 2016). This is even more so for officials in charge of public agencies mandated to regulate the sector to uphold public health. They need to be sophisticated to be able to detect faulty designs; identify

construction materials, practices and procedures that do not meet public health requirements and ensure the effecting of the appropriate rectifications before it becomes too late. The problem in Ghana, however, is that, as one of the fellows from the Ghana Institute of Architects puts it, “*the Assemblies [referring to the regulatory authorities] do not have qualified people to check what is right or wrong*”.

He shared some of his experiences with some of the building inspectors he has met at construction sites.

When they come to our sites, we always teach them what to do. Their investigators, they do not have capacity. The people there – some are SS [Senior High School] leavers, some are HNDs [Higher National Diploma] who have just been on the job for a while and think they know. When they come inspecting the site, sometimes we just watch them and ask them what they want to do. So, we give them a checklist, do this, do this and they are very grateful. So ignorant people keep coming out to certify wrong things and report good news.

One official at the Physical Planning Unit of the Kumasi Metropolitan Assembly made a corroborating remark in a separate interview.

I had a meeting with the Ghana Institute of Architects. What they were saying was that they wish they were working at the engineers’ departments of the MMDAs [Metropolitan, Municipal and District Assemblies]. Because they have done some research [and] what came out is that they are highly challenged as far as reading plans is concerned. When they look at structures, they can’t even determine that there is something wrong. Most of them have courses that are not even related to what they are doing.

This raises the question as to how such officials got their positions in the first place, which I suggested to them. Reproduced below is the response of one of the participants from the Physical Planning Unit of the Kumasi Metropolitan Assembly:

The point is that, in the local government system, the salary is nothing to write home. So, somebody who did for instance civil engineering you want to pay the person at the first level GHC1,500, while his colleagues in private practice are receiving GHC3,000, they will go into private practice. So, there is a huge challenge there.

The Fellows from the Ghana Institute of Architects suggested that another dimension of the problem lies with the politics-laden recruitment processes of the local authorities. The government-controlled recruitment process is influenced heavily by cronyism where positions in the Assemblies are given based on considerations other than relevant competencies. As observed by one public risk officer in Oteng-Ababio (2016), managing risk as a professional career is not well appreciated in Ghana.

Therefore, political favouritism and other considerations tend to take precedence over relevant competencies in the appointment of people into sensitive public institutions. With a deep-seated perception or ignorance that it does not take much skill to put up a building (Benzoni, 2013), little thought goes into recruiting personnel to monitor or regulate it. This, the second informant from the Institute of Architects remarked, has led to a situation where:

People without the requisite qualifications are manning the Assemblies. We have people who should but do not have these jobs. They are walking unemployed. And there are some, who come from different fields altogether or with lower qualifications, who, because of politics, have been put in these positions. It is a government thing.

Engineer 5 captured the problem this way:

There is constant training of engineering personnel by the country's engineering institutions on construction related issues and rectification. However, I seem not to see the implementation of this knowledge at the municipal and district assembly levels who are supposed to check integrity of buildings from design through to the construction phases.

In Arku et al (2016), some of the district assembly officials who participated in the study made similar remarks about their own capacity which corroborate the observations of the study informants: “We’ve short staff, and honestly speaking”, the officer added, “some of them [our staff] are ill-equipped for the task” (Emphasis added) (Arku et al, 2016: 372). The authorities’ capacity challenges undermine their ability to police developers and contractors effectively and efficiently, which, as the informant from the Engineering Unit of the Accra Metropolitan Assembly noted, creates room for them (developers and contractors) to “do their own thing: cut corners-use unqualified personnel; cut down material requirements; use substandard ones” resulting in the creation of weak buildings with repercussions for collapse incidents.

Logistical constraints

Further to the capacity challenge, the local authorities also complained that they do not have the required logistics to carry out their mandate – an issue which has been reported in other studies (See Asante & Sasu, 2018; Ahmed & Dinye, 2011; Botchway et al., 2014, for instance). The job of the

Development Control Departments of the Assemblies is field-based – they are to inspect permitted projects at construction sites to make sure they are being done according to permit requirements, the right materials are being used and standard construction practices and procedures are being followed. They are also to conduct monitoring in their jurisdictions and stop unpermitted developments. Efficient delivery of this task requires logistics such as vehicles, computers, digital cameras, Global Positioning Systems (GPS), and personal protective equipment (PPE). Both the officers of the Kumasi and Accra Metropolitan Assemblies complained that all these resources are usually lacking. So, as one officer bemoaned in a study, “*though our work is field-related, the inadequate logistics has limited us to the office*” (Asante & Sasu, 2018: 9).

One of the senior officers of the Development Control and Building Inspection Unit of the Kumasi Metropolitan Assembly (KMA) made a salient remark on this, which deserves to be quoted in full:

We have a lot of challenges – we have a whole lot of logistical constraints. For instance, when somebody comes to complain that there is this building going on, and that it is, either, in the road, or it is a shoddy work, you need to move to the site quickly. There are at times that you need a task force to carry out outright demolition, there are times that you need to go to the site and do marking, there are at times you need to go to the site and make sure that you stop the work and seize their tools. Now there are times that you do not have fuel, you have vehicle and even the maintenance of the vehicle itself is on you. The KMA would ask you, if you have a problem with your vehicle, go and put the vehicle [at the Maintenance Department]. But as to when they would do your vehicle for you, only God can tell. Sometimes, you will go and park your car there and by the time you go and take your car, most of the parts is [sic] gone. It is grounded.

The officer’s rather long complaint reads exactly like a re-statement of a remark made by one district assembly official in a similar study about their capacity for development control in Accra:

We’re besieged with several administrative and logistics problems [...] we’ve short staff. We don’t have the required budget to carry out our duty effectively. Meanwhile Accra is expanding and there is high demand on our Department. We’ve big problems here but the general public has not even the minimum knowledge about the difficulty we have here [...] the only thing they know is “we’re ineffective” (Arku et al, 2016; 372).

Botchway et al (2014) and recently Asante & Sasu (2018) made similar findings that in addition to lack of vehicles, which building inspectors consider their most pressing need, there are inadequate numbers of computers, digital cameras, Global Positioning Systems (GPS), and personal protective

equipment (PPE). These combinations of problems compromise the authorities' efficient delivery of their mandate. As one official from the Physical Planning Unit of the Kumasi Metropolitan Assembly aptly puts it:

By law, you have said that anybody that will put up any development must have a permit, and you put a government agency – civil service over that – meanwhile, they are challenged. How do you expect them to rise up to their mandate? So, this is where the issue is: the very people who are to play the direct role are handicapped.

Engineer 1 corroborated the concerns expressed by the regulators:

Enforcement is an issue – the district assemblies, the municipal assemblies who issue out building permits to clients do not go rounds to check whether they are building up to the regulations. A client will put up a building up to roof before you see them coming to check.

Engineer 5 made a remark that dramatically captures the dire scale of the problem as regards to the non-monitoring of construction developments by the regulators. *“I am of the view that the right building inspections are not done by the authorities. I have not been on any private/personal project in which building authorities have come to check the progress or safety of work. And I have been practicing for six years now”.* (Emphasis added).

Spate of development

In addition to human resource and logistical constraints, another impediment to effective and efficient regulation that emerged from the discussions and interviews with the participants is the spate of ongoing construction works especially in the cities. As noted elsewhere, the National Building Regulations (commonly pilloried by some experts as ‘outdated’, ‘colonial’ and ‘restrictive’ – see Arku et al, 2016; Yeboah & Obeng Odoom, 2010; for instance)²⁵ enjoin the authorities to supervise permitted projects in their jurisdictions—they are to do stage by stage inspections to ensure that contractors or builders build to their permit specifications and in accordance with Ghana’s building code. As noted

²⁵ As explained elsewhere, the much-criticized National Building Regulations have recently been revised and unified into a single comprehensive document called the Ghana Building Code (GhBC) GS1207: 2018. However, whether the revision meets the contemporary needs of the Ghanaian construction sector is not engaged in this study.

earlier, the officers are not able to do this due to logistical and other constraints. Another factor that impedes their capacity to deliver on their mandate is the scale of ongoing construction works in the country especially in the cities vis-à-vis their staff strength. Thus, the spate of construction works in the cities, further dwarf their monitoring capacity.

As remarked by Engineer 3, *“they are mostly understaffed. If you look at the geographical area of the assemblies and the number of inspectors they have, they cannot move regularly. So, if they want to do the work properly, they will need more hands”*. For instance, it is estimated that 85 percent of all new constructions in Ghana occur in Accra, the capital and Kumasi, the second biggest city in the country (Arku, 2009; 2006; Asante & Sasu, 2018). The volume of construction developments, has, thus, overwhelmed regulatory strength and as the informant from the Engineering Unit of the Accra Metropolitan Assembly remarked, since *“we do not have [enough] people [building inspectors] to go out [and do monitoring at construction sites], most developers take advantage and do their own thing: cut corners-use unqualified personnel; cut down material requirements; use substandard ones”*.

Political interference

Further to human resource, logistical constraints and the spate of development, another impediment to effective enforcement of safe building regulation that emerged from the participants’ responses was political interference. The authorities complained severally about how politics impedes their work – an endemic problem widely reported in the literature (Yeboah & Obeng-Odoom, 2010; Arku et al, 2016; Asante & Sasu, 2018; Boamah et al., 2012). For instance, while the technocrats – civil servants – are at the helm of the technical management of human settlement through the planning process, politicians play some crucial roles like chairing the statutory committees under the Assemblies (Gyampo, 2008; Yeboah & Obeng-Odoom, 2010). The ripple effect of the usual political wrangling, which by the way is intractable, stalls the operations of the politicians-headed committees. For instance, the Kumasi authorities complained that the City’s Planning Committee for close to a year, had not been able to meet

to review building permit applications because the Assembly members were challenging the composition of the Committee. This means that all the developments that have been going on in the City within that period do not have official approval.

One of the Monitoring Officers of the Accra Metropolitan Assembly made the following remark about political interference: *“You realize this person is doing the wrong thing and you go [to intervene]. Before you realize, a top official will call you and tell you to never go to that site again. So those are also some of the factors [that impede our work]: The political interference”*. His colleagues in Kumasi made similar complaints in Asante & Sasu (2018) on how political interference frustrates their operations:

In accordance with section 10(6) of L.I. 1630, we have, on a number of occasions, ordered the demolition of whole or part of certain buildings in Kumasi but we have received an order from our “boss” or a politician to stop the demolition (Asante & Sasu, 2018: 9).

The regulators remarked that they tend to yield to the politicians and the powers that be because, as one of the Monitoring Officers of the Kumasi Metropolitan Assembly noted in the focus group discussion, *“disobeying these ‘big men’ could have dire consequences on your career”*. Thus, they are rightly sensitive to the implications of ignoring the orders from politicians or top superiors. In Asante & Sasu, one building inspector reported an instance where *“one of my colleagues lost his job because he ignored an order from a politician”* (Asante & Sasu, 2018: 9). Given such circumstances, he added, you will be forced *“to respect the order than to lose my job”* (Asante & Sasu, 2018: 9). This re-echoes Flyvberg’s (1998) assertion that in open confrontation between technical rationality and power, rationality usually yields to power.

In *‘We are Not the Only Ones to Blame’*, Yeboah & Obeng-Odoom (2010) captured the accounts of some district assemblies’ officials on how political interference adversely affects development control in Ghana’s cities most of which are in line with those expressed by the informants in this and the other studies. In the end, people with political connections or associations in other high places are empowered

to construct shoddy buildings which eventually tend to undermine public health. As recounted by one building inspector in Asante & Sasu (2018), most of the structures that *“have collapsed were earmarked for demolition [but] due to some political interference, the developers were allowed to continue construction”* (Asante & Sasu, 2018: 9).

Long, costly and complicated permitting process

Further to the above, the spate of construction works in the cities especially has meant that the authorities are saddled with huge volumes of permit applications constraining expeditious review and return of feedback to developers. This leads to delays, missing applications, which encourage developers to either ignore prior permit approval or proceed with building even when permits are being processed. Many developers and even city officers stated in Oosterbaan et al (2012); Arku et al (2016) and Yeboah & Obeng-Odoom (2010) that these are some of the reasons developers do not even bother contacting the authorities when they are beginning new constructions or tinkering with old structures. Some artisans who participated in Arku et al (2016), for instance, stated that *“The district assembly works department is ineffective, and it is a waste of time and resources to apply for building permit”*. *“The system simply doesn’t work”*, his colleague added (Arku et al, 2016: 372). A landlord who had converted his residential building to commercial use also stated in Oosterbaan et al (2012) that *“It takes forever to go through the entire [building permit] registration process . . . it is very frustrating”*. Another respondent noted *“It’s impossible for anyone to complete the [permit application] process in the official time . . . In fact, not even in an unofficial time”* (p.58).

One property owner made a similar remark in Arku et al (2016): *“It took me almost 5 years to get my permit [...] anytime I checked on my document at the planning office. The officials will ask me to come another day [...] this went on for years [...] it was very frustrating for me”* (Arku et al, 2016: 371). Thus, as one housing developer aptly observed,

“The nature of [Ghana’s] building permit system does not encourage people to seek approval prior to developing their property [...] there’re too many administrative hurdles to go through and the system

is generally unresponsive to the needs of people. There is no sense of urgency on the part of the planning officials [...] in fact the system is a complete mess (Arku et al, 2016: 372).

When I suggested this to the regulators in the interviews and focus group discussions, they corroborated the concerns that the permitting process is costly, long and complicated. The participant from the Physical Planning Unit of the Kumasi Metropolitan Assembly, for instance, noted the following: *“the perception is that the permitting process is too cumbersome and frustrating, which is true. Even in getting the lease, it will take you a lot of money and time”*. His colleague, one of the senior officers at the Development Control and Building Inspectorate Unit of the Assembly, made a similar observation:

People convert almost every space they see into stores in Kumasi. It is everywhere. When we chance on such a thing, we will ask you to stop the work and go and do change of use. But it is a process which also takes unnecessarily long time for which reason people do not follow. [Emphasis added].

Some city authorities engaged in other studies made similar remarks. For instance, in Yeboah & Obeng-Odoom (2010) one planning officer remarked

[The permitting requirements] in practical sense make it more difficult for people to come to us [for planning permit before development]. But not all the documents are important. If you are assessing [planning] applications, there are few major documents you really need to focus on. The rest, we do not scrutinize (p.85).

Nonetheless, viewed from a broader perspective, Ghana’s situation²⁶ reflects what seems to be transpiring as a broader problem with long, costly and complicated permitting processes in the developing world. For instance, as noted in chapter two, in South Asia in 2014, it took an average of 14 procedures and 196 days to get a construction permit. Formal permitting fees average a staggering 12.8 percent of the overall cost of construction in the region. By comparison, the aggregate regulatory fees paid for planning and construction approvals is equivalent to 1.7 percent of the overall cost of construction in the OECD countries. This fee is only 0.6 percent of the construction cost in Japan

²⁶ Note: There have been some reforms to expedite permit applications. And Engineer 1 for instance stated that the situation has improved a bit.

(Moullier, 2015). Most governments in developing countries resort to high permitting fees as a de facto backup tax instrument. In Haiti, for instance, according to Moullier (2015), close to a decade after the 2010 devastating earthquake, building authorities continue to charge developers construction permit fees equivalent to 16% of the cost of construction. This could be similarly high elsewhere, reaching as high as 20 percent in Madagascar and 25 percent in Serbia. In the city of Mumbai, India, the formal cost of going through a planning and construction permitting process is equivalent to 46 percent of the construction cost (Moullier, 2015). However, the costly, long and complicated permitting process, the evidence shows, is self-defeating and counterproductive because not only does it fail to generate more revenues to the local governments (see Moullier, 2015, for instance, for a review), but as corroborated by the insight from Ghana, it also undermines compliance with appropriate building safety standards by encouraging or forcing developers to circumvent the process altogether and undertake construction practices that undermine public safety.

Corruption

Further to the long, costly and complicated permitting process and the other factors discussed, corruption is reported in the literature as one of the major problems that is at the heart of compromised compliance and enforcement of safe building and construction regulation in Ghana. For instance, in Arku et al (2016), one developer shared the following experience:

When I first applied for my building permit, they told me all the required documents were properly filled and they asked me to check on it in about 45 days. I went and they told me to come back in 30 days. I went to the planning office many times and no one was available to talk with me or willing to talk with me. This trend went on for about a year, and I finally discussed the situation with a friend, and he asked me whether I've given money to anybody to work on the document and I said "No". My friend laughed and said, "you must be new in town". Then on my next visit, I paid money to one of the officials who finally moved the document to the next stage. This cycle of paying money went on for about 3 years before I finally received my final approval. There was not a single official receipt issued for any of the money I've paid at various stages (p. 375)

Benzoni (2013) puts the problem this way: *"bribery is widely accepted in Accra – frankly, it's a rational solution to a frustrating permitting process"*. Despite the widely corroborated stakeholders'

and scholarly accounts that corruption is at the heartland of the problem (not only in Ghana though – see Kenny, 2012; Escaleras et al, 2007; Lewis, 2005; Berlinski, 2011), when it emerged in the interviews and focus group discussions, some of the officials sought to downplay it as “*just a notion out there*”. However, some of them conceded that it is real: “*Building inspectors*”, one senior officer at the Building Inspectorate Division of the Accra Metropolitan Assembly admitted, “*could be compromised. “I would not say they are angels*”, he added. The other participants also made similar remarks that city authorities’ corruption is key to the compromised compliance and enforcement of safe building and construction regulations in the country.

Institutional corruption implicates on building safety in several ways. For instance, it could lead to unnecessary delays and frustrations in the permitting processes, which, as discussed earlier, further undermine compliance with appropriate building safety standards by encouraging or forcing developers to circumvent the process altogether and undertake construction practices that may compromise public safety. It also could lead to situations where building inspectors turn blind eyes to designs and building practices that deviate from code specifications and lead to the creation of structurally incompetent buildings, which then result in disastrous outcomes. Thus, corruption undermine all aspects of regulation enforcement and compliance. This leads to the construction of inferior public infrastructure, private buildings, and housing units, which ultimately fail, often in the face, but even also in the absence, of physical hazards leading to greater death tolls and other losses than would occur in the absence of corruption (Berlinski, 2011; Lewis, 2005; Soane, 2016; Kenny, 2012; Escaleras et al., 2007).

As could be discerned thus far, the insights shared by the study informants on the factors that undermine compliance and the enforcement of safe building and construction regulations in Ghana are remarkably similar in substance and form to the findings of almost all the other studies conducted by other scholars on building construction, development control and planning in the country (e.g. Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah et al., 2012; Botchway

et al., 2014; Ametepey et al., 2015; Arku et al, 2016; Asante & Sasu, 2018). This is a proof positive of the deeply structural character of the impediments to development control in Ghana. When Asante & Sasu pointed out to the building inspectors they were interviewing that the challenges they were mentioning were similar to what other regulatory officials had long complained about in other studies conducted years ago, one of them replied, they “*are the same problems that confront our outfit today*”. Frustrated, one of his colleagues remarked: “*nothing has changed*” (Asante & Sasu, 2018: 9).

The structural impediments to compliance and the enforcement of planning and building safety regulations create conditions for widespread unsafe construction practices to thrive, which lead to the creation of unauthorized and usually unsafe buildings that result in disastrous outcomes. As one senior officer at the Engineering Unit of the Accra Metropolitan Assembly remarked:

So far buildings that currently have collapsed, like [name withheld], they do [sic] not have permit. They did not submit their drawings for us to vet. You know in Ghana, people put up buildings they do not come for permit. The buildings that are collapsing are buildings that don't have permit.

To illustrate the scale of the problem, Freiku (2003) once suggested that in Kumasi, the second biggest city in Ghana, almost 80% of the houses built are without the appropriate permits from the Town and Country Planning Department of the Metropolitan Assembly. Even where permits are secured, due to monitoring challenges, many developers tend to do a whole lot of unapproved modifications during construction. One of the informants from the Development Control and Building Inspection Unit of the Kumasi Metropolitan Assembly thus complained:

Normally people are issued with permit, but they go ahead doing something different. You realize they have been given a permit to construct one or two story; they end up building three stories. You sometimes realize that the design itself has been changed. They have done a whole lot of modifications to what they are supposed to do.

Land conflicts

In 2005, an estimated 934 million people were said to be living without security of tenure in informal settlements. This number is projected to increase to 2 billion by 2030 (UN-Habitat, 2008). In Sub-Saharan Africa, it is estimated that more than 90 percent of the rural population accesses land via legally

insecure customary and informal tenure systems, as do 40 million Indonesians and 40 million South Americans (Commission on Legal Empowerment of the Poor in Moullier, 2015). It is estimated that 5 million people worldwide suffer from forced evictions each year due to insecure land tenure (Moullier, 2015). The discourses on insecure land tenure often focus on the adverse implications on the opportunity for poor people to accumulate wealth (see De Soto, 2000). Nonetheless, there is also a building safety dimension (World Bank, 2003; Reerink & Gelder, 2010). For instance, Moullier (2015) argues that land tenure security plays an important role in investment in sustainable and safe infrastructure and housing.

The broader point is that without secure tenure, people fear eviction and demolition of their homes, which makes it unlikely that they will invest in improving their homes or neighbourhoods. They are even less likely to invest in more resilient construction or retrofit. It is claimed that as a result of widespread failure to provide tenure security, an increasingly large proportion of urban residents in low- and middle-income countries are not willing to make investments in property improvement or safety, which increases disaster-risk (See Moullier, 2015, for instance). As with other developing countries, land tenure (in)security plays critical roles in building safety challenges in Ghana. However, the manner the problems play out in Ghana is different from as asserted or disputed in the literature (Moullier, 2015; De Soto, 2000; World Bank, 2003; Reerink & Gelder, 2010) on the nexus between building safety and security of tenure in other developing countries.

Land ownership in Ghana could be classified into two broad categories: state or public lands and customary or private lands. The pluralistic legal environment within which land is managed in Ghana means that there exist both formal and informal routes to accessing land (Ayee et al, 2008; Boamah, 2013). However, as pertain to other parts of Africa (See Kishindo, 2004; Berry, 2008, for instance), the traditional landholding institutions, customary or informal tenure systems control the largest percentage of lands in Ghana– between 80 – 90 percent of the total land area in the country (UN-Habitat, 2011).

Further, Ghana's land ownership system, just as pertain to other parts of the Sub-Saharan Region, is characterized by widespread, intense disputes and uncertainty (Ayee et al, 2008; Boamah, 2013). It is not uncommon for two or more people to buy the same plot of land from the same landowner or two or more competing owners. As a result, multiple people will claim ownership of the same piece of land (Arku et al, 2016; Darkwa & Attuquayefio, 2012) with the resulting disputes adversely affecting compliance with building permit regulations.

As indicated earlier, Ghana's building regulations mandate developers to acquire permits from the relevant metropolitan, municipal or district assembly (MMDA) before they could commence any project. But with the persistence of land title or ownership contestations, purchasers of land in especially the cities and their environs are perpetually exposed to or face huge risks of protracted litigation or loss of funds as the sellers may be incapable of transferring proper legal title to the purchasers. To forestall this, developers or land buyers commence projects immediately on buying land and, thus, circumvent due process fearing that their permit application may be refused or delayed unnecessarily, which might make them lose their lands for failure or long delays in project commencement. Thus, as some district assembly officials noted in Arku et al (2016), although those who violate permit regulations are conscious of their actions and the consequences, the drive to safeguard their land tends to supersede the regard for building permit regulations. One of them, thus, noted

People are afraid of losing their land to someone else so they're eager to build. The perception is "if I don't act today somebody will lay claim to the land tomorrow". Because of this urgency [the] majority of the people don't bother to fulfil the legal requirements before developing their land (Arku et al, 2016).

Yeboah and Obeng-Odoom (2010) reported the concerns and perhaps the frustration of the Kumasi Metropolitan Assembly's Director of Planning:

The first thing that goes into their [developers'] mind [after acquiring land] is to dig the foundation and get some quantity of sand and gravels [all in preparation towards commencing development]. Coming to us [for planning permission] is not their priority (p.83)

Some developers shared their experiences in Arku et al (2016): *“Almost every land in Accra is under some sort of dispute so if you buy land and you don’t develop it fast you would lose it. The procedure to get a building permit is long so it is better to start building before you apply for it”*. Another developer shared a similar experience

When I bought my land, the first question the original owner asked me was “when are you going to start building on it?” This owner asked this question repeatedly anytime he saw me. Initially I didn’t understand why he was still concerned about the land. But another member from the stool family informed me that the land is a disputed land. As soon as I became aware of this, I started developing the land even though I didn’t apply for building permit. I was just afraid that if I delay, the land may be taken away from me by the rival family member (p.376).

The overall effect of developers’ drive to build without permit due to land conflicts and litigations is that the authorities do not get the opportunity to vet the designs of the proposed structure and ensure that they conform to the approved standards and monitor the stages of the construction to ensure the use of the right standardized materials and reinforcements to guarantee the safety of the building, its occupants and the public. As noted earlier, the regulators engaged in the study stated that most structures that collapse usually do not have permit. An official at the Accra Metropolitan Assembly for instance remarked:

So far buildings that currently have collapsed, like [name withheld], they do [sic] not have permit. They did not submit their drawings for us to vet. You know in Ghana, people put up buildings they do not come for permit. The buildings that are collapsing are buildings that don’t have permit.

This is not surprising as the intractable land litigations and conflicts associated with the customary land tenure system discourage developers from following building permit regulations. The problem is more profound or acute in Accra and its environs. Nonetheless, the participants from Kumasi observed that it is being felt there as well. But the unavoidable question that issues out from the foregoing is how and why land conflicts and litigations have become a critical impediment to compliance with building permit regulations in Ghana, particularly in Accra and its environs. The answer to this lies with some global and local events that shaped a controversial customary land tenure system and changed the

meaning of property and, thereby, shaped land to become an important and, pursuant to that, a contentious commodity in the then colonial-Gold Coast and, subsequently, independent Ghana.

The Industrial Revolution and the abolition of the slave trade affected land tenure in Ghana. The former meant that industries in Britain needed more raw materials which the colonies were supposed to supply. The abolition of the slave trade, however, meant that the profit of traders would decline. Together, the developments led to a greater demand for land for agriculture and mining activities. The increasing monetization of the rural economy, itself a product of the abolition of slave trade and the expansion of the Industrial Revolution, resulted in the scramble for land (Dickson, 1969; Agbosu, 1990 in Obeng-Odoom, 2013) and, in turn, created a need for laws to hasten its alienation (Howard, 1978 in Obeng-Odoom, 2013). In the then Gold Coast, various legislations such as the Public Lands Ordinance in 1876 and similar bills in 1883, 1885, 1886 and 1897 were introduced by the colonial government to regulate the acquisition of lands required for public service of the colony and protected territories as well as the way such lands would be held. For instance, the Public Lands Ordinance of 1876 comprised thirteen clauses that set precedents for land administration in Britain's colonies, protectorates, and territories. Clause three of the Ordinance stated that the colonial secretary must set up an agreement in the form of monetary compensation for all owners and persons with interests or estates in land needed for absolute purchase by the colony.

Land rights in the Gold Coast, prior to the introduction of the Ordinance, were regulated by codes of conduct rather than proprietary laws that connoted notions of individual ownership (Sackeyfio, 2012; Field, 1940; Manoukian, 1950). Thus, the provisions of the Public Lands Ordinance of 1876 meant that, for the first time in the Gold Coast, land could be valued as a commercial commodity – thus, indigenous groups with rights or interests in land could now sell it by asserting their rights to property. The development need not have been a problem had there been already well-developed and harmonious laws on alienation of land. However, pre-colonial Ghana did not have a *uniform* corpus of customary

law. Land rights in pre-colonial Ghana, as with many parts of Africa, were not only founded on some complex multifarious, overlapping, and competing realms of social and political relations (Field, 1940; Manoukian, 1950; Sackeyfio, 2012), but also different versions of customary laws existed even within the same community (Obeng-Odoom, 2013). This means that several users could hold different rights to resources on the same piece of land. The terms of land tenure depended not only on the specificity of individual rights but also on the contingency of other tenures re-created and transformed over time (Juul & Lund, 2002; Sackeyfio, 2012).

The colonial administrators did not fully understand or consider the intrinsically legally pluralistic nature of indigenous land tenure. Rather, they viewed customary land tenure as a homogenous set of stable rules and beliefs. The architecture of indirect rule, which prevented the people from having direct contact with the colonialists, further complicated the problem by enabling the chiefs to keep ‘contradictory’ interpretations of customary land tenure laws away from the British (Obeng-Odoom, 2013). The information asymmetry enabled the chiefs to impose their interpretation of custom as *the* custom of the people. Nonetheless, even when the colonial state was aware of some dissenting voices, it usually backed the chiefs since they were helping the state to subjugate the common people. For instance, not only did the colonial state intervene when the common people attempted to remove such chiefs from office, but it also even installed its own chiefs elsewhere (Ward, 1958; Firmin-Sellers, 1996; Amanor, 2001; 2005; 2006 in Obeng-Odoom, 2013). Right before the very eyes of the common people, tradition was being reinvented to support the interest of chiefs (Obeng-Odoom, 2013).

The resulting ambiguities provoked the articulation of different and conflicting versions of land ownership and different social identities and multiple parties that could advance legitimate or valid access or claim to a single plot, resulting in complex conflicts among different parties. Thus, in the Gold Coast, a situation was created where neither the ‘*peoples*’ customary laws, the chiefs’ ‘*re-written versions*’ nor the *European laws* strictly applied. As such, from the beginning of colonial rule, the seeds

of future land conflicts were sown resulting in large numbers of disputed transactions regarding the disposal of land and the rights to it (Sackeyfio, 2012). The problems were most prevalent in the cities – where lands were in high demand. For instance, upon becoming the new capital, lands in Accra were desired even more, which, as would be expected, intensified the contestations and competition for lands. All of these developments brought new meanings to the language about land; its value, acquisition, and dispossession; and compensation for it, and, therefore, cushioned a landscape ripe for litigations, conflicts, competition and contestation for the control and ownership of lands in the capital– a development that fed into and has since remained a marked feature of the City’s commercial and urban development (Antwi, 2002; Boamah, 2013; Darkwa & Attuquayefio, 2012).

Colonial developments aside, one major external factor that also has had telling impacts on lands and land tenure conflicts in Ghana is the implementation of IMF/World Bank-imposed structural reforms in the land sector. The liberalization of Ghana’s economy and the housing sector in the 1980s attracted substantial real estate developers and injection of unprecedented private capital into Ghana’s construction sector leading to an increased demand for lands. For instance, between 1995 and 2005, the Ghana Investment Promotion Center (GIPC) registered 81 real estate projects, with a total investment of \$105 billion in real estate development, civil engineering and residential construction (Arku, 2009). As at 2004, Accra alone had attracted 89 companies involved in housing and building construction from 12 different countries in Asia, Europe and elsewhere in Africa (Grant, 2007). The phenomenon of gated communities or housing became popular in the cities. The membership of The Ghana Real Estate Developers Association (GREDA) according to the UN-HABITAT (2011) grew from 38, as at its inception in 1988, to 400 by 2003. Arku (2009) estimates that about 85% of all new building developments in Ghana occur in the cities – Accra and Kumasi in particular.

As an increasing number of private property developers got involved in the residential market, land prices began to skyrocket, speculation on the property market became common practice. For instance,

in the 1980s and 1990s, the price for building plots increased by more than 1000 percent (Konadu-Agyemang, 2001; Arku, 2009). This rapid rise in land values has become particularly apparent in Accra, Tema and Kumasi and, has, thus, exacerbated the disorderliness in the land market as more and more people seek to cash in or control land due to the increasing demand in response to the accelerated need for infrastructure such as buildings in the urban centres. To worsen matters, state bureaucracies; corruption; poor land records or transactions keeping; organization of land transactions in secrecy and outside formal systems (Antwi, 2002; Boamah, 2013; Mahama & Antwi 2006; CDD, 2002; Crook, 2004) also have made it easy for land transactions and ownership data to be manipulated leading to intractable problems such as multiple sales of the same land; disputed ownership, unclear title to land (Boamah, 2013; Ayee et al., 2008).

There are many land disputes in Ghana involving chiefs, family heads, government, individuals and groups in various permutations – (a) inter-ethnic and intra-ethnic; (b) between groups; (c) between chiefs and their people; (d) governments and communities; (e) communities and transnational corporations; and (f) between individuals, who have a claim or derivative rights in land such as strangers, tenants and migrant farmers, women, youths (Ayee et.al., 2008; Crook, 2004). In 2003, the Greater Accra Region alone was reported to have about 15,000 land cases pending before the courts (World Bank, 2003 in Obeng-Odoom, 2013). In the High Court of Kumasi, there were a total of 9,214 land cases as of 2002, an 18 percent increase from 1997 when land cases as a percentage of total cases constituted 46 per cent. In Ghana as a whole, it was estimated that there were about 60,000 land cases in court as of 2002 (Kasanga, 2003 in Obeng-Odoom, 2013). These cases tend to be protracted. The uncertainty during the pendency of these land cases means that, generally, land tenure in Ghana is insecure and it is against this backdrop that developers or land buyers are pressured to disregard building permit regulation processes and begin putting up their buildings lest they will be drawn into protracted litigations or lose their funds.

Compromised compliance & enforcement of permit regulations: Summary of key highlights

The section has analysed the participants' responses on the impact of compromised compliance and enforcement of building permit regulations on building collapse in Ghana. The analysis does not only illuminate the foremost foreground of the political economists' methodology of accident research (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Wales, 2017; Freudenburg et al., 2009) that such risks usually have historical-institutional context. It also corroborates the study's contention that the causes of the inappropriate construction practices and behaviours that underlie building collapses in developing countries just as much arise from internal as well as externally imposed and inherited conditions and factors.

The initial parts of the analysis showed that some of the problems that tend to undermine compliance and enforcement of building permit regulations in Ghana are internally generated. These include challenges with human resource and logistics; political interference; the long, complicated and costly nature of the building permit acquisition process as well as the ever-intractable problem with institutional corruption. These problems play out and reinforce themselves and sustain the prevalence of non-enforcement and noncompliance with building permit regulations leading to the creation of unsafe buildings. However, evidence has also been led in establishing how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations in crucial institutions such as land and land sector institutions have shaped an undisciplined and insecure land tenure system that undermine compliance with permit regulations. From the foregoing, it could be argued that the issue of compromised compliance and enforcement of building permit regulations in Ghana has an historical- institutional context: the factors that give rise to it just as much arise from both *internal* problems (such as corruption; political interference) as *externally imposed* and *inherited* or *underdevelopment* conditions (such as colonial land policies and postcolonial neoliberal policies such as structural reforms). The study's analysis of the problem of low compliance

and enforcement of building safety regulations in Ghana at the crosscutting edges of internal (national) and external (global) processes and factors honours Charles Gore's call for the rejection of methodological nationalism or spatial separatism (Gore, 1996; 2010) – i.e. the tendency for analysts to give primacy to just internal national factors, and isolate or separate them from external processes, factors and developments as determinants or causes of phenomena.

Use of standard non-compliant materials & improper handling of standard-compliant ones

Further to compromised enforcement and compliance with permit regulations, another theme that emerged as central to the building safety problem in Ghana was a challenge with materials. A critical determinant of building performance is the quality of building materials. As noted elsewhere, resilient building design is based on assumptions regarding the strength and performance of the constituent materials (Moullier, 2015; Engebø et al., 2017). However, as discussed in chapter two, the construction markets of many developing countries are inundated with standard-noncompliant or inferior materials deficient in chemical and/or physical properties like size, weight, density– which ultimately reduce load bearing capacity (Awale, 2015; Gbonegun, 2017; NREH, 2016; Nhlabatsi, 2014). In Ghana, as Engineer 3 noted, “*Sub-standard materials are all over the place. We have a very porous regulatory system which makes it easy for these things to enter the system*”. But the quality challenge is with not just the imported materials, but also the locally manufactured ones. Engineer 1 explained the problems with the locally manufactured materials as follows: “*When they are putting up the factories, they will send the right samples to do the [Ghana] Standards Authority. But when they are doing the mass production, they bring in the substandard materials. And because monitoring and checks are weak, they are able to produce so many of the substandard materials into the system.*”

Regulation challenges aside, developers' penchant for cheaper materials was found to also incentivize the importation and manufacturing of inferior construction materials in the country.

Engineer 2 who is into the production of building materials shared his experience with builders, which is representative of the views most participants expressed on the subject.

Customers are not willing to pay the actual price. I personally had a problem. As I said, I am into the manufacturing of construction materials. With my engineering background, I was producing based on the required specifications. Along the line, I realized that there are a couple of other people within where my factory is located. Most of the customers come and they did not take the strength of the materials into consideration. All they know is that I have a thousand Cedis and need thousand blocks. He comes in and there are quality blocks, which are costly. But to him, he has a tight budget and wants to build at a cheaper cost.

Contractor 1 used iron rods to illustrate how the problem with materials plays out: *“The iron rods in Ghana here, they will label it 14mm, but you will measure, and it is 12mm. You take a 16mm, take a tape and measure the diameter, and it is 14mm”*. The other participants corroborated Contractor’s 1 assertion in separate interviews. But as Architect 1 noted *“if you have the professional insight, you know how to work your way around it and achieve the required material strength”*. For instance, Engineer 3 stated that armed with the knowledge on the problems with the materials, what happens is that *“when we are doing our materials analysis and the project requires say, 16mm, we write 20mm because we know if you go to the market, what will be sold to you as 20mm is actually 16mm.”* Contractor 1, Engineers 1 and 2 and Architect 1 and the other participants also made similar remarks.

Thus, knowing the problems with the materials, as Engineer 3 put it, *“we put in place quality control. We independently test them and see that they are safe and meet the standard”*. The problem, however, is that a marked feature of construction practice in Ghana is that individual homebuilders/clients directly purchase the materials for their projects (Hedidor & Bondinuba, 2017). This is not peculiar to Ghana though – the practice is common in other developing countries as well (See Wells & Wall, 2003; Mitullah & Wachira, 2003, Adewole et al, 2014; Ayodele et al., 2011; Adenuga, 2012, for instance). What this means is that homebuilders who have no knowledge about the dynamics and the problems with the materials on the market frequently side-line the practitioners who know, and either go to the market alone or with the highly preferred artisans whose informal apprenticeship usually excludes

training in materials properties and testing (Hedidor & Bondinuba, 2017; Tutu & Bempong, 2018) and, as Architect 1 noted, “*just buy anything that is available*” –usually the cheaper ones, which in most cases are also inferior.

The adverse implication of this is obvious. Having uninitiated homebuilders and artisans who do not have any formal capacity or whatsoever for detecting and testing material strength and property at the forefront of procurement in a market context where substandard materials are ubiquitous could only lead to one outcome –inferior or standard non-compliant materials deficient in chemical and/or physical properties like size, weight, density will end up at construction sites. Further to the challenges with the utilization of standard-noncompliant materials, the respondents noted that the way even standard compliant ones are utilized leaves much to be desired. The broader point here is that building materials, even if they are of the highest standard or quality, can be seriously vulnerable if not properly handled or utilized in accordance with standard construction practices and procedures (Moullier, 2015).

As discussed in chapter two, the problem with building materials in developing countries is not only that some are usually inferior. Even when standard-compliant materials are procured, short term cost considerations encourage adverse cost or corners cutting practices such as reducing the right intake, outsourcing building construction and supervision services to cheap but less sophisticated craftsmen or artisans (See for instance, Adewole et al., 2014; Adesanya & Olanrewaju, 2014; Akinyemi et al, 2016; Alinaitwe & Ekolu, 2014), which then lead to safety gaps during the execution of the project. The participants’ submissions corroborate the assertion that the practice of reducing material specifications and mishandling of standard-compliant materials by low-skilled craftsmen play key roles in the creation of unsafe buildings in developing countries. In respect of cutting down material specifications, one of the Monitoring Officers at the Development Control and Building Inspection Unit of the Kumasi Metropolitan Assembly made the following observation during the focus group discussion:

The clients are very central to the problem. You are the contractor; you say in your professional opinion; the cement could be used to make 25 blocks. Then the client says, Mr. Kwasi used the same

number of cements to make say 40 blocks. Why will you make just 25? So, if the contractor insists [on upholding high safety standards], he will give the work to someone else. So, they will do it for them only for the blocks to be soaked when it rains causing problems.

Architect 1, Engineers, 1, 2, 3 and 4 and the other participants made similar remarks. Contractor 1 shared an experience he had with a client who wanted to cut down the quantity of materials specified in the design which corroborates this assertion.

I lost a job. I did a design for someone and she wanted me to supervise the building. They wanted to cut down the materials specified in the design. I explained to her why we need what is in the design. When she insisted on not putting in the required materials, I left the project. People are interested in getting buildings for obvious reasons. But do not pay a lot attention to the safety aspect.

Cutting down the quantity of materials specified in designs may lower construction cost in the short term but, could, nonetheless, implicate adversely on the achievement of material strength and lead to the creation of defective buildings. As one of the two Fellows from the Ghana Institute of Architects remarked, if you “do not do what the specification is calling for, you will have poor beams and columns with little strength. You will pay more in maintenance and the collapse of the structure”. A related finding was how even standard-compliant ones are handled by the artisans to whom developers often outsource construction services. The remarks of Engineer 5 and Architect 7 capture in summary the general orientation of the study participants on the problem. Engineer 5 thus submitted:

Generally, construction materials used are of reasonable quality. They are not “decidedly” inferior in that sense. Rather, due to the non-involvement of professionals in most of the projects, the correct proportions and right treatment of materials e.g. sieving fine aggregates to get rid of unwanted material which may harm concrete’s strength, are not done.

Architect 7 too remarked: “the quality of materials is often debatable. We can have the right material but if it is not fixed right, it’s useless.” The broader point here is that because they are not trained to work with published industry guidelines and specifications, as discussed elsewhere (Tutu & Bempong, 2018; Keteku-Atiemo, 2006; Bondinuba, 2012; Hedidor & Bondinuba, 2017; Hedidor et al., 2016), the artisans are not able to batch, proportion or measure materials scientifically. Second, the operations of the artisans are labour intensive as they normally lack the usually substantial capital needed to purchase

the necessary batching and other equipment to measure, cut and lay materials in accordance with standardized scientific construction practices and procedures. In Tanzania, Mlinga and Lema (2000) found that 65% of such builders did not own any kind of equipment. Wells & Wall (2003) and Hedidor & Bondinuba (2017) made similar findings in Kenya and Ghana. Without the necessary equipment, in the determination of ratios for mixing concrete and mortar, moulding and laying of sandcrete blocks, most of them follow clients' instruction or previous experience (Hedidor & Bondinuba, 2017).

Malpractices like this could result in problems such as insufficient cement to the aggregate ratio in cement blocks, concrete and mortar works, which normally lead to poor finishing and weak buildings with rising moisture content in walls, leaking roofs, cracks, uneven block strength and bearing capacity and possible collapse of the structure, even if the materials used are of adequate quality. An exemplifying case in point is the collapse of the BBJ building in the capital of Uganda in September 2004, which killed eleven (11) and injured twenty-six (26) others (Alinaitwe & Ekolu, 2014). The inquiry into the accident established that the materials for the construction (particularly the cement, aggregates, steel) were of adequate quality and conformed to the national standard specifications. The problem was with their technical utilization. Incorrect implementation of concrete technology onsite led to low concrete strength. As it turned out, there was no professional architect or engineer retained to be responsible for the supervision of the construction work. The site workers who were playing the roles of 'engineers' were only technicians and artisans, and not qualified engineers (Alinaitwe & Ekolu, 2014). Oke & Abiola-Falemu (2009) made similar findings in Nigeria.

Overall, the insight from the respondents and other studies show a clear picture whereby uninitiated homebuilders and technically challenged artisans play frontline roles in the otherwise highly technical construction processes such as the procurement, determination of the type, quantity and proportioning of materials for building projects, which leads to safety gaps during execution. Nonetheless, as with the other impediments to building safety, the causes of widespread use of substandard materials and

improper applications of even standard-compliant ones in Ghana just as much arise from internal national factors such as regulation failure as external ones. Here, the key external factors that are of interest include colonial building codes; liberalization policies, and the labour hiring culture of the global/international capitalist system of construction. As shown in the analysis below, the widespread utilization of substandard materials in the country is about but not just regulation failure, it could also be traced to colonial building codes and structural reform liberalization policies that have biased the taste of Ghanaians towards expensive industrially processed building materials. The misapplication of standard-compliant materials by local artisans too is linked to not only the labour intensive nature of their operations but also their limited exposure or near total exclusion from the global capitalist system of construction responsible for the flooding of the Ghanaian construction sector with industrially processed building materials.

As with other African countries (Njoh, 2000; 2009; 2012 in Obeng-Odoom, 2013), in Ghana, there is high reliance on industrially processed building materials (See Tamakloe, 2012; Oxford Group, 2017)—indigenous materials, traditional building systems and technology are spurned. This is partly attributed to the inheritance of bureaucratic building permit procedures and colonial building laws which depict houses constructed with local materials as substandard, and, therefore, bias the taste of people towards purchasing imported building materials (Obeng-Odoom, 2013; Arku, 2009). As reported elsewhere, the “prohibition [is] directly responsible for the extensive use of [industrially processed building materials such as] cement and concrete as the primary building materials in Ghana” (Government of Ghana, 1989: p. 39). Of course, as with other building regulations, these too are sparingly enforced. Nonetheless, they still create psychological barriers to the use of local or indigenous building technology and other resources and thereby reinforce the widespread dependence on the industrially processed inputs. Colonial laws aside, one key external factor that has immensely

influenced the widespread dependence on industrially processed building materials in Ghana is the liberalization policies imposed on the country by the IMF/World Bank.

The exposure of the Ghanaian economy to the international political economy through the implementation of the IMF/World Bank Structural Adjustment Program led to high import content in building materials (Arku, 2009; Konadu-Agyemang, 2001)—a development that fed into and has since remained a marked feature of the Ghanaian construction sector (Tamakloe, 2012; Oxford Group, 2017). According to Arku (2009), data from one government-commissioned report showed that the flow of building materials into Ghana increased by approximately 60 per cent in the 1980s (the reform era). Today, it is estimated that up to 80% of Ghana's building materials are imported (Tamakloe, 2012; Oxford Group, 2017). One positive consequence of these developments is that building materials are more available now, whereas previously their scarcity was a bane of the housing industry. Their abundance, however, has not only stifled local initiative in technology development and indigenous materials production, it has also increased the cost of building construction (Arku, 2009; Konadu-Agyemang, 2001) due to tax components, volatility of exchange rates and inflation – when imported and high production cost even when manufactured locally – the raw materials are imported and other costs such as energy are also usually high.

The dominance of the Ghanaian construction sector by low-income informal developers (UN-Habitat, 2011; Boamah, 2010) (a point I return to later in the thesis) has meant that these already expensive industrially processed materials are even more unaffordable to many developers. Dealers in building and construction materials in the country are therefore faced with a market context where the majority has little interest in affordable local materials but at the same time does not have enough purchasing power for the costly industrial alternatives. They respond to the dilemma by importing or producing their cheaper but sub-standard or inferior *versions* in order to be competitive. Therefore, if “*sub-standard materials are all over the place*” as Engineer 3 rightly complained, then it is not only

because Ghana has “*a very porous regulatory system*”. It is also because of the high taste or preference for industrially processed materials – a consequence of inheriting colonial building codes that prohibit the use of traditional building materials and forcible exposure of the housing sector to the international political economy by the IMF/World Bank through structural reform liberalization policies.

As noted earlier, the misapplication of standard-compliant materials by the local artisans is linked to not just the labour intensive nature of their operations, but also their near total exclusion from the global capitalist system of construction that has flooded the Ghanaian construction sector with industrially processed building materials. In chapter two, it was discussed that the globalization of construction and market deregulation have led to increased presence of construction firms from the advanced capitalist economies in the construction sectors of developing countries (Raftery et al, 1998; Ofori, 2000; Najjir et al, 2012). Studies (see Strassman and Wells, 1988; Raftery et al., 1998; Moavenzadeh; Hagopian, 1984; Ofori, 1996; Ofori & Chan, 2000, for instance) suggest that similar developments led to technology transfer and overall improvement of construction practice in countries like Singapore, Korea, and Japan. However, most of the countries in the Global South (Sub-Saharan Africa in particular) have not appropriately adapt policies to fully leverage the increased participation of advanced construction firms in their construction sectors to solve their skills gap problems (Osabutey et al., 2014).

Studies suggest that the foreign firms usually undertake large and complex projects (Moavenzadeh, 1978; Turin, 1973; Drewer, 1980) and rarely involve local artisans or craftsmen in their projects. They normally import personnel from their countries of origin and in a few cases a handful of top professionals trained in their host developing countries (Moavenzadeh, 1978; Turin, 1973; Drewer, 1980; Cockburn, 1970). The empirical evidence corroborates these claims. The participant from Construction Watch, for instance, submitted that “*the foreign firms bring their own professionals. They engage a few local “professionals though – nonetheless, only at the low level of the chain, not at the*

high level where they could learn a lot". The local artisans and craftsmen to whom majority of developers outsource jobs are completely removed from the chain. In this sense, it could be argued that globalization of construction and market deregulations have created a paradox of a global capitalist system of construction that, on one hand, has flooded the Ghanaian construction market with complex industrially processed building materials, and on another hand limits local artisans –who undertake the majority of building projects–from entering the system to learn how to properly apply the materials.

The situation will have been salvaged if there were any meaningful skills training programmes that expose artisans to the current climatic and environmental changes, introduction of new technologies and standards such as new building codes, regulations and materials in today's ever-becoming complex construction sector (Ricketts, 2001; Alinaitwe & Ekolu, 2014; Soane, 2016). However, as it turned out, such training has remained one of the unsupported sectors in Ghana (For a review, see Hedidor & Bondinuba, 2017) with the overall effect being craftsmen and artisans' lack of the technical wherewithal for important things such as proportioning or batching materials in accordance with scientific and standardized practices, ascertaining materials strength and soil suitability, with repercussions for widespread creation of shoddy buildings in the country.

Outsourcing of jobs to low-skilled and unqualified people

The next finding to be analysed is outsourcing jobs to low-skilled building practitioners. In the final analysis, the building must be structurally sound to be used for whatever purpose for which it was constructed. This requires that the building process must not only adhere to the relevant safety regulations, set industry guidelines, standards and procedures, it also must be undertaken by the right personnel with the required skills and experience appropriate for the type of building being constructed. But, as with many other developing countries (Wells & Wall, 2003; Mitullah & Wachira, 2003, Adewole et al, 2014; Ayodele et al., 2011; Adenuga, 2012), in Ghana (Arku 2009; Hedidor & Bondinuba, 2017; Hedidor et al, 2016; Offei-Nyako et al., 2014; GHIS, 2012; Keteku-Atiemo, 2006),

construction jobs are frequently outsourced to low-skilled and sometimes unqualified building practitioners. The following findings emerged from the discussions and interviews with the study participants as central to why developers outsource jobs to people who may not have the right competencies to execute:

- Regulation failure
- Rising cost of other building inputs
- Landguardism or activities of land guards

Regulation failure

In the first theme, it was discussed that problems such as human resource and logistical constraints, political interference and corruption as well as the state of construction works undermine or compromise the enforcement of building regulations. In the end, a conducive climate is created for widespread inappropriate construction practices to thrive. One of such inappropriate construction practices that frequently featured in the submissions of the study participants is the outsourcing of construction and building supervision services to low-skilled artisans or craftsmen. One of the Fellows from the Ghana Institute of Architects, for instance, submitted *“there is nothing to check them [referring to builders/homeowners/developers/contractors] so they do what they can get away with. They do not see architects; they do not see structural engineers”*.

One of the officers of the Accra Metropolitan Assembly corroborated this in a separate interview. Since *“we do not have [enough] people [building inspectors] to go out [and do monitoring at construction sites],”* he remarked, *“most developers take advantage and do their own thing: cut corners-use unqualified personnel; cut down material requirements; use substandard ones”*. [Emphasis added].

The Fellow from the Ghana Institution of Engineers also made a similar remark, which corroborates the assertion that the widespread practice of outsourcing construction and building supervision services

to people without the required technical capacity is linked to poor enforcement of the relevant laws. He, thus, submitted:

It has to do with how we are implementing and monitoring our regulatory frameworks. Not that we don't have laws. We have. If our laws are working, if you are not certified to do certain jobs, you cannot be there. You can't say you have your own choice and go and take instead of a professional, anyone you want to supervise your work for you.

Rising cost of other building inputs

Regulation failure aside, the participants shared a range of perspectives on why many a Ghanaian homebuilder tends to outsource jobs to low skilled practitioners. Some emphasised ignorance of safety imperatives underlying building construction. Such participants noted that most Ghanaians lack adequate orientation about professional practice in the construction sector. Unlike, for instance, health professionals who constantly engage the public on radios, televisions, through community outreach programs and other mediums, construction professionals and institutions in Ghana rarely engage the public on their work. Therefore, very few people understand the sector, the different roles that the different personnel working in the sector play. The perception is that once someone identifies with the sector, they are positioned to do anything leading to a widespread practice of giving jobs to practitioners who may not have the required skills to execute with implications for shoddy work. Contractor 1, for instance, submitted:

We do not educate the public. Doctors and nurses do public health education, but the built environment professionals hardly engage the public to educate them. Many people do not even know they should involve [certified] professionals and why they should do that. Some people do not have any idea about which professional should do what. They do not know the difference between say a draftsman and an architect. And this ignorance cuts across – even the so-called educated class lack appreciation of the built environment sector – who does what. They do not even know the various professionals we have in the construction sector – that we have structural engineers, architects, soil engineers – who do different things. So, once they get any mason, they think that is all. They think once the person is in the construction industry, they can do the job.

Related to the above is the notion in Ghana that building a house is a simple and straightforward matter of stacking cement to blocks (See, Benzoni, 2013, for instance). As the informant from Construction Watch noted, people think “construction is just [about] raising building – putting blocks

on it and plastering it”. One of the interviewees from the Town and Country Planning Department of the Accra Metropolitan Assembly corroborated this assertion:

Some of them [referring to developers] think [that] once you have your money and you can purchase brick and cement and you mix your mortar, and bunch with the brick, you are good to go. But they tend to forget or not know and are very ignorant of the fact that a building without the correct proportions of whatever materials you are supposed to use will fail at any point in time. They will just see a mason and he will sketch something for them, and they feel it is a building – they can put [it] up.

“A lot of people” [referring to developers], Engineer 2 also submitted, “do not take into cognizance the fact that when you are designing, there are a lot of factors that go into it: You analyse the forces, the strength of materials, properties of materials. All they know is that you buy blocks, you buy this and put them together. A lot of them feel it is an easy thing to do”. This mind-set, the participants suggested, is linked to what they referred to as “yesteryears” mode of construction in the country in which so-called certified “professionals” played little to no role. Architect 1, for instance, noted: They (referring to developers) will tell you that “our forefathers did it, they did not use any engineers; they did not use any professionals. People have done similar structures without using professionals and the structures are still standing, so why the need for so-called ‘professionals’”. “There is also the mind-set that”, Engineer 3 also remarked, “If in those days we build without formally trained architects and engineers, why can we not do same today?”

Further to the above is also a pejorative perception among the public that the so-called professionals are just theories-cramming (the local term for this derogatory description is ‘book long’) people who do not bring a lot to the otherwise simple process of building construction. But, nevertheless, demand high fees compared to artisans who are perceived to have mastered the craft through many years of ‘learning by doing’ and at the same time charge cheaper fees. As underscored by Engineer 3, “we battle on the market with artisans who are able to convince clients that they have experience and are also cheaper compared to you [the professional]– whom they see as just expensive and are going to do the same thing that the artisan will be able to do.” Thus, little value is placed on professional contribution to the

construction process. Almost all the architects who participated in the study made some rather funny but very telling remarks that sought to suggest that clients see their profession as nothing more than a simple enterprise of “*drawing lines on paper*” and, therefore, always protest at why they want to charge high fees for an endeavour that takes little to no real effort. In the end, jobs are given to practitioners who may charge lower fees but may not have the required technical capacity to execute the project leading to shoddy work.

The high cultural emphasis on homeownership in the Ghanaian society also featured in the participants’ responses as one of the key factors underlying outsourcing of jobs to people without the right competencies. Ghanaians attach high social status and cultural prestige to homeownership. This is well-documented in the literature (See Tipple, 1987; Willis & Tipple, 1991; Geest, 1998; Obeng-Odoom & Amedzro, 2011; Korboe, 1992; UN-Habitat, 2011; Asante et al, 2018). Boamah (2010) for instance, observed that:

“Home ownership is very important in the Ghanaian society as it serves a dual purpose of providing shelter and also indicates one’s social status and prestige. For many Ghanaians, homeownership is the key to financial security; it is necessary for the attainment of civic pride and family ties; and it also consolidates the extended family system which is an integral part of the Ghanaian tradition and culture” (p. 5).

In ‘*Yebisa Wo Fie*²⁷: Growing old and building a house in the Akan culture of Ghana’, Geest made the following observation on the premium Ghanaians place on homeownership

A house is someone’s identity, it is a sign of security and happiness. A house is the concretization of social relations and the sentiments accompanying them. A house, not least of all, is a status symbol. Building a house is building a powerful symbol. A house is something to which people [Ghanaians] attach some of the most cherished virtues of their culture: respect, love, memory, ‘home’ and beauty...building a house is seen as one of the most important achievements in a person’s life. It provides elderly people with respect and security (Geest, 1998: 333).

²⁷ This is a popular Ghanaian adage that says that ‘when a man dies, people ask of his house(s) not his money’, implying every African breadwinner is expected to leave behind a legacy of a house, without which one is considered a failure in society (Asante et al, 2018: 1223).

In Ghana (but broadly Africa), a person who can build his/her own house is considered to have achieved a "cultural coming of age" (Berger, 2002; Asante et al, 2018). To draw an analogy, the African equivalent of the American dream is said to be homeownership. Culturally, renting is regarded as "*failed ownership*" (UN-Habitat, 2011: 1). The participants suggested that the cultural drive to attain homes in Ghana is such utterly consuming that it sometimes leads to a diminished emphasis on quality. The perception is that it is better having a poorly constructed home or more of that than not having one at all. This tends to encourage suboptimal construction practices such as outsourcing jobs to cheap but unqualified people with implications for creating shoddy structures. The remarks of Architect 7 is representative of the views expressed by the participants on the topic:

In the Ghanaian context, ones' success is measured by the number of buildings one has – irrespective of the quality. By employing cheap labor and artisans, the owner knows he will make more savings not thinking of the quality. This will enable him build more houses. Therefore, the mason becomes the engineer, the architect and the contractor with no or less supervision.

Certainly, ignorance, cultural drive to attain homes at all cost, sticking to old ways of construction and placing little value on the role of professionals in the construction process could lead to insufficient focus on safety imperatives. However, as the respondent from the Town and Country Planning Department of the Accra Metropolitan Assembly noted, it all boils down to the socio-economic situation of the homebuilder. For whatever might be the challenge, he argued, if "*you have the resources and doing your own building, I do not think you will endanger your life, for instance, by going to outsource your job to people who are not up to the task*". The other participants made some corroborating remarks in separate interviews. One of the officials from the Physical Planning Unit of the Kumasi Metropolitan Assembly, for instance, noted "*Ideally you will have to take an architect. But how many people can afford architects? So, they use these mason guys and their know-how is limited*".

The merit in the respondents' claim that poverty is fundamental to the problem is substantial in that building a house is quite an expensive endeavour. And in a country where about 80 per cent of the population lives on less than US\$ a day (Gary in Obeng-Odoom, 2013), very few people could have the

financial wherewithal to build a house. For instance, it is estimated that, with the prevailing circumstances, junior high school teachers with twenty years of experience in Ghana would need to save all their gross salary for six years before they could build a three-bedroom house with basic finishes in the city (Obeng-Odoom, 2013). Given these circumstances, for many Ghanaians, rental housing will have been the viable alternative to homeownership.

But, not only is renting culturally considered demeaning (UN-Habitat, 2011), it also comes with many hardships such as landlords' demand for so many years' rent in advance (between two and five years – Owusu-Ansah et al, 2017) and other litany of uncomfortable experiences (See Arku, et al, 2012; Asante et al, 2017), thereby fuelling the need for many a Ghanaian to build their own house. And in the absence of any meaningful housing finance schemes (Arku, 2009) (this point is elaborated upon later), homebuilders, majority of whom are low-income (UN-Habitat, 2011; Arku, 2009), are always going to aim at cutting down the cost of construction as much as possible by outsourcing jobs to practitioners who may charge lower fees but may not have the required technical capacity to execute the project with attendant implications for shoddy work.

While all the factors mentioned i.e. (individual builders' ignorance; static local culture of construction and general poverty) may influence developers to outsource jobs to cheaper practitioners without the required technical skills to execute them, it appears that the ever-rising cost of building inputs such as land and building materials fuelled mainly by external and inherited factors provide the most systematic explanation for why the problem is widespread. First, as discussed earlier, the implementation of IMF/World Bank-imposed structural adjustment liberalization reforms has led to the emergence of large-scale construction companies financed by foreign banks in Ghana's construction sector. For instance, between 1995 and 2005, the Ghana Investment Promotion Center (GIPC) registered 81 real estate companies. 34 were of European origin, 14 from North America, 13 from Asia, 11 from Africa, and 9 from the Middle East. The majority of them were from Italy, the UK, Switzerland

and the USA. The building and construction sector is now the third largest target for foreign investment in Ghana (See Arku, 2009). The activities of these large foreign banks-funded private real estate developers and their clientele (mainly Ghanaians abroad, staff of foreign embassies and trans-national corporations) are driving up the values of one of the critical building inputs: land (Konadu-Agyemang, 2001; Arku, 2009; Grant, 2007). Thus, as an increasing number of private property developers got involved in Ghana's residential market, subsequent to the liberalization of the sector, land prices have skyrocketed, speculation on the property market have become a common practice. For instance, in the 1980s and 1990s, the price for building plots increased by more than 1000 percent (Konadu-Agyemang, 2001; Arku, 2009).

The effects of the liberalization policies are being felt in not only land prices but also in that of building materials as well. For instance, according to Konadu-Agyemang, (2001b), between the 1970 and 1998, increments in the prices of cement and roofing sheets were averaging over 200,000% per annum due to inflation; the inheritance of colonial bureaucratic building permit procedures and laws which prohibit the use of local materials but also the massive devaluation of the Cedi that occurred under structural reforms and the de-regulation of the building material industry (Arku, 2009). Given the circumstance of growing cost of building inputs (partly fuelled by the inheritance of inappropriate colonial building codes; high rates of inflation and exchange rate volatility and the activities of foreign banks-financed large private real estate companies and their clientele), homebuilders, majority of whom are low-income (UN-Habitat, 2011; Arku, 2009), are always going to aim at cutting down the cost of construction as much as possible. But without much control over the cost of key inputs like land and materials (as the analysis show, their prices are even determined mainly by factors that emanate from beyond the borders of the country), the focus is always going to be on the cost of personnel. This, together with the high fees charged by so-called professionals or the perception of their being expensive, is what makes them turn to artisans whose charges tend to be lower. The empirical evidence bears out

this analysis in the submission of Researcher 1 (whose research explores the building practices, decisions and behaviours of Ghanaians) as follows:

It is mainly due to the quest of building owners to cut down the cost of construction. The belief is that engaging professionals throughout the building process is very expensive²⁸. With the rising cost of building materials [and land], building owners already spend a lot, which they can do little about. Where they think they have much control is how much they spend on construction workers. So, they make up for the cost of materials in the cost of engaging workers.

Two very interesting deductions could be drawn from this finding. The first is that the issue of outsourcing jobs to low-skilled artisans and craftsmen and its implications for the creation of unsafe structures must be seen as not just a simple feature of individual homebuilders' ignorance of construction safety imperatives or poverty; incompetence of artisans; static local culture of construction or even failure of development control. But it is also about how many Ghanaians (especially those of the low income strata) attempt to pursue their housing needs against the backdrop of rising cost of housing construction in the country partly fuelled by inappropriate colonial planning laws and regulations²⁹; market deregulations; the emergence of large-scale construction companies financed by the international capital market and their clientele, which are driving up the prices of critical housing inputs such as land and materials. The second deduction that could be drawn from the finding is that while developments like the emergence of foreign banks-funded real estate private companies and the flooding of the Ghanaian construction market avail the rich, elite and the professional classes with precious urban lands, high quality industrially processed materials and well-resourced construction companies and professionals to build safer and resilient houses, they produce the unintended effect of driving up the cost of housing construction and impeding opportunities for local artisans to benefit from

²⁸ Some qualifications of the role certified building practitioners play in building construction in the country are warranted. It is suggested that nowadays the trend is that builders 'engage consultants to provide them with design and sometimes cost estimates and later utilize labour-only contractors or builders to undertake the physical construction of the house in an incremental manner (See Afram et al. 2015, for instance).

²⁹ To further illustrate how the inheritance of colonial building and planning regulations inflate the cost of construction, studies suggest that parts of the country where such regulations are less rigidly enforced, the cost of housing is lower, even when account is taken of the differences in the value of land (See Tipple *et al.*, 1997 in Obeng-Odoom, 2013).

the transfer of knowledge on modern construction, practices and materials, and, therefore, undermine the capacity of the poor and artisans to build the best quality and safest buildings possible.

In short, the very factors and developments that, on one hand, create conditions for the rich, elite, professional classes to build safer structures are what create the conditions that undermine the capacity of the poor, the artisans, on the other hand, to build the best quality and safest buildings possible. Finally, by analysing the problem of outsourcing jobs to low skilled practitioners against the backdrop of both internal national and individual factors (such as poverty) and external (global) factors (such as the emergence of foreign banks-funded private real estate companies and their clientele), the study does not just show that the influences of vulnerabilities for building collapse in Ghana is partly subordinated to and/or enmeshed in broader processes that are expressions of international, national and local socio-political economic dynamics, factors and developments. But, methodologically, it also heeds to Charles Gore's call for analytical departure from methodological nationalism or spatial separatism (Gore, 1996; 2010).

Landguardism or activities of land guards

Another finding that emerged as underlying outsourcing jobs to unqualified people is the activities of land guards. Early on, we saw how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations in crucial institutions such as land and land sector institutions have shaped a contentious land tenure system that undermine compliance with building permit regulations. However, that is not the only role land conflicts play in generating building safety problems in Ghana. It contributes to the prevalence of other inappropriate construction practices as well. Challenges with multiple sale of lands; long legal processes for the resolution of land conflicts by the courts; lack of faith in the police and court systems as a result of perceived corruption and bias; and weak law enforcement (Ayee et al., 2008; Darkwa & Attuquayefio, 2012) have generated a widespread practice in Ghana – especially Accra, the capital and its environs –

where land buyers or developers hire armed gangs (known locally as '*land guards*' – mainly young people) who engage in the use of illegitimate force to threaten and ward off competing rivals.

The activities of land guards or what Darkwa & Attuquayefio, 2012 call '*landguardism*' usually lead to violence and even deaths. The Ghanaian media is awash with such stories. For instance, in November 1998, land guards killed two police officers (popularly known as Kweku Ninja and Taller) when the officers allegedly attempted to erect pillars (which serve as boundaries and also indicate ownership) on some plots of land they had acquired at Ablekuma, a suburb of Accra (Darkwa & Attuquayefio, 2012). Further, in December 2005, there were reports that land guards at Achiaman near Amasaman had killed Godfrey Cobbinah, a senior administrator at the Ghana Internal Revenue Service (IRS). As President of the Welfare Committee of the Internal Revenue Service, Mr Cobbinah was inspecting some lands acquired by some of the members of the Service when he was killed. On 24th September 2010, it was reported that residents of Oyibi, a developing suburb in Accra, had been subjected to brutal attacks by land guards and threatened with eviction (Darkwa & Attuquayefio, 2012).

There were, at least, three different media reports on the activities of land guards in the first quarter of 2019. On January 10, it was reported that some land guards violently descended on some developers working at a construction site belonging to the Greater Mission International Children's Home – an orphanage at Dodowa in the Shai-Osudoku District of the Greater Accra Region. The construction workers were reportedly subjected to severe beatings by about 20 land guards. The heavily armed land guards destroyed some construction materials such as cement and building blocks belonging to the orphanage and pulled down some newly built structures, chased the workers out and warned them to never set foot on the land again. Some of the construction workers were said to have sustained various degrees of injury³⁰.

³⁰ Dodowa Orphanage Attacked By Land Guards: <https://www.modernghana.com/news/908581/dodowa-orphanage-attacked-by-land-guards.html?fbclid=IwAR3h8YIEYEd2iuZoCuPKQw0VIKqiZBXbk88N-bWpvejgapAYbpYYp-eVBm0> (Accessed: 24. 02. 19).

Barely a month after the January incident, there was another report that some homes, structures and walls have been destroyed by land guards at Ashongman Ablorh in the Greater Accra.³¹ Not too long ago, it was reported in the media that some land guards had attacked some building inspectors from the Ningo-Prampram District Assembly³². The officers had gone to a construction site to inspect building permits. The armed guards who doubled as the constructors and supervisors of the project were infuriated by the presence of the officials on their site, insisting that they do not need permit to work. They began slashing the officers with cutlasses when they attempted to issue them summons. These are just a sample of the stories available in public sources and, as noted by Darkwa & Attuquayefio (2012), many more incidents remain unreported or inaccurately reported. Land guards, as the examples illustrate, threaten, maim, and sometimes kill people in addition to demolishing property and preventing hired labourers and building inspectors from doing their job. Some of the study informants shared their ordeals with land guards. Engineer 2 for instance submitted:

Because of this land guard issue, a contract we had signed, we abrogated it. We had signed contract with the client to start construction. We had mobilized materials to the site and all of a sudden, we saw some guys on a motorbike –heavily built men. They asked us who gave us permission to come on the land. As we were explaining, one of them slapped my colleague. He slapped him heavily. Because of that we just moved our car from the site, we went to the office, we called the client and we just abrogated the contract.

Arku et al (2016) found that experiences like this have made qualified engineers, architects and other trained building practitioners reluctant to take up construction and supervision of buildings in some parts of the cities – especially Accra. In addition to Engineer 2, other participants shared some experiences which corroborate the finding of Arku et al, (2016). Contractor 1, for instance, submitted:

I have a project at Adenta [one of the suburbs of Accra] that I have put on hold. We have secured all the required documents for the project to begin. Apparently, someone also was making claim to the

³¹ Land guards terrorize Ashongman Ablorh Adjei residents: <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Land-guards-terrorize-Ashongman-Ablorh-Adjei-residents-723265> (Accessed: 24. 02. 19).

³² JoyNews (2019). Land guards attack: Staff of Ningo-Prampram DA left terrified following attacks. <https://www.facebook.com/watch/?v=1033549370164337> (Accessed: 19. 03.19).

land. As soon as we went to the site, he came there asking who gave us permission to do the construction on his land. I told the client to sort it out with him before I can continue to work on the project. He [the client] insisted that I should not be afraid and continue with the project. I told him point blank that I cannot.

Engineer 5 also submitted that the security implications of the activities of land guards have made him and his colleagues to be “*selective of projects. Because*”, he added, “*when these guys are coming, they come with all kinds of weapons – machetes – some of them even carry guns. And they are not hesitant to shoot to kill.* Architect 6 too added in a separate interview: “*When we visit the site and we sense any danger of these land guards and their harassments, we just back out from such contracts*”. Engineer 4 made a similar remark: “*For me, that is the first thing I consider before taking up a project especially in Accra. I will not go and get problem. Because these land guards if they do not injure you, they will kill you*”.

Thus, many qualified building practitioners are reluctant to take up jobs in some parts of the cities due to the activities of land guards. Developers, however, could not wait long enough to find qualified personnel willing to brave the risk and take up such projects since they face risks of protracted litigation or loss of funds, if they delayed in commencing the project. Arku et al (2016) found that these frustrations force land developers to outsource building construction to these same gangs, who have no training and, worse still, do it in haste. The reluctance of building owners, qualified practitioners and public inspectors to visit such sites to supervise the construction out of fear for their physical safety creates room for the gangs and their allies to put up weak buildings. Thus, land litigations and ‘landguardism’ create room for people without any technical competence or whatsoever in building construction and supervision to take charge of large-scale unregulated construction of buildings in the country (especially in the cities).

Even more, the Land Development (Protection of Purchasers) Act, 1960 (Act 2), which applies in Accra and its environs fuels the land litigations and conflicts with other adverse implications for building safety. The law automatically confers ownership of land on anybody who builds to lintel level

on any land in Accra and its environs, even if the land did not belong to him or her. Arku et al (2016) found that the law has been widely subjected to abuse by encroachers who intentionally claim land simply by building surreptitiously and hurriedly to lintel level. The legitimate landowners may litigate but have little recourse to evict the encroachers who are shielded by the Act. This has repercussions for building safety in many ways. For instance, as they attempt to build hurriedly to lintel level to claim ownership of lands, not only may the encroachers not allow enough time for completed stages to cure before they build on, but also, in their haste, they could commit even more mistakes and cause disasters. Second, legitimate landowners are equally under pressure to proceed to build not just without permits but also to do so with greater haste. This could encourage corners cutting, lead to mistakes and eventually the creation of defective buildings waiting for their day.

Outsourcing jobs to low-skilled and unqualified people: Summary of key highlights

This section analysed the participants' responses on one of the problems frequently emphasized as fundamental to the creation of unsafe buildings in the countries in the Global South: outsourcing jobs to low-skilled and unqualified people. The extant commentaries (the internal focal literature) on the practice tends to attribute it to factors such as ignorance, negligence, carelessness, indiscipline, greed on the part of builders, contractors and other construction actors in which weak regulation plays key roles (Adewole et al., 2014; Olajumoke et al, 2009; Asante & Sasu, 2018). This way of looking at the problem is methodological individualism or nationalism (Gore, 1996) in the sense that it focuses on individual and internal national factors as the cause of the problem and, thereby, delinks it from any outside influence. This is in spite of the overwhelming scholarly evidence (see Wells, 1998; 2001; 2007; Wells & Wall, 2003, for instance) suggesting that the present political economy settlements of the construction sectors of the countries are the creations or products of not only their internal national processes and factors, but also of decades of colonial and postcolonial modernization and recent world

system-neoliberal-capitalist policies of successive governments and international bodies in those parts of the world.

The study has unpacked and reinterpreted the internal focal discourse within a political-economic framework that brings into sharp focus the role of external factors and inherited conditions in influencing and sustaining the prevalence of the problem. Evidence has been led in showing how such external factors as market deregulation, the emergence of large-scale construction companies financed by the international capital market and their clientele (mainly Ghanaians abroad, staff of foreign embassies and trans-national corporations) in the Ghanaian construction sector are driving up the prices of critical housing inputs such as land and materials in ways that push local developers, majority of whom are low-income, to make up for their high expenditure on the inputs in what they use to hire personnel. Also, it has been argued that the intersectionality of both colonial indirect rule system and land policies as well as internationally-imposed neoliberal structural reforms and their resulting transformations are critical to understanding how land conflicts have become a durable impediment to building safety in Ghana by forcing developers to outsource jobs to unqualified people with implications for shoddy constructions.

Incremental process of self-building and poor building maintenance culture

This section interprets the final item that emerged from the participants' responses as critical to building safety challenges in Ghana: the incremental process of self-building and poor building maintenance culture. Ghana has a history of national economic planning but housing has not been a large component. The pre-1957 British colonial state introduced some central government-financed housing schemes (Boamah, 2010; Arku, 2009). For instance, in 1945, the colonial government created the Department of Social Welfare and Housing (DSWH) to set housing policies and implement housing schemes in the then Gold Coast. By 1948, the DSWH had facilitated the completion of seven subsidized housing estates for war veterans and civil servants and colonial administrators in three urban centres –

Accra, Kumasi and Takoradi. The policy, as could be seen, focused on a small segment of the population and concentrated on a few cities and, therefore, did not target the housing needs of the larger population. In effect, majority of the population especially low-income families could not benefit from the colonial housing programs (Arku, 2009; Boamah, 2010).

After political independence in 1957, the post-colonial socialist state continued with the direct involvement of the government in housing provision. The state was of the firm ideological view that access to housing was a human right which the government had the duty to provide to the citizens and therefore committed significant efforts into delivering them during the 1950s and 1960s (Arku, 2009; Boamah, 2010; Tipple & Korboe, 1998; Konadu-Agyemang, 2001). For instance, in its 1959–64 Development Plan, the Kwame Nkrumah government proposed to construct about 6,700 housing units, 200 units for middle-income households, 1500 units for low-income households, and 5000 for labourers, respectively. Similarly, the Nkrumah government's Seven-Year Plan (1964–70) projected to construct some sixty thousand new houses across the country for lower-income people (Arku, 2009).

The overall impact of the various housing policies introduced by the post-colonial state on building production, just like the colonial ones, was, however, minimal. For instance, the state-owned enterprises (SOEs) and quasi-governmental bodies received more than 80 per cent of the government's budgetary allocation to the housing sector, but, they, nevertheless, produced just about 10 per cent of the nation's housing stock. While the state-funded buildings were rented out at considerably discounted rates to the workers employed by state owned institutions (SOEs), public and civil servants, the vast majority of the population resided in either privately rented or self-built homes. Little effort went into the state's repeated rhetorical support for self-help projects. Instead, successive governments' housing policies focused almost exclusively on public housing and slum clearance to solve the housing problem in the country (Arku, 2009).

Against the backdrop of worsening housing crisis in the country marked by overcrowding; unaffordable housing prices; poor physical housing conditions and poor sanitation services, the Ghanaian Government, under IMF/World Bank's pressure, liberalized the housing sector in the 1980s (Boamah, 2010; Arku, 2009; Tipple & Korboe, 1998; Konadu-Agyemang, 2001). This made the already insignificant state role in housing delivery even less visible as the World Bank's Structural Adjustment Programs compelled the government to only play facilitating role by stimulating the growth of the real estate sector (i.e. private sector); liberalizing the land markets and building material industry; encouraging the formal private sector to construct rental housing units and reform housing institutions (Pacione, 2005; Addo, 2014; Arku, 2009).

The reforms, which handed enormous tax holiday benefits to private companies, as would be expected, successfully attracted substantial number of real estate developers and unprecedented private capital into the sector. For instance, between 1995 and 2005, the Ghana Investment Promotion Center (GIPC) registered 81 real estate projects, with a total investment of \$105 billion in real estate development, civil engineering and residential construction (See Arku, 2009). However, the dollar-denominated houses produced by the private real estate developers are usually exorbitant ranging from US\$30,000 to US\$2,000,000 depending on the location of the land, size of the property, type of building finishes, number of bedrooms, type of house (detached, semi-detached or penthouse) and whether it is furnished or unfinished (Asante et al, 2018; Arku 2006). Therefore, as noted elsewhere, only high income people— the so called middle class, expatriates and Ghanaians abroad are able to afford such houses – the middle and lower income groups are effectively priced out of the private housing market (Buckley & Mathema, 2008; Addo, 2014; Arku, 2009).

Obeng-Odoom (2015) captures how the results of structural reforms played out in the Ghanaian housing sector this way:

The private companies adopted the rhetoric of “affordable housing,” as required, and they were given major tax holidays. However, their extension of a helping hand to the poor was so short that the rich became the beneficiaries of such “pro-poor” housing programs (pp. 573 – 574).

Thus, the result of what Researcher 2, described as “*capitalist [housing] developments that extol neoliberalism as a virtue*” has been what Okyere et al (2018) described as a paradox of a boom in supply for the wealthy, and scarcity for those at the lower ends of the income strata. Unable to afford the pricy private real estate buildings, most middle- and lower-income earners in Ghana either self-build their houses or rent (Owusu-Ansah et al, 2018; Asante et al, 2018; Arku et al, 2012). The way these people build their houses – whether for household use and/or renting – is at issue in this theme.

In contrast with the practice in the advanced world where self-building a house involves the owner engaging construction professionals to build on his or her behalf (Merritt & Rickett, 2001; Rickett, 2001), many a Ghanaian self-builds their house through what Ahadzie & Amoa-Mensah (2010: 63) refer to as “locked-up capital process” or “Do-It-Yourself (DIY) financing process” (Boamah 2014: 7). This involves “intermittent and piecemeal acquisition and utilization of housing inputs such as plots of land, sand, various building materials in the housing construction process in tandem with building owners resource flow” (Ahadzie & Amoa-Mensah in Asante et al., 2018: 1224). It is a gradual step-by-step process through which owner-builders append or improve building components as funding, time, or materials become available (Moullier, 2015; Wells & Wall, 2003). Tipple et al. (1998, p. 400) captured the way this protracted process of building construction plays out in the Ghanaian context as follows:

Land is purchased, permissions sought, and materials collected together by a prospective owner. Masons tend to lead the construction team, bringing with them their laborers and recommending or bringing friends who are carpenters, plumbers, electricians, etc. Personal contacts tend to dominate in the contractor choice, verbal contracts witnessed by neighbors govern the conduct of the construction process. Prices are often set more on how much the contractor thinks the client can pay rather than on prices per square meter.

The method is traditionally used for the construction of individual low cost houses. But quite substantial buildings, including multi storey buildings (mostly housing but also hotels, shops and other

non-residential buildings) are now being produced in this way (Wells & Wall, 2003). The problem, however, is that the building process can take many years – normally five (5) to fifteen (15) years or even more—depending on the finances of the prospective owner (UN-Habitat, 2011; Asante et al., 2018; Boamah, 2014). The reason it takes homeowners – particularly those domiciled in Ghana³³ – such a long time to complete their houses is that there are no meaningful formal housing finance schemes in the country, In any event those available, target the upper class (Arku, 2009). Therefore, most people often rely on less stable informal housing finance sources: personal loans, loans from friends, family members and, occasionally, an employer (Addo, 2014; Karley, 2008; Boamah, 2010; 2014; UN-Habitat, 2011; Ahadzie and Amoa-Mensah, 2010; Asante et al, 2018; Tipple et al., 1998). Others also rely on windfall gains such as retirement lump-sums (Gough and Yankson, 2000; Ofori, 2006; Tipple et al, 1999; Obeng-Odoom, 2010c).

The discourses on incremental process of building construction in Ghana usually focus on how it locks in capital, materials and energy which could have been used for more productive functions and also leads to large scale abandonment of projects (Ahadzie & Amoa-Mensah, 2010; Tipple et al, 1999; Bank of Ghana, 2007; Gough and Yankson, 2000 in UN-Habitat, 2011). However, the informants' accounts and the findings of other studies (Asante & Sasu, 2018, for instance) suggest that it could contribute to the creation of unsafe buildings as well. The point here is that because builders do not have enough stable income to start and complete buildings at a go, every part of the construction process is done in piecemeal. For instance, blocks are usually made and stored for many years before actual construction begins. The problem here, as noted by Engineer 6, is that *“the materials and every stage of the uncompleted structure is [sic] left to the mercy of the weather for so many years”*. And so, effectively, by the time the building will be completed (as noted earlier, it normally takes builders

³³ Those abroad are able to take advantage of high salaries there to save and build much quicker back home (See Obeng-Odoom, 2013)

between five to fifteen years or more to complete), *“the foundation and the materials used for the construction will have been weakened already”*, he added.

And since landlords or homeowners also use artisans (Keteku-Atiemo, 2006; Bondinuba, 2012; Hedidor & Bondinuba, 2017; Hedidor et al., 2016; Ghana Institute of Surveyors, 2012) who also tend to disregard standardized scientific construction practices and procedures (for the reasons already discussed), the structure will be ripe for integrity crisis long before it is even completed. Further to the above is what the study informants repeatedly emphasized as Ghanaians *“poor building maintenance culture”*– an *‘endemic problem’* widely emphasized in the literature (For a review see Tipple, 1987; Willis & Tipple, 1991; Geest, 1998; Korboe, 1992 in Obeng-Odoom & Amedzro, 2011) and in the media (Afrane, 2017; Dauda, 2011; Obeng-Mensah, 2008; Solomon, 2018). *“So, you see”*, Engineer 2 summarized, the problem is that

People cut corners when putting up the buildings –they do not use qualified practitioners; they won’t put in the required materials and sometimes even use inferior materials – because there is no one there to check them. And to cap the problem, these poorly constructed buildings are also rarely maintained when they are in service. It’s God who is protecting us in this country because most of the buildings you see are potential death traps.

Chapter six: Conclusion

The chapter analysed the participants’ responses on the challenges to building safety in Ghana. Based on the evidence from the empirical and secondary data, interpreted within the political economists’ methodology of accident framework (with due regard to Charles Gore’s call for the rejection of methodological nationalism/separatism), the following conclusion emerges: weak regulation; undisciplined and insecure land tenure system and the strain on the informal settlement of building supply systems are core to understanding the challenge with building safety in Ghana. First, regarding *weak regulation*, as underscored severally in the study, buildings are safety-critical infrastructure – their failures come or could come with significant human, material, environmental and other losses. As a result, virtually every society has some cultural protections – sets of laws and

procedures (usually expressed as statutory and non-statutory demands –building regulations and codes) for the regulation of their construction industry. Thus, there are set standards for the activities of builders, architects, specialized design consultants, contractors and other built environment stakeholders in the design construction, management, repair, maintenance, occupation and even the demolishing of structures (Watt, 2007; Arku et al, 2016; Health & Safety Executive, 2015).

Such codes or regulations constitute the acceptable levels of risk or precautionary prescriptions for hazard avoidance in the pursuit and the provision of building needs and services and usually embody and/or specify technical demands such as the approved building materials, personnel and other technical requirements and practices intended to ensure public safety in the design, construction, utilization, adaptation and even demolishing of buildings. The study has found that Ghana has similar regulations (Arku et al, 2016; Ahmed & Dinye, 2011; Boamah et al, 2012; Botchway et al., 2014; Ametepey et al, 2015; Asante & Sasu, 2018) which, not too long ago, have been unified into the Ghana Building Code. Developers are required to comply with the regulations by first seeking prior written permission from the relevant metropolitan, municipal or district assembly (MMDA) before they commence projects. If permission is granted, developers are further enjoined by the regulations to notify the authorities of the dates on which they intend to begin construction and of the dates on which every stage of the construction will be ready for inspection (Asante & Sasu, 2018). These twin measures are to afford the authorities the opportunity to comment on the proposed structure and ensure that the construction conforms to approved standards and processes to guarantee the safety of the building, its occupants and the public (Oteng-Ababio, 2016).

However, complex bureaucratic, expensive and lengthy procedures involved in both processes as well as officialdom corruption dissuade most developers from complying with the regulations. Yeboah & Obeng-Odoom (2010); Ahmed & Dinye (2011); Oosterbaan et al (2012); Boamah et al (2012); Botchway et al (2014); Ametepey et al (2015); Arku et al (2016); Asante & Sasu (2018) made similar

findings. Non-compliance could have been restored through the monitoring of construction works at sites and holding offending developers accountable through sanctions. This, however, is also impeded by the limited capacity – in terms of human and equipment and the scale of developments under the jurisdictions of the various local authorities. Furthermore, and similar to the critical role political clientelism plays in land and access to housing in other parts of Africa (See, Rakodi, 1997; Fox, 2013; 2014, for instance), efforts at enforcing building regulations in Ghana are frequently undermined by “*big men*” or individuals with strong social and political connections and influence who easily get away with non-compliance on their personal properties, as well as on the properties of others in their locality or elsewhere who seek their intervention (Yeboah & Obeng-Odoom, 2010; Arku et al, 2016; Asante & Sasu, 2018). And, finally, symptomatic of the situation in other developing countries (Lewis, 2005; Moullier, 2015; Berlinski, 2011; Kenny, 2007; 2012; Escaleras et al, 2007), developers in Ghana have little to no trouble in finding unscrupulous regulatory and monitoring public officials (the proverbial ‘bad nuts’) to accept bribes and other favours and turn blind eyes to designs and building practices that deviate from code specifications. In the end, unsafe buildings are created waiting for their day.

Further to weak regulation, the study also found that the *undisciplined and insecure customary land tenure system* in the country also plays key roles in contributing and reinforcing the prevalence of non-compliance with building regulations and other inappropriate construction practices and for that matter the creation of structurally incompetent buildings in the country. It has been argued that the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have turned land into an important asset, thereby stimulating competition and contestations for the control and ownership of lands. The intractable conflicts associated with Ghana’s land tenure system (Centre for Democratic Development, 2002; Antwi, 2002; Boamah, 2013; Darkwa & Attuquayefio, 2012) means that purchasers of land in especially the cities

and their environs are perpetually exposed to or face huge risks of protracted litigation or loss of funds as the sellers may be incapable of transferring proper legal title to the purchaser.

To avoid such problems, the common strategy widely adopted by developers is to commence projects immediately after paying for lands. They, therefore, circumvent due process fearing that their permit application may be refused or delayed unnecessarily, which might make them lose their lands for failure or long delays in project commencement. In addition to compromising compliance with building permit regulations, the study has also found that the land ownership problems in Ghana contribute to the prevalence of other inappropriate construction practices such as outsourcing jobs to unqualified people and uncontrolled hasty constructions in the country. The challenges with multiple sale of lands; long legal processes for the resolution of land conflicts by the courts; lack of faith in the police and the larger justice systems as a result of perceived corruption and bias; and weak law enforcement (Darkwa & Attuquayefio, 2012) have generated a widespread practice where land buyers or developers hire armed gangs (known locally as ‘land guards’) who engage in the use of illegitimate force to threaten and ward off competing rivals (Ayee et al., 2008; Darkwa & Attuquayefio, 2012).

The activities of land guards often lead to violence and even deaths. These security concerns have made qualified construction practitioners unwilling to take up jobs in some parts of the cities – especially in Accra, which, in turn, has led to a common practice, whereby developers outsource building construction to these same gangs. And not just building practitioners, the owners of the projects themselves as well as regulatory personnel are reluctant to visit such sites to supervise the construction out of fear for their physical safety, which, therefore, creates room for the gangs and their allies to put up weak buildings. Thus, land litigations and ‘landguardism’ in Ghana create room for people without any technical competence or whatsoever in building construction and supervision to take charge of large-scale unregulated construction of buildings in the country.

Even more, the Land Development (Protection of Purchasers) Act, 1960 (Act 2), which applies in Accra and its environs fuels land litigations and conflicts with adverse implications for building safety. The law automatically confers ownership of land on anybody who builds to lintel level on any land in Accra and its environs, even if the land did not belong to them. Arku et al (2016) found that the law has been widely subjected to abuse by encroachers who intentionally claim land simply by building surreptitiously and hurriedly to lintel level. The legitimate landowners may litigate but have little recourse to evict the encroachers who are shielded by the Act. This has repercussions for building safety in many ways. For instance, as they attempt to build hurriedly to lintel level to claim ownership of the land, not only may the encroachers not allow enough time for completed stages to cure before they build on, but also, in their haste, they could commit mistakes and cause disasters. Second, legitimate landowners are equally under pressure to proceed to build not just without permits but also to do so with greater haste. This could encourage corners cutting; lead to mistakes and eventually the creation of defective buildings waiting for their day.

Finally, *the strain on the informal settlement of building supply systems in the country*. The study has found that the public formal and private formal sectors play limited role in the supply of housing needs and services in Ghana. The market is driven by the informal sector – self-builders and small-scale enterprises. The informal sector delivers in excess of 90% of the annual housing output in the country (UN-Habitat, 2011; Boamah, 2010). The findings suggest, however, that they do so under very difficult circumstances with attendant implications for structural integrity. The ever-escalating cost of building inputs such as land and materials (partly fuelled by factors beyond the borders of the country such as the emergence of foreign banks-funded private real estate companies and their clientele in the Ghanaian housing market) means that developers, especially the mostly low income informal self-builders, are always going to aim at cutting down the cost of construction as much as possible. This manifests in practices such as utilizing substandard materials; cutting down safety specifications in designs; poor

building maintenance and outsourcing jobs to cheaper practitioners who may not have the skills to deliver the project. The lack of access to stable formal housing scheme compounds matters by prolonging the building process such that the structure will already be ripe for integrity crisis long before they are even completed due to constant exposure of materials and every stage of the uncompleted structure to wetting and drying weather conditions.

The strain on the informal housing sector implicates on not just the self-builders but also the small scale enterprises that are engaged in the construction of the buildings. The small scale enterprises, the second players of the Ghanaian informal housing sector, may consist of a professionally trained practitioner but usually a craftswoman/man (artisan) and her/his helper or a small team of them and their helpers (Arku, 2009). The findings suggest that many a developer resorts to their services as a cost cutting measure to make up for the high cost they incur in inputs such as materials and lands. Further, not only do they usually not have the required capital to buy sophisticated modern equipment to aid their work, but also opportunities for them to upgrade their skills are limited by low government support for such sectors and the labour hiring culture of the international capitalist system of construction that excludes them from entering the learning chain of knowledge transfer to be abreast with the new complex building materials and other technologies that have flooded the Ghanaian construction market.

In short, the artisans are called upon to provide building construction and supervision services on an unimaginable scale yet with limited budget, skills, machinery and exposure to modern technology. These strains on them (but the entire informal housing sector though) are certainly going to undermine the quality of the many buildings they produce for housing and other purposes in the country. What this means overall is that any discussion of how the informal housing sector has become a durable impediment to building safety in Ghana that does not take into account the strains on the sector unravelled in this study is bound to project ill-informed conclusions. Put simply, the *'informal sector-blaming approach'* to building safety problems in Ghana advanced by built environment professional

bodies such as the Ghana Institute of Surveyors (see, GHIS, 2012, for instance) needs to be problematized.

The analysis provided herein raises issues with some key groundings of the extant literature on building collapse in developing countries. As discussed in chapter two, inappropriate construction practices such as outsourcing jobs to low skilled people, utilization of standard non-compliant materials, poor building maintenance, noncompliance and non-enforcement of regulations are normally considered as '*causes*' of building collapse in developing countries. The findings from Ghana suggest that the factors are better understood as *effects* or symptoms of broader structural problems. For instance, the study has led evidence in showing how the rising cost of building inputs such as land and materials coupled with the dominance of the Ghanaian building supply market by low-income informal developers creates path dependency or ratchet effects by limiting their capacity to invest in safer building materials, construction, highly skilled labourers and regular maintenance. In this sense, the problems of outsourcing jobs to low skilled practitioners, utilization of substandard materials and poor building maintenance usually passed off in the building collapse literature as '*causes*' are analysed in this study as the *effects* or outcomes of the interactions between the rising cost of building construction and the dominance of the Ghanaian building supply market by low income developers. In short, the findings from Ghana suggest that, contrary to popular opinion, building safety challenges such as outsourcing jobs to low skilled practitioners, utilization of substandard materials and poor building maintenance must be seen as symptoms of larger structural problems – not as causes.

Finally, the findings from Ghana suggest that the phenomenon of building collapse in developing countries could have an historical-institutional context. Drawing on the tenets of the political economists' methodology of accident research regarding the need to situate the influences of vulnerability for such risks within the relevant series of historical factors, processes, developments, the study has demonstrated that the causes of the deleterious construction practices and behaviours that lead

to the creation of unsafe buildings just as much arise from local as well as externally imposed and inherited conditions, and factors. In this sense, the analysis is not only comprehensive, it also avoids the problems associated with methodological nationalism/separatism (see Gore, 1996). The study has led evidence in showing how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have shaped an informal settlement of building supply system and an undisciplined and controversial land tenure system, which undermine compliance and enforcement of safe building and construction practices in the Ghanaian society, with adverse repercussions for building safety. The methodological implications of the study's analysis of building safety challenges in Ghana at the cross cutting edges of both internal (national) and external (global) factors for the extant *internal focal approach* to building collapse in developing countries, which tends to conceptualize such risks as unintended unfortunate isolated events, accidents or incidents, which result from problems 'internal' to developing countries would be taken up in the discussion chapter.

Overall, the findings suggest that weak enforcement of building regulations; undisciplined and insecure land tenure system and the strain on the informal settlement of building supply systems in Ghana provide the *structural context* for how the creation of unsafe buildings arise and are thus central to establishing the grounds for the deleterious consequences of building collapses in the country. As shown in the next chapter, these factors are fundamental to understanding the inappropriate construction and building use practices that generate vulnerability for building collapses in the cities. The Ghanaian urban population is experiencing accelerated growth, which has amplified the already acute building need pressures in the cities, and is, in turn, exacerbating or acting on the above *structural influences* of inappropriate construction and building use practices in ways that encourage the creation of even more unsafe buildings in the cities—the reason most collapse incidents happen in those parts of the country.

CHAPTER SEVEN

DATA PRESENTATION & ANALYSIS PART 2: THE COLLAPSE OF BUILDINGS IN CITIES IN GHANA– WHAT FACTORS ARE AT WORK?

This chapter addresses the second part of the empirical data. It interprets the participants’ responses on the factors underlying the creation of weak buildings in cities in Ghana with its attendant implications for building collapses in those parts of the country. In Boateng (2016; 2018; 2019a) and Boateng & Wright (2019) and chapter three, it was argued that high growth and agglomeration of more and more people in urban habitats usually encourage accelerated demand for buildings – for residential, commercial and other purposes. It was found also that the rise in demand for buildings in urban settings subsequent to rapid demographic and economic expansions in cities influence, shape or dictate construction processes and building use practices in such places in ways that tend to undermine safety, sustainability, wellbeing and longevity imperatives.

Consequently, building collapse in the urban context was theorized as a pathological feature of urbanization: the unintended outcome of the interplay of the substandard construction and building use practices in urban settings propelled by accelerated demand for buildings subsequent to rapid demographic and economic expansions in such places. According to this conceptualization, the influences of the unsafe construction and building use practices that influence the creation of unsafe buildings and, for that matter, the occurrence of the collapse incidents are generated by the pressures of accelerated demand for buildings as a result of urban expansions. The empirical focus of the study was to ascertain the extent to which Ghana’s situation bears out this claim – the focus of this chapter.

In summary, the chapter will argue that, Ghana’s situation bears out some of the critical issues discussed in Boateng (2016; 2018; 2019a) and Boateng & Wright (2019) and chapter three. For instance, in chapter three, it was argued that the high growth and concentration of people in cities generate the need for more buildings for housing, commercial and other activities. This has been true in Ghana. Also, in chapter three, deleterious construction processes and building use practices such as the construction

of appendages and extra floors atop old structures, conversion of buildings to uses unintended in original designs were conceptualized as critical ‘*causes*’ of building collapse in cities as they undermine the structural integrity of buildings. Similar developments were uncovered in Ghana. The empirical findings suggest, however, that they are better understood not as ‘*causes*’. But as the ‘*effects*’ or outcomes of the interaction of broader structural problems such as the rising cost of lands, land conflicts and institutional and planning failure to designate places for burgeoning commercial activities in the cities propelled by foreign direct investment and increased need for service and trade.

Further, contrary to as discussed in Boateng (2016; 2018; 2019a) and chapter three, the conditions that underlie the insufficient focus on putting up the best quality buildings possible in Ghana’s cities are *not* generated by urbanization induced-building need pressures. As argued in chapter six, in Ghana, weak enforcement of building regulations; undisciplined and insecure land tenure system and the strain on the informal settlement of building supply systems provide the *structural context* for how the creation of unsafe buildings arise and are thus central to establishing the grounds for the deleterious consequences of building collapses in the country. The pressures of accelerated demand for buildings in the cities subsequent to urban expansions are worsening these structural influences of adverse construction practices, thereby encouraging the creation of more unsafe buildings – the reason most collapse incidents occur in those parts of the country. What this means overall is that the conditions that prefigure the creation of unsafe buildings and for that matter the occurrence of building collapses in cities in Ghana, contrary to as discussed in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three, are *not* generated or caused by urbanization induced-building need pressures. They are rather *embedded* in the structural influences of adverse construction practices in the Ghanaian society discussed in chapter six—the urbanization-induced building need pressures in the cities are only exacerbating the scale of the problem leading to the creation of even more unsafe buildings.

In summary, the empirical findings suggest that, while closely linked to the demographic and economic expansion processes of urbanization, the phenomenon of building collapse in cities in Ghana has a structural context: they emerge from the interplay of the historically and socially created socio-political-economic factors, processes and systems that shape, dictate and implicate the pursuit and the provision of building needs and services in the country in ways that produce progressive outcomes for a minority few and largely deleterious outcomes for the majority. The findings are analysed under three overlapping themes: strain on the informal sector to respond to rising building needs in the cities expeditiously; land challenges-induced suboptimal construction and building use practices in the cities and magnification of building regulation challenges in the cities.

Strain on the informal sector to respond to rising building needs in the cities expeditiously

As discussed in the first part of the analysis (chapter six), in Ghana, private real estate developers and the state (i.e. the private formal and public formal sectors) play limited role in the supply of building needs. The market is driven by the informal sector – self-builders and small-scale enterprises, which may be an individual (Arku 2009; Hedidor & Bondinuba, 2017; Keteku-Atiemo, 2006). The upside is that the sector actively delivers in excess of 90% of the annual housing output in the country and mainly for lower income and poor people not targeted by the private real estate sector and government housing schemes but are in dire need of housing (UN-Habitat, 2011; Boamah, 2010). The downside, as also noted in the first part of the analysis, however, is that the majority of the population who constitute the informal providers of building needs in the country are not well off (Asante et al, 2018; Arku, 2009) and, therefore, do not have the required resources to invest in safer building materials, construction, skilled labourers and periodic maintenance of buildings. Their socio-economic situations, therefore, force them to undertake corners cutting practices such as outsourcing jobs to cheap low-skilled artisans; utilization of cheap inferior materials and cutting down safety requirements/specifications in designs. Engineer 1 captured the problem this way:

You see, because the state does little as regards to housing delivery, individuals are under pressure to put up their own building – for themselves and/or for commercial purposes. But most of the people are not in the rich class. They are in the mid class and most of them are not even all that wealthy. But still they want to put up their own buildings. And because they are not rich enough to be able to build a house but are still determined to get one, the little amount they have, they want to push it to an appreciable level. And if you are putting in the right materials, the amount the person is holding cannot get to that level, but the person is still aiming at that. That explains why they want to cut cost and bring in cheap craftsmen. They do not see the problem until the collapse comes.

The problem has become even more acute in the cities subsequent to increased demand for buildings in the context of rapid urban expansions. Consistent with trends in other developing countries (United Nations, 2014; 2016; Satterthwaite, 2017), Ghana too is undergoing remarkable urban transformation. Censuses data at various times indicate a steadily growth and concentration of people in the urban settings of the country. For instance, the 1960 census report indicated that Ghana had a population of 6.7 million people; 1.5 million lived in urban localities, resulting in a 23% level of urbanization. By 2005, the percentage of people living in urban areas climbed to 47.8%. According to the latest 2010 census report, the proportion of Ghana's population living in urban areas, as at then, stood at 50.9 percent (Ghana Statistical Service, 2012). One of the key findings that emerged from the review of the literature on housing and construction in both historic (see for instance Beard, 2015; Closs, 2013; Hartwell, 2001; Kidd, 2002; Nevell, 2011; Symonds, 2005; Kemp, 1989; Hurst, 2001; 2006; Nicols, n.d) and contemporary urban developments (Mankiw, & Weil, 1989; Muellbauer & Murphy, 1997; Glaeser et al., 2005; Bhatta, 2010) in chapter three was that rapid growth in urban population usually propels demand for buildings and housing challenges. This has been true of the Ghanaian situation.

The explosive growth in Ghana's urban population has come with enormous housing challenges in the cities. The 2000 Population and Housing Census indicates that the total housing stock in the country was about 2.2 million with the backlog exceeding 500,000 units and supply figures varying between 25,000 and 40,000 units per annum (Karley, 2008). The total stock of houses in the country, as per the latest census data is 3,392,745 – 57.7% are in the rural areas, and the remaining 42.3% in the urban areas (Ghana Statistical Service, 2012). Urban housing deficit in Ghana, by some estimations, stood at

1.7 million as at 2015. It is projected to hit 5.7 million by 2020 (UN-Habitat, 2011). Since the public formal and private formal sectors play limited roles in housing delivery in the country, there has been enormous pressure on the informal sector to deliver even more buildings and expeditiously to meet the rising demand in the cities.

The general experience, however, is that demand pressures do not just attract many producers or suppliers to engage in competitive supply for the service or commodity in dire need, but also, and even more importantly, they create or generate further pressures for hastened or speedy production (Maskell, 1987; Harrison, 1994; Swanson, 1998; Sakakibara et al, 1997). This has been the case as regards to building supply in cities in Ghana. One of the participants from the Building Inspectorate Division of the Accra Metropolitan Assembly for instance noted:

You know development is taking a different dimension [in the cities]. In putting up the building, there is [sic] some number of days you must let it cure before [you] continue. But a lot of people are in cities and they want buildings and so little time is allowed for buildings to cure before continuing.

Another participant from the Ghana Institute of Architects shared a similar insight: *“In the urban centres, there is the rapid need for such infrastructure. So, a building that is to take 6 months, they will finish it in 3 months”*. Contractor 1 also remarked: *“The buildings that collapse, they do not cure it to the required strength before they cast additional floors. They just build in haste. So, the required strength is not achieved before they begin to put further loads on them”*.

The participant from the Construction Watch gave an account of an incident, which exemplifies the mutually corroborative insights the other participants shared:

There was one building collapse in [one of the suburbs of Accra—name withheld] whereby the owner was using only artisans. From the stories I heard in the media, after they had finished casting the slab (concrete) for the first floor, you know, concrete you have to leave it for 28 days to cure; to get its maximum strength. These people did not wait, within a week; they started putting blocks on it. So, putting too much load on it, it collapsed.”

He recounted a similar incident he once witnessed at a construction site, which he advised against. The builders, nevertheless, paid no heed to the advice.

I went to a construction site, after they had cast the slab; they left it to the sun. I told them that this thing that you are doing, you have to cure it, you have to protect the slab from the direct heat of the sun. Or else, it will dehydrate; it will lose its strength early. For concrete to get stronger, it needs a lot of water and cement is something that absorbs so much water, so once it absorbs the water – the sun also dries it and it starts cracking so I told them that you have to cure it for at least 3 weeks. That was the advice. They [, however,] did it for 2 days and stopped.

The problem with hasty production, however, is the high likelihood of shoddy finishing—a rather sensitive issue, which could easily lead to inadvertent catastrophic consequences particularly in the construction sector where the products involved (and here buildings) require a lot of time and care to reach the optimal healthy standard. Hurriedly conducted construction has the danger of not giving enough time and attention to quality control testing and proper inspection of newly constructed elements, prior to progression or casting of subsequent elements and could, thus, adversely affect structural integrity and result in disastrous consequences (Lewis, 2005; Alinaitwe & Ekolu, 2014). The broader point here is that building construction is a complex, delicate, and demanding endeavour, requiring not only highly technical and professional skills (Alinaitwe & Ekolu, 2014; Merritt & Rickett, 2001; Rickett, 2001) but also for key inputs like concrete to reach optimal strength, they require enough time to cure, and, therefore, cannot be rushed through just because more people need buildings. This does not mean the construction process cannot be expedited. But in such circumstances, as the participant from the Construction Watch (a civil engineer) advised,

If you are going to do it quickly, then you have to also consider certain things. You can't just use normal concrete. If you can't wait, you have to use additives. So that you can get your building reaching its strength in [a few] days.

The problem in Ghana, however is that, as discussed earlier, at the forefront of building supply in the country, as with many other developing countries (Wells, 2007; Ofori, 2007; Mitullah & Wachira, 2003; Adewole et al, 2014; Ayodele et al., 2011; Adenuga, 2012) are uninitiated low-income people and technically challenged artisans (Hedidor & Bondinuba, 2017; UN-Habitat, 2011; Boamah, 2010; Arku, 2009; Karley, 2008; Addo, 2014) who, as one of the participants from the Ghana Institute of Architects observed, do “not even know the additives to speed up the process”. Further, additives are

expensive, given the ever rising cost of other housing inputs like materials and land; levels of poverty and as the participant from the Construction Watch puts it, “*the way Ghanaian developers like to cut corners, nobody will go and buy additives*”. Against the backdrop of expensive professional fees or the perception of it being expensive, developers employ wayside artisans (Keteku-Atiemo, 2006; Bondinuba, 2012; Hedidor & Bondinuba, 2017; Bedu & Ankai, 2016; Hedidor et al., 2016; Ghana Institution of Surveyors, 2012) who in most cases, as found in chapter six, are not highly skilled or do not have much knowledge in the physics of building, scientific construction procedures and practices, to do the work (Hedidor & Bondinuba, 2017)– and to make matters worse– with enormous haste leading to shoddy works.

As the second informant from the Ghana Institute of Architects aptly noted: “*The reason it happens [referring to the collapses] in the urban areas is that there is high demand and there is pressure. So, the wrong thing is done hurriedly – at a lightning speed*”.

The situation in Ghana is just a reflection of a rather pervasive problem in cities in the Global South where informal developers are hastily putting up buildings because of high demand. Lyu et al (2018) show that similar dynamics underlined the collapse of four buildings in the Wenzhou City of China on 10th October 2016, which killed twenty-two (22) migrant labourers and injured six (6) others. Another case in point is the April 2016 collapse incident in Nairobi, the Kenyan capital, which killed close to 50 people and maimed several others. Apparently, there is high demand for buildings in Nairobi (Reuters, 2017; Manyuira, 2018), and the owners of the facility are part of the many informal developers in the City who bypass regulations to cut down cost to maximize profit. The accounts on the incident suggest that the structure had been “shoddily” built within a few months and the 126 single rooms were being rented out at a monthly rate of \$35 (£24)³⁴ (The Guardian, 2016; Associated Press, 2016). In Uganda,

³⁴ While this fee may not be considered exorbitant in advanced countries, in developing countries’ context, it is substantial.

it was found that similar problems regarding uncontrolled speedy construction and poor workmanship led to the collapse of the BBJ building that killed eleven (11) people and injured twenty-six (26) others in Kampala, the capital, circa September 2004 (See Alinaitwe & Ekolu, 2014).

Land challenges and inappropriate construction and building use practices in the cities

Land is one of the fundamental inputs for building construction. In chapter six, it was discussed that a series of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have turned land into an important asset in Ghana, thereby generating competition and contestations for the control and ownership of lands with adverse repercussions for building safety in the country. There is nowhere is the undisciplined and insecure land tenure system inducing unsafe construction and building use practices in the country than in the cities – where the commodity is in high demand. The study findings on the adverse impacts of land challenges on building safety in cities in Ghana are analysed under two subheadings: Appendages and extra floors atop old structures and conversion of buildings to uses unintended in original designs.

Land challenges and suboptimal practice 1: Appendages and extra floors atop old structures

Human beings have long tended to adapt their buildings to their behavioural needs and functional requirements (Lawrence and Low, 1990). When buildings cease to accommodate behavioural and functional requirements, people seek to correct the problem through construction, renovation, or moving to a different building – which requires new land. However, as suggested in chapter six, in Ghana, lands – especially urban lands, are under enormous pressure as a result of increased demand and speculation (Arku et al, 2016; Ayee et al., 2008; Darkwa & Attuquayefio, 2012; UN-Habitat, 2011; Arku, 2009). It was found that the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal urban policies and their resulting transformations have turned lands into an important asset and for that matter very expensive commodity especially in the cities – particularly, Accra and Kumasi and their environs.

To illustrate, as an increasing number of foreign banks-funded private real estate companies and their clientele (mainly Ghanaians abroad, staff of foreign embassies and trans-national corporations) got involved in the residential market, subsequent to the liberalization of the housing sector in the 1980s and 1990s, the price for building plots increased by more than 1000 per cent (Konadu-Agyemang, 2001; Arku, 2009; Mahama & Antwi, 2006). Today, land prices in the cities are even much higher. Further to the ever-rapidly rising cost of lands due to increased demand and speculation, in many urban areas in Ghana, as also found in chapter six, even though the state owns some land, customary tenure systems are the major custodians of land and typically govern land transactions in the country (UN-Habitat, 2011; Arku et al, 2016; Ubink, 2008; Ubink & Amanor, 2008; Amanor, 2008; Boni, 2008; Tonah, 2008; Crook, 2008). However, as also found in chapter six, the traditional land tenure system is characterized by widespread disputes and uncertainty, where landowners commonly sell the same land to multiple people—taking advantage of the country’s land registration/administration challenges (Arku et al, 2016; Ayee et al., 2008; Darkwa & Attuquayefio, 2012).

The overall consequence of the ever-escalating cost of lands and pervasive land ownership conflicts is increased difficulty in acquiring land in Ghana for the construction of new buildings to meet the ever-escalating building need pressures in the cities. Benzoni (2013) observed what he calls a “common sense response” in Accra, the capital, where in the context of the problems noted above (rising cost of land and pervasive land ownership conflicts), people build up extra floors onto old structures to take advantage of what they call the “*free land in the sky*” without recourse to the city authorities, qualified architects or engineers. The practice, however, is also rampant in Kumasi too (See, Adinyira & Anokye, 2013; Asante & Sasu, 2018, for instance). Adding extra floors atop old buildings puts the structural members under enormous stress and as Salvadori & Levy noted in *Why Buildings Fall Down*, if “even the toughest rock would eventually crack under the weight of more and more stones piled up on it” (Salvadori & Levy, 1992:18), how much more old buildings?

The accounts of the study participants suggest that such non-engineered constructions are some of the common ways many a Ghanaian landlord is responding to the accelerated demand for buildings propelled by the spiralling growth in the country's urban population. Both appendage and the construction of extra floors atop structures threaded through the participants' responses as critical to understanding building safety challenges in cities in Ghana. The second respondent from the Ghana Institute of Architects, for instance, noted:

Migration of low skilled people coming to the urban centres for non-existing jobs. Somebody wants to accommodate them. May be the foundation was not designed for [a] two-story but, then, he wants to exploit the situation in order to get some rents. So, he builds on the old one without taking note of the foundation – structural integrity. So, people want to exploit the situation by trying to go five or more stories without doing the proper thing – in terms of structural design and soil tests.

The informant from the Construction Watch (a civil engineer) shared a similar insight:

“Sometimes you do a design for say a two story then you see the person adding another story on top. So, what you designed did not cater for three stories, it is for two stories, but you see the owner adding an extra story to it, putting more pressure on the building”.

Speaking to the worrying case of Kumasi – the second biggest city in the country – one of the senior officials at the Development Control and Building Inspection Unit of the Kumasi Metropolitan Assembly (KMA) made the following complaint:

You realize they [referring to developers or landlords] have been given a permit to construct one or a two story; they end up building three stories. You sometimes realize that the design itself has been changed. They have done a whole lot of modifications to what they are supposed to do.

One of his colleagues at the Physical Planning Unit of the Town & Country Planning under the Assembly also made a similar observation: *“I have seen this pattern where people have residential buildings and they just add another one or [even] more floors”*. I inquired: “What account for that? It is not just here, there are examples elsewhere – Kenya, Nigeria and other places”. His response: *“the issue has to do with, especially in the urban centres, the population is increasing, [and] everybody wants to live in town. The landlords want to cash in and so they do it”*. He cited an incident that

happened at the center of the City in 2006 due to such dangerous practices, for which the Assembly received enormous public opprobrium for duty dereliction.

I can give one example of what happened at [name withheld]. At a point, the structure collapsed, then on radio they [referring to journalists and the public] were saying the Department did not do their work well. But when they came over and we took out their permit, we realized that in their drawing it was supposed to be two stories, but when they were building, they made it three stories.

The situation in Accra, the capital, is even worse. One of the Monitoring Officers of the Building Inspectorate Division of the Accra Metropolitan Assembly submitted:

It is rampant [here – referring to appendages' construction]. It is very rampant. And even not [only] that: you see, sometimes, they apply for a permit for may be three stories. [But] in the process of putting up the three story, you know, they think they have permit, and at your blind side, they add extra floors.

His colleague, a senior officer at the Inspectorate, corroborated his accounts in a separate interview and cited an incident that occurred at one of the suburbs of the capital where the owner had constructed a warehouse attached to the building – without permission from the Assembly. Engineer 1 too mentioned a similar incident: “A structure collapsed at [name withheld]. The design was for three story. But the client on his own accord decided to add two more floors without contacting the designer. And it eventually collapsed”. Once again, not just in Ghana, in other rapidly urbanizing parts of the developing world, cases abound where population pressures, land acquisition challenges; poverty, commercial considerations, and poor knowledge in construction incentivized similar non-engineered constructions and led to collapse incidents (See S Arya, 2000; Thiruppugazh, 2008; Yates, 2002; Buildings Department, 2007).

An exemplifying incident in point is the collapse of four (three six-stories, and one two-story) residential buildings in the Wenzhou City in the Zhejiang Province of China on 10th October 2016, which killed twenty-two (22) migrant laborers and injured 6 others. Wenzhou is a major manufacturing hub for shoes and purses and has, therefore, made the City the preferred destination for many of the people in rural China who migrate to cities in search for jobs and other opportunities. The high influx of rural migrants to Wenzhou has ratcheted up the demand for housing, which means that new

spaces/lands are required to construct more residential buildings. However, the high rates of urbanization and industrialization in the City have meant that there is pressure on the available land for housing purposes. The City's landlords responded to the situation by adding extra floors to their old structures (most of them were built in the 1970s and in floodplains) to create more spaces to meet the rising demand by the many rural migrants. The buildings, from a structural safety perspective, were to all intents and purposes, only waiting for their day. In October 2016, four of them collapsed and killed twenty two (22) people with several others, including a three-year-old girl, sustaining various degrees of injuries (For a review, see Lyu et al, 2018).

Land challenges and suboptimal practice 2: Conversion of buildings to unintended uses

One of the participants from the Engineering Unit of the Accra Metropolitan Assembly (a structural engineer) expressed himself on the key considerations involved in the design of buildings as follows:

“Every building is designed according to certain usage. I may design a building [as] a residential. The type of loading is different from a commercial building”. Nevertheless, he continued, “people go and use the residential building as commercial buildings – as offices. These days in Ghana, that is what is happening now”.

The Fellow assigned by the Ghana Institution of Engineers (GhIE) to the study corroborated the engineer's concerns in a separate interview: *“That is what is happening in Accra now. Accra is becoming like that”*. The other participants made similar observations. The participants' responses corroborate Grant & Yankson (2003), Grant & Nijman (2004) and Oosterbaan et al (2012) claim that there is a sprawling conversion of residential units to commercial uses (service workshops, retail, and wholesale outlets) within and along major roads in Accra. Nevertheless, the development is not confined to just Accra. The Kumasi City authorities also expressed similar concerns in my interviews with them: *“If you look at Adum [a suburb and the central business district of Kumasi], the official from the Physical Planning Unit of the Department of Town & Country Planning under the Kumasi Metropolitan Assembly submitted, “right now, they have turned every living place into commercial use”*. His colleagues at the Development Control and Building Inspectorate Unit of the Assembly made a similar

observation. One of them thus remarked for instance that *“people convert almost every space they see into stores in Kumasi. It is everywhere”*.

The finding corroborates that of Adarkwa & Oppong (2005) and Cobbinah & Niminga-Beka (2017) that the Kumasi city is experiencing increasing conversion of buildings to commercial and related uses. The problem with the practice (as noted in chapter three) is that since the structures originally were not meant for commercial use, the design considerations, regarding their fit for purpose will normally not include the subsequent additional imposed loads associated with the new use. Therefore, using them commercially could exert further pressure on the structural members, cause fatigue and eventual collapse just as attempts to make the necessary adjustments to suit the new purpose, if not properly done, could also lead to structural integrity erosion and eventual collapse (Soane, 2016). Perhaps, the most exemplifying incident on record in the country is the Melcom Achimota case captured in the background section of the study.

The Melcom Group of Companies– the low-cost department store that was occupying the six-story building –were using the first three (3) levels as shopping space. According to the investigative accounts of the National Disaster Management Organization of Ghana (see NADMO, 2014), the company later acquired the top floors in anticipation of an increase in sales due to the upcoming Christmas to warehouse their merchandise without making the necessary “structural changes” to accommodate the additional load³⁵. “This extra load on critical columns”, NADMO contended in their report, “could have aggravated the precarious situation of the building and been the last straw that broke the camel’s back”

³⁵ In the Ghana Institution of Engineers (GhIE) report on the incident, the Management of Melcom denied the claim that they were using the building to warehouse their merchandise (See GHIE, 2012). Rather, they said, it was the landlord who was using some parts of the building to store containers of tiles, televisions and other goods. The GHIE investigative team could not meet the landlord to take his side of the story. However, three days after the collapse, the GHIE report states, “even though Melcom, the company that was using the building as supermarket do not sell tiles –stack of tiles were identified at the site between two slabs. A sample taken from the site weighed about 5 kilos” (See GHIE, 2012: 13)

in the early morning of November 7, 2012 (NADMO, 2014: 29). Eighty-one (81) casualties were recorded (fourteen (14) deaths; sixty-one (61) injuries).

The study participants largely attributed the practice to public indiscipline and lawlessness reinforced by weak enforcement of regulations. The participant from the Engineering Unit of the Accra Metropolitan Assembly, for instance, noted that some landlords have the mindset that *“once the building is there, I can use it to do whatever I want”* and, as added by one of the participants from the Ghana Institute of Architects in a separate interview, since *“people get away with it”*, it has become rampant. The participant from the Physical Planning Unit of the Kumasi Metropolitan Assembly shared an encounter he once had with a landlord who was converting her building without the appropriate permission:

I remember somebody was doing a similar thing [converting a residential structure into a shop] where I used to stay. I told them it’s wrong. I got back the other time and they had done it. So, I went there again and this time it was insults.

Like the other participants, he also argued that indiscipline and lack of strict enforcement of laws is at the core of the problem: *“I think it has to do with that [indiscipline]: It is my house, whatever I do with my house, you have no [control over it]. And the punitive measures are not stringent enough: if people do that and it’s demolished, they would come for permits before [they do it].”*

The city authorities engaged by Arku et al (2016) in *Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders* made similar remarks regarding the Ghanaian public “indifference to laws”; “lack of respect for regulations” and “disdain for planning authorities”. Similar sentiments were also expressed by the city authorities who participated in Cobbinah & Niminga-Beka (2017). Thus, the notion that public indiscipline and lawlessness is at the core of such conversions is a widely held view among cities’ officials in Ghana. However, as severally contended in the study, political economists have long counselled that social and economic phenomena are usually the products of specific historical

experiences and that it is important to place them within the appropriate socio-political-economic and historical context when they relate to accidents (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Wales, 2017; Freudenburg et al., 2009). Similarly, we learn from Charles Gore's critique of methodological nationalism that to the extent that national economies and societies are not completely isolated and closed from outside influences, any social inquiry that gives primacy to just internal national factors, isolates and separates them from external influences as determinants of phenomena has not completed its intellectual task (Gore, 1996; 2010).

A deeper re-view of the practice in the light of the literature on urban trends and developments in the country (Oosterbaan et al, 2012; Grant, 2001; Hutchful, 2002; Konadu-Agyemang & Adanu, 2003; Cobbinah & Niminga-Beka, 2017; Adarkwa & Oppong, 2005) and even elsewhere (Sutton & Fahmi, 2001; Quang & Kammeier, 2002; Barredo & Demicheli, 2003; Gough & Kellet, 2001; Coen et al., 2008 in Oosterbaan et al., 2012) suggests that there is more to the problem than just public "indifference to laws"; "lack of respect for regulations" and "disdain for planning authorities". The evidence bears out that the conversions are cities dwellers' response to planning and institutional failure to designate enough planned spaces to meet the growing number of commercial activities in cities and that there are much more complex political-economic forces at play, some of which even date back to the long past era of structural or liberalization reforms.

As noted in chapter six, in the early 1980s, the Ghanaian government began some economic reforms. This was in response to macroeconomic instability and stagnation (Oosterbaan et al, 2012). The reform—commonly known as the Structural Adjustment Program (SAP)—was in three stages. The first stage (Economic Recovery Program – ERP I) occurred from 1983 to 1986 and was mainly a stabilization package to reduce inflation, achieve external equilibrium, and promote economic growth and export recovery (Grant, 2001; Hutchful, 2002; Konadu-Agyemang & Adanu, 2003). The second stage – ERP II –was the adjustment phase, implemented from 1987 to 1990. This stage comprised

reforming the financial sector, state enterprises, the education sector, and the civil service; initiating a medium-term agricultural development program; creating legislation to encourage small-scale mining activities; liberalizing the legal framework regulating business; and adopting a new investment code and amendments to the 1985 investment code, which reduced industries specifically reserved for Ghanaian enterprise (Oosterbaan et al, 2012; Otiso & Owusu, 2008). The final stage: ERP III began in 1993 to create an open and liberalized market. Reforms under ERP III also included poverty reduction through labor-intensive and high-productivity activities program; enhancing access to social services for the poor; continuing progress in human resource development; building capacity; and expanding public-sector management and private sector development (Konadu-Agyemang, 2000; Hutchful, 2002; Moller-Jensen & Knudsen, 2008).

The wage and salary freeze during the restructuring period made it impossible for incomes to keep up with the rising cost of living. The economic restructuring led also to the introduction of user-pay system for health, education and other state provided services, and the withdrawal of state subventions to housing agencies. Konadu-Agyemang (2001b) argues that all these factors had severe ramifications on housing production and affordability, and the shortages and poor maintenance of existing stock continued unabated. Nonetheless, the analysis here would not focus on this effect of the reforms on housing but something elsewhere. In the course of the reforms, a significant number of workers suffered retrenchment, poverty levels and economic uncertainty increased causing many urban residents to seek creative means for generating income for survival, capital accumulation, or to, simply, minimize economic vulnerability (Otiso & Owusu, 2008). Many people turned to the informal sector, the long-time source of livelihood for urban dwellers, which significantly expanded in the reform era to absorb the many formal workers who suffered retrenchment. Even some formal-sector workers invested in small businesses and acquired additional jobs, as other urban household members diversified their sources of income by engaging in multiple urban economic activities leading to increased demand for

business spaces in urban settings (Oosterbaan et al, 2012). The increased pressure on urban lands coupled with institutional and planning failures to designate planned commercial spaces/infrastructure to contain the concentration of informal businesses proliferated the conversion of especially residential buildings to commercial uses. In Oosterbaan et al (2012), one veteran city planner reminisced how the developments played out in Accra:

As the country's economy expand[ed], due to the reform policies, we started seeing massive residential conversion. Accra Roads Rehabilitation Project started around the early 1990s . . . This was immediately coming after the commencement of economic recovery program in the 1980s. Once the infrastructure-building program was completed, small-scale activities started to spring up in most neighbourhoods. People began to sell more, as retailing became the major economic activity . . . it [was] one of the most intensely engaged economic activities in the city. But lack of designated commercial spaces meant that pressure [was] being put on residential properties owners to convert their units into retail spaces (p.56)

And with more and more people moving into the cities, the spate of the conversion has not only been intensified, it has also been diversified in response to other social and economic needs. Therefore, today, people do not only convert buildings to commercial use; they also convert them to serve other needs such as those complained of by the study participants –churches, offices. This is not peculiar to Ghana, as other developing countries that have implemented economic reform policies are also experiencing similar pressures in their cities. The development is being felt in cities like Cairo, Lagos, Johannesburg, Rio de Janeiro, Buenos Aires, Santiago, and Hanoi Pereira and Santa Marta where significant foreign direct investment and increases in service and trade activities in cities have created demand for commercial and retail spaces (see Sutton & Fahmi, 2001; Quang & Kammeier, 2002; Barredo & Demicheli, 2003 in Oosterbaan et al., 2012; Gough & Kellet, 2001, for a review). Even in smaller cities such as Cochabamba in Bolivia, such residential conversion to commercial uses (e.g. service workshops, retail and wholesale outlets) are said to be ubiquitous (see Coen et al., 2008).

The finding here, once again, corroborates the study's contention that the extant internal focal approach to building collapse in developing countries' de-emphasis of external and inherited conditions limits the potential for comprehensive understanding of the influences of the inappropriate construction

practices and behaviours that generate vulnerabilities for such risks in those parts of the world. As noted in chapter two, the discourses on building collapse in developing countries have traditionally followed what was conceptualized as *internal focal approach*, which tends to frame them as the unintended unfortunate isolated events, accidents or incidents, which result from problems ‘*internal*’ to developing countries. The approach underscores micro issues such as ignorance, carelessness, negligence, greed, and indiscipline on the part of builders, contractors and other construction actors in which weak regulation play key roles in sustaining the prevalence and reinforcement of the inappropriate construction practices that emerge from them (See Asante & Sasu, 2018; Kuta & Nyaanga, 2014; Olajumoke et al., 2009, for instance).

However, as this study has shown, focusing on only micro factors could increase our learning only so much – the central point of Charles Gore’s critique of methodological nationalism or separatism. There is even more to learn from engaging how the ‘*micro*’ factors are linked to the more *macro* issues of the political-economic influences of construction and building use practices and, especially, also from how these two scales/levels of emphases interact with each other and their linkages to colonial and postcolonial-modernization policies and the more recent world system-neoliberal-capitalist ideas that in profound ways are shaping the design and implementation of housing policies and other agenda of successive governments and international bodies in those parts of the world. Following their attribution of the problem to public indiscipline and indifference to laws, the study participants were of the view that strict enforcement of laws against the practice may bring some sanity and improve building safety in the cities. One of the officers of the Physical Planning Unit of the Kumasi Metropolitan Assembly for instance submitted: *“I think the punitive measures are not stringent enough. I think that if people do that and it’s demolished, they would come for permits before [they do it].”*

Undoubtedly, there is a place for the enforcement of planning regulations in dealing with indiscriminate conversions of buildings to unapproved uses. However, it seems there is little to be

achieved from placing much emphasis on this measure as it is doubtful that such interventions could resolve the political- economic undertones that encourage the practice in the first place. Further, there is doubt whether such an approach will be effective, considering the spate of the practice; its informal nature and, as discussed earlier and would be further intimated in the next section, the compromised capacity of Ghanaian cities' authorities for regulations enforcement (Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah et al., 2012; Botchway et al., 2014; Ametepey et al., 2015; Arku et al, 2016; Asante & Sasu, 2018).

Magnification of building regulation challenges in the cities.

The essence of resilient building codes and regulations rests on the assumption that they will be complied with. As noted in chapter six, Ghana's building regulations set out two mechanisms to ensure that buildings are constructed in accordance with public safety requirements. The first mechanism is the injunction placed on developers to seek prior written permission from the relevant metropolitan, municipal or district assembly (MMDA) before they could commence projects. The second mechanism is that if permission is granted, the developer ought to notify the authorities of the dates on which s/he intends to begin construction and of the dates on which every stage of the construction will be ready for inspection (Asante & Sasu, 2018). These twin measures are to afford the authorities the opportunity to ensure that the construction conforms to approved standards and processes to guarantee the safety of the building, its occupants and the public (Oteng-Ababio, 2016).

However, the evidence on record has shown that problems such as land conflicts (Centre for Democratic Development, 2002; Antwi, 2002; Boamah, 2013; Darkwa & Attuquayefio, 2012; Arku et al, 2016; Ayee et al., 2008) bureaucratic, expensive and lengthy procedures as well as officialdom corruption (Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah et al., 2012; Botchway et al., 2014; Ametepey et al, 2015; Arku et al, 2016) dissuade most developers from complying with the processes. In some parts of the country, socio-cultural factors play key roles where natives question the rational

for such regulatory demands contending that, as indigenes who are developing their ‘own’ lands, they could not need ‘*permission*’ to do that (see Boamah et al., 2012). In addition to circumventing the permit processes, the empirical and the corroborative secondary evidence on record (Bondinuba, 2012; Hedidor & Bondinuba, 2017; Hedidor et al., 2016; Keteku-Atiemo, 2006; Tutu & Bempong, 2018; NADMO, 2014; GhIE, 2012) suggest further that actual construction works are also undertaken in ways that do not adhere to standard construction practices and procedures: jobs are frequently outsourced to unqualified, low-skilled artisans and contractors; standard non-compliant materials are commonly used even as the practice of cutting down materials specifications in designs is also common.

It has been suggested that these cost or corners cutting measures reflect how many people (especially those with low incomes) attempt to pursue their housing needs against the backdrop of rising cost of housing construction in the country partly fuelled by inappropriate colonial planning laws and regulations; market deregulations; the emergence of large-scale construction companies financed by the international capital market and their clientele which are driving up the prices of critical housing inputs such as land and materials in the country. The prevalence of inadequate consideration of safety imperatives or corners cutting in every part of the country is obviously concerning. However, it is even more so in the cities and their environs where most of the ongoing construction works occur (Arku, 2009; 2006; Asante & Sasu, 2018). For instance, it is estimated that 85 percent of all new constructions occur in Accra, the capital and Kumasi, the second biggest city in the country and their environs (Arku, 2009; 2006; Asante & Sasu, 2018). Since most construction works occur in such places, it is axiomatic that more structurally suspect buildings would be created at such places and the high concentration of people, physical and financial assets in the cities means that a single accident can cause catastrophic effects and destroy years of development gains (Oteng-Ababio, 2016) – the reason effective and efficient building administration in the cities is crucial.

However, the empirical findings corroborate the findings of Boamah et al (2012); Ametepey et al (2015); Ahmed & Dinye (2011); Botchway et al (2014); Kpamma & Adjei-Kumi (2013); Yeboah & Obeng-Odoom (2010); Arku et al (2016); Asante & Sasu (2018) that limited capacity – in terms of human resources and logistics and the spate of construction developments; political interference, land tenure insecurities, and the ever-intractable issue of corruption undermine the enforcement of building safety regulations in the cities. To summarize, the challenges of building regulations enforcement have increased in the cities where the will to develop is undermining the need to be prudent. As the second participant from the Ghana Institute of Architects aptly noted: *“The reason it happens [referring to the collapses] in the urban areas is that there is high demand and there is pressure.”* However, since the cities authorities *“do not have [enough] people [building inspectors] to go out [and do monitoring at construction sites]”*, the respondent from the Engineering Unit of the Accra Metropolitan Assembly added, *“most developers take advantage and do their own thing: cut corners-use unqualified personnel; cut down material requirements; use substandard ones”*. In the end, huge stocks of unsafe buildings are created waiting for their day.

Chapter Seven: Conclusion

In chapter six, it was argued that with the rising cost of land and materials (partly fuelled by the emergence of large-scale foreign banks-financed private real estate companies and their clientele in the Ghanaian construction sector; inappropriate colonial building laws and regulations, which encourage dependence on expensive foreign materials; exchange rate volatility and inflation), has meant that developers, particularly low income informal self-builders, are under pressure to cut corners – thus, the cost of construction – as far as possible. And the lack of any meaningful formal housing schemes has meant that the building process takes several years to be completed by which time the structure is

already ripe for integrity crisis due to constant exposure of the materials and every stage of the uncompleted structure to wetting and drying weather conditions for so many years. Also, due to the frustrations in the building permit acquisition process, building developers frequently tend to evade or circumvent building regulations, which all together conduce to the creation of structurally suspect buildings in a society with a well-documented endemic poor building maintenance culture. It is against the backdrop of the above *structural context* of precarious construction climate that the country's cities are experiencing rising demand for buildings.

Ghanaian cities—particularly Accra but also Kumasi— are seeing remarkable growths (for instance, these two metropolises accounted for 75% of the country's regional capital population in 2000, up from 71% in 1984 – Oosterbaan et al, 2012)—thanks to natural population increase but also rural to urban migration (induced by among other factors the high concentration of private and public investments in such places). Further, the findings herein have corroborated that of other studies (e.g. Karley, 2008; Arku, et al, 2012; Addo, 2014; UN-Habitat, 2011; Oosterbaan et al, 2012) and the country's statistical reports (see, for instance, Ghana Statistical Service, 2012) that the high growth and concentration of more and more people in the cities, as being felt in other developing countries (UN, 2014; 2016; Desai, 2012; Satterthwaite, 2017), has accelerated the demand for buildings for accommodation, economic and other purposes.

The pressures of accelerated demand for buildings in the cities have worsened the rather precarious construction climate by encouraging even more perilous construction and building use practices. These are manifesting as uncontrolled speedy/hasty constructions; construction of appendages and extra floors atop old structures and widespread conversion of buildings to (especially commercial) uses unintended in original designs. Cities' authorities will normally intervene to uphold public health and wellbeing by controlling these safety-undermining construction and building use practices that have become pervasive in the cities. However, institutional cultures such as corruption and political interference

further undermine their already under resourced capacity to exercise efficient oversight and ensure development control by enforcing the relevant regulations against the accelerated or widespread substandard construction and building use practices. The overall effect of all this is the creation of a conducive climate in which the pursuit and the provision of building needs and services in the cities play out or thrive in ways that tend to undermine public safety.

Per the foregoing, it could be argued that building collapse incidents in Ghanaian cities result from the interplay of the inappropriate construction and building use practices influenced by structural conditions or factors such as the strain on the country's informal settlement of building supply systems, undisciplined and insecure land tenure system and weak regulation, in which the exigencies or pressures of accelerated demand for buildings in the cities, subsequent to rapid demographic and economic expansions create further incentives, causes and motivations that contribute and reinforce the prevalence of the deleterious construction and building use practices, and, thereby, conduce to the creation of even more unsafe and poorly maintained buildings in such places. At issue here is how accelerated demand for buildings, in the context of rapid demographic and economic expansions in the cities, act on or worsen the prevailing structural influences of adverse construction processes and building use practices in the Ghanaian society in ways that lead to widespread creation of structurally incompetent buildings in the cities.

In this sense, contrary to the findings in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three, the conditions that underlie the insufficient focus on putting up the best quality building possible in Ghana's cities are not generated by urbanization induced-building need pressures. They are rather linked to the broader political-economic influences of adverse construction and building use practices in the Ghanaian society – the building need pressures induced by rapid urban expansions only worsen or exacerbate the scale of the problem by encouraging the creation of even more unsafe buildings in the cities and, hence, the reason majority of collapse incidents occur in such places. For

instance, in Boateng (2016; 2018; 2019a) and chapter three, it was argued that accelerated demand for buildings in cities subsequent to urban expansions generates speedy or expeditious constructions, which lead to shoddy works and, therefore, creates conditions for the occurrence of collapse incidents. However, it seems the challenge in Ghana is not necessarily about the expeditiousness with which the buildings are constructed. As the participant from Construction Watch perceptively noted, the construction process could certainly be expedited, but in such circumstances, *“you have to use additives. So that you can get your building reaching its strength in [a few] days”*.

The challenge, in Ghana, as suggested in the analysis, is that most of the informal developers who are at the frontline of the provision of building needs in the country are low-income people. The rising cost of building inputs coupled with their low socio-economic situation does not only limit them from being able to invest adequately in safer building materials, construction, and skilled labourers, it also makes the already expensive building additives even more unaffordable. This, therefore, implies that in contrast to the findings in Boateng (2016; 2018; 2019a) and Boateng & Wright (2019), the challenge in Ghana is not so much about speedy constructions induced by accelerated demand for buildings. But even more about the incapacity of especially low-income informal self-builders—the major providers of building needs in the country—to support the delivery of safer buildings and in the rather *expeditious* manner required to meet the ever-rising demand in the cities.

Second, it was also contended in chapter three and Boateng (2016; 2018; 2019a) that the growth and agglomeration of people in cities attract investments and generate commercial activities – which, in turn, influences the practice of converting especially residential buildings to commercial uses. The practice was, therefore, conceptualized as a critical cause of building collapse in cities as it undermines the structural integrity of buildings. While this has been true of Ghana’s situation, the historical analysis provided herein suggests that the practice needs to be understood against the backdrop of institutional and planning failures to designate planned spaces for the informal commercial activities that burgeoned

in the cities subsequent to structural reforms. In short, contrary to as conceptualized in Boateng (2016; 2018; 2019a) and Boateng & Wright (2019), the practice must be seen rather as the *effect* or outcome of institutional and planning failures to designate planned spaces for commercial activities – not as a *cause*. In respect of appendages and the construction of extra floors atop old structures, the empirical evidence bears out that, while linked to urbanization-induced building need pressures, the critical forces at play are the rising cost of urban land and pervasive land ownership conflicts that impede easy access to land for constructing new buildings in the cities. As noted by Benzoni (2013) the practice is cities’ dwellers’ “*common sense response*” to the rising cost of urban land and pervasive land ownership conflicts, which make acquiring land for the construction of new buildings to meet the ever-escalating building needs in the cities extremely difficult.

Usually, city authorities will step in to enforce safe building regulations and guard against these practices. But the evidence on record suggests that, too often, these efforts are undermined by institutional cultures like corruption and political interference. Add to that a dearth of building inspectors and other resources, and unsafe building practices multiply. In the end, a flourishing climate is created in which the pursuit and the provision of building needs and services in the cities play out or thrive in ways that tend to undermine public safety. What this means overall is that the empirical evidence from Ghana refutes the finding in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three that, the phenomena of building collapse in cities are primarily driven by the demographic and economic expansion processes of urbanization. What is rather empirically verifiable is that the conditions that give rise to the inappropriate construction practices (for instance: cutting corners; compromised compliance and enforcement of safe building and construction regulations) and lead to the creation of unsafe buildings emerge from the interplay of weak regulation enforcement, undisciplined and insecure land tenure system and the strain on the informal settlement of building supply systems in the country. The pressures of accelerated demand for buildings in the cities in the

context of urban expansions worsen these structural influences of adverse construction and building use practices, thereby engendering the creation of even more unsafe buildings – the reason majority of collapse incidents happen in those parts of the country.

Overall, the empirical findings suggest that, while closely linked to the demographic and economic expansion processes of urbanization, the phenomenon of building collapse in Ghana's cities has a structural context: they emerge from the interplay of the prevailing socio-political-economic conditions and factors that shape, dictate and/or constrain people's construction decisions, practices and behaviours in the Ghanaian society –some of which are internal while others are externally-imposed and/or inherited. The implications of these findings for other African and broadly developing countries similarly situated and the larger discourses on urban pathologies in Africa as well as the literature on building safety are discussed in the next chapter.

CHAPTER EIGHT: DISCUSSION, IMPLICATIONS & APPLICATION OF STUDY FINDINGS

The study sought to confer insight into the tangle of factors underlying the creation of unsafe buildings in cities in developing countries with its attendant implications for collapse incidents. To do this, the methods and ideas accrued in the pathology of urban processes literature were distilled to theorize an initial causal grounding for the phenomenon (Boateng, 2016; 2018; 2019a; Boateng & Wright, 2019). It was suggested that the phenomenon is a pathological feature of urbanization –the outcome of deficient construction and building use practices in cities encouraged by accelerated demand for buildings subsequent to rapid demographic and economic expansions in such places in which weak regulation plays key role. The empirical focus of the study was to ascertain the veracity of the claim in the Ghanaian urban context. Specifically, the study set out to explore the extent and ways in which the urbanization process of spatial concentration of people, social and economic activities and the resulting building need pressures contribute to the creation of unsafe buildings and to that end the occurrence of building collapses in cities in Ghana. The study also aimed to examine what can be learnt from Ghana to think about other countries and cities similarly situated and the implications of the overall findings for the broader literature on urban pathologies in Africa and building safety.

In summary, the study has found that:

- The emergence of large-scale foreign banks-financed private real estate companies and their clientele (Ghanaians abroad and rich locals, staff of foreign embassies and trans-national corporations) in the Ghanaian construction sector; inappropriate colonial building laws and regulations, which encourage dependence on expensive foreign materials; exchange rate volatility and inflation are driving up the prices of critical building inputs such as land and materials and, thus, the overall cost of housing construction.
- Ghana's housing market is informal sector-driven–dominated by low income people whose socio-economic situations and the rising cost of housing construction create path

dependency or ratchet effects, and, thus, limit their capacity to invest in safer building materials, construction, and highly skilled laborers and are, therefore, forced to frequently cut corners by outsourcing jobs to cheap but low-skilled artisans and contractors; utilizing cheap but inferior materials; cutting down materials and other safety requirements specified in designs.

- In contrast with the practice in the advanced world where self-building a house involves the owner engaging construction professionals to build on his or her behalf, most Ghanaians generally self-build their houses through a protracted incremental process which takes sufficiently long time (5 – 15 years or more) that buildings are usually due for structural integrity challenges long before they are even completed due to constant exposure of materials and every stage of the uncompleted structure to wetting and drying weather conditions.
- The inefficiencies in Ghana's building permitting system (marked by corruption and delays) as well as the insecurities, tensions and conflicts associated with the country's undisciplined and insecure land tenure system encourage evasion, and, therefore, widespread construction of unpermitted or illegal buildings
- All the factors above including the high cultural emphasis on homeownership and ignorance play out and reinforce themselves in ways that encourage the creation of (many illegal) buildings with questionable integrity in a society with a well-documented endemic poor building maintenance culture and, therefore, provide the *structural context* for understanding how the creation of unsafe buildings arise and are thus central to establishing the grounds for the deleterious consequences of building collapses in the country.
- Ghana's urban population is experiencing accelerated growth, which has amplified the already acute building need pressures in the cities, and is, in turn, exacerbating or acting on

the above *structural* influences of inappropriate construction and building use practices in ways that encourage the creation of even more unsafe buildings through increased corners cutting; uncontrolled hasty constructions; construction of appendages and extra floors atop old structures and widespread conversion of buildings to unapproved uses.

- Cities' authorities would normally step in to enforce safe building regulations and guard against the practices. But too often, these efforts are undermined by the activities of land guards, institutional cultures like corruption and political interference. Add to that a dearth of building inspectors and other resources, and unsafe building practices multiply.
- The overall effect of all this is the creation of a flourishing climate in which the pursuit and the provision of building needs and services in the cities play out or thrive in ways that tend to undermine public safety.

The study, based on the foregoing, has argued that building collapse in Ghanaian cities is the unintended outcome of the deficient construction and building use practices influenced by the strain on the informal settlement of building supply systems in the country; undisciplined and insecure land tenure system and weak regulation, in which the exigencies or pressures of accelerated demand for buildings in the cities, triggered by rapid urban expansions, generate further incentives, causes and motivations that contribute and reinforce the prevalence of the deleterious construction and building use practices, and, thereby, conduce to the creation of more unsafe and poorly maintained buildings in such places. At issue here is how accelerated demand for buildings, in the context of rapid demographic and economic expansions, are acting on or worsening the prevailing socio-economic and institutional-cultural influences of adverse construction and building use practices in the Ghanaian society in ways that lead to widespread creation of structurally incompetent buildings in the cities. The findings of the study corroborate just as much as they challenge that of other studies on the topic in Ghana, Africa and

the broader developing countries' context as well as the way the discourses on urban pathologies in Africa and developing countries' in general are normally framed.

First, not just in Ghana (Asante & Sasu, 2018; Danso & Boateng, 2013; 2015; Tutu & Bempong, 2018; Keteku-Atiemo, 2006; Arku et al, 2016; Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah, et al, 2012; Botchway, et al, 2014; Ametepey et al, 2015; Adinyira & Anokye, 2013), in developing countries in general, the scholarly discourses on building collapse (Oloyede et al., 2010; Wachira, 2015; Tchamba and Bikoko, 2016; Soane, 2016; Kumar, 2016; Olajumoke et al, 2009) have long followed what could be termed as an *internal focal paradigm or approach*. Such studies, as discussed in chapter two, tend to center on contributory factors that are 'internal' to developing countries. Emphasis is placed on individual factors such as ignorance, negligence, carelessness, indiscipline, greed on the part of builders, contractors and other construction actors and institutional factors such as corruption, political interference, long, costly and complicated permitting processes, resource challenges (human and logistics) and other impediments to compliance and enforcement of safe construction regulations (For a review, see for instance, Oloyede et al., 2010; Wachira, 2015; Tchamba and Bikoko, 2016; Soane, 2016; Kumar, 2016; Olajumoke et al, 2009; Alinaitwe & Ekolu, 2014; Kuta & Nyaanga, 2014; Windapo & Rotimi, 2012).

The approach, thus, constructs the phenomena as 'events', 'accidents' or 'incidents' and, therefore, atomizes the underlying causes, for instance, as the mistakes, carelessness or negligence of individual building practitioners or clients/developers in which weak regulation plays key roles. Per this view, building collapses are unintended unfortunate isolated events, which result from problems 'internal' to developing countries. There is little or no coherent or systematic engagement with historical-institutional factors. For instance, the impact of inherited conditions (such as colonial policies) and externally imposed factors (like the neoliberal order, which, beginning from the 1980s, shaped and continue to shape the political economy settlements of the construction sectors of many developing

countries - Wells, 1998; 2001; 2007; Wells & Wall, 2003) are barely engaged with. But as counselled by political economists who study accidents, such phenomena must not be approached, seen or perceived as mere isolated events. Rather, they must be considered as windows for unpacking the normal working of the social system. To the political economists, accidents afford insights into social realities that ordinarily pass unnoticed, therefore, the analysis of their underlying range of factors and agencies must always be situated within the relevant socio-political-economic and historical context (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Wales, 2017; Freudenburg et al., 2009).

Undoubtedly, the analysis or the study of building safety/collapse could benefit and has benefitted from the focus of the internal focal approach on micro causes internal to developing countries. However, leaving the analyses at that level is unhelpful for it seems there is even more to learn from examining how the '*micro*' problems highlighted in the approach are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at local, national, and even global levels in nurturing and/or generating the poor construction practices and behaviours that underprop the emergence of collapse incidents. The study has demonstrated empirically the analytical value of this proposition in Ghana by leading evidence to establish how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal urban policies and their resulting transformations have shaped the political economy settlement of Ghana's construction sector and its land tenure system into durable impediments to safe building construction with repercussions for collapse incidents in the cities.

Thus, evidence has been adduced in this study in showing that the influences of vulnerability for building collapse incidents in Ghana have an historical-institutional context—the factors that give rise to them just as much arise from both *internal* problems (for instance: negligence, carelessness of

individual construction actors; institutional problems like corruption) as *inherited* and *externally-imposed* or *underdevelopment* conditions (such as colonial land policies and neoliberal structural reforms). Consequently, in departure from the extant explication of building collapse as just some isolated ‘unfortunate’ events, accidents or incidents resulting from problems ‘*internal*’ to developing countries, this study projects an historical-institutional analytical conception of vulnerability for such risks that extends, connects and discusses how the underlying poor construction practices and behaviours just as much arise from local as well as externally imposed and inherited conditions, processes and factors. Thus, taken together, the findings of the study corroborate most of the *micro* issues raised in the literature on Ghana and the developing world in general as underlying building safety challenges— to wit: problems with regulation; materials (standards and utilization) and the outsourcing of jobs to low-skilled building practitioners.

Nevertheless, the study takes a critical distance from existing studies which explore the problems without any coherent engagement with the underlying historical-institutional dynamics and integrates or situates their build-up processes within the relevant series of historical factors, processes and developments that have shaped them into structural impediments that recurrently generate vulnerability for collapse incidents. In this sense, the study’s originality lies in its rigorous (re)interpretation and problematization of the extant internal focal discourses within a political-economic framework that explains the historical-institutional context of building safety challenges in the Ghanaian society by shedding light on how collapse incidents emerge from the interplay of the wider societal influences of adverse construction processes and building use practices in the country – some of which are internal while others are externally-imposed and/or inherited.

Put together, the findings suggest that the factors that give rise to vulnerabilities for collapse incidents are partly subordinated to and enmeshed in broader processes that are expressions of international, national and local socio-political economic, processes, factors and developments. In this

sense, the findings corroborate Charles Gore's concern that the tendency for analysts to give primacy to internal national factors, and isolate or separate them from external processes, factors and developments as determinants or causes of phenomena stands to lead to fatally incomprehensive conclusions. See his critique of methodological separatism and nationalism (Gore, 1996; 2010). Regarding the prevalence of the incidents in the cities, the study has argued that while closely linked to urban (demographic and economic) expansions, the critical issues are the historical-institutional contextual factors that undermine safe construction and building use practices in those parts of the country. The study's emphasis on institutional-historical factors as the drivers of building collapse in the Ghanaian cities in contrast to the demographic and economic expansion processes of urbanization is not only at variance with the initial ontological standpoint canvassed on the phenomenon in Boateng (2016; 2018; 2019a); Boateng & Wright (2019) and chapter three. It also has some broader implications for the way the discourses on urban problems in the African continent and developing countries' in general are normally framed –primarily as the consequences of explosive urban population growth – the so-called 'over-urbanization' or 'abnormal' urbanization thesis (Bryceson et al., 2009; Ravallion et al., 2007; Todaro & Smith, 2006; World Bank, 2000 in Obeng-Odoom, 2010a).

The abnormal or over-urbanization thesis' intent focus on population tends to create the impression that Africa's urban problems are solely or even mainly driven by population characteristics. However, as the findings herein suggest, Africa's urban challenge does not seem to be really about population characteristics per se. Rather, the critical forces at play pertain to the historically and socially created socio-political-economic factors, processes and systems that shape, dictate and structure access and the distribution of resources and exercise of power – in ways that produce progressive outcomes for a minority few and largely deleterious outcomes for the majority – which are the enduring legacies of colonial/historical and contemporary-modern policies and the more recent neoliberal-capitalist ideas that in profound ways have shaped and continue to shape urban policies in that part of the world. The

present-day conditions in cities in Africa are, therefore, best understood in the context of the various colonial and nationalist policies and programs of international bodies that organized their urban systems for particular purposes. Broadly, Grant (2001; 2003; 2009); Grant & Nijman (2004); Konadu-Agyemang (2001); Davis (2006); Arku (2009); Fox (2012; 2013; 2014); Okyere et al (2018); Obeng-Odoom, (2009; 2010a; 2010b; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018;); Sowatey & Atuguba (2015); Obeng-Odoom & Bockarie (2018) and other critical postcolonial institutional scholars make similar claims.

The mainstream framing of Africa's urban problems around population characteristics, therefore, serves as a convenient distraction by obfuscating their historical-institutional contexts—i.e. the impacts of the programs, policies and ideologies of colonial and postcolonial governments and international bodies on the creation and magnification of urban pathologies on the Continent. Evidence has been shown in this study in demonstrating how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal capitalist policies of successive governments and programs of international bodies and their resulting transformations have shaped Ghana's informal settlement of building supply and customary land tenure systems into enduring impediments that undermine compliance and enforcement of safe construction practices, with repercussions for building collapses in the cities. The study's findings give impetus to the growing challenge (See, Obeng-Odoom, 2010b; 2016, for instance) for change in mainstream framing of developing countries' urban conditions/problems to focus more on policy processes, institutional dynamics, and historical peculiarities.

Another critical issue that the study's findings address is the de-emphasis of the *social context* of building collapses in building safety discourses. In the unfortunate event of building collapse, horrified by the destructions that come with it – material, human and/or other losses – attention is directed mainly at finding the immediate or actual physical proximate causes – the engineering, physical, or technical

defects disclosed by the collapse. Such matters tend to be considered as primary and paradigmatic (Tsang & Wenzel, 2016; Masurkar & Attar, 2014). On the surface, approaching building collapses this way seems wholly plausible – after all building safety imperatives– statutory or otherwise–usually embody technical or engineering demands (Watt, 2007; Health & Safety Executive, 2015). But, as contended in chapter four, this engineering focal approach to building safety/collapse tends to ignore, conceal or deprioritize a vantage area of inquiry: the impact of wider socio-cultural factors (broadly defined).

The point here is that engineering imperatives are not the only or even the main considerations that influence construction decisions, practices and processes. Rather, socioeconomic, culture and other factors tend to play impactful roles (Habraken, 1988; Lawrence & Low, 1990; Low, 1996; Rapoport, 1969; 1973; 1980; 1982; Moffat & Kohler, 2008; King, 1980; Hewitt, 1997), and, therefore, influence not just the physical components, but also the eventual structure that may emerge. Stuart Hall conveys this point better:

...building a wall involves physical and materials factors, but it could not take place outside a system of meaning, institutionalized cultural knowledge, normative understandings and the capacity to conceptualize and use language to represent to oneself the task on which one was engaged and to build around it a collaborative and communicative ‘world’ of meanings: in short, ‘a culture’. (Hall, 1997: 232).

This implies that whatever is the challenge to structural integrity or safety, the wider societal or socio-cultural influences of poor construction practices and processes are what may cumulate to undermine it. The insufficient emphasis placed on the social context of building collapse (i.e. the engineering focal approach to the analysis of such phenomenon), therefore, denies a theoretically comprehensive understanding of the complex circumstances that collectively lead to such incidents and any systematic search for the technical as well as the social lessons needed to avoid repetition. The findings herein support the view that it is difficult to think adequately about building safety or collapse incidents in isolation from the wider socio-cultural or societal influences of the demand and supply,

design, construction, utilization and adaptation of buildings and the regulation of such processes and practices. The study has led evidence in establishing how Ghana's informal settlement of building supply systems; customary/cultural mode of land alienation; high cultural emphasis on homeownership; incremental culture of building construction; poor building maintenance culture and other structural or wider societal (or socio-cultural) factors influence and reinforce the prevalence of the inappropriate construction and building use practices that lead to the creation of unsafe buildings and, to that end, building collapses in the country.

Further, while the findings of the study corroborate many of the issues raised in the literature on building safety in Ghana and developing countries in general, they at the same time raise issues with some of the established claims in the discourses on construction risks in the country and the developing world in general. As mentioned elsewhere, the ongoing environmental, and climatic changes, and changes in the construction industry such as new building codes and regulations and building materials and general advances in building technology have meant that even the well-trained building practitioner is still under increasing need for more and new knowledge and skills to cope with and provide competent response to the demands that the ever-becoming complex construction industry place on them (Ricketts, 2001; Merritt & Rickett, 2001; Alinaitwe & Ekolu, 2014; Soane, 2016). Thus, the increasing complexity of construction projects creates the need for professionals who are well-trained in all the phases of projects lifecycle (Omran & Hussin, 2009).

Yet, too often, in a range of developing countries, jobs are frequently outsourced to people with little to no professional training (Ayuba et al., 2012; Ede, 2010; Fakere et al., 2012; Oloyede et al., 2010; Dimuna, 2010 in Asante & Sasu; Soane, 2016; Kumar, 2016; Olajumoke et al, 2009; Alinaitwe & Ekolu, 2014; Tchamba & Bikoko, 2016; GHIS, 2012). This leads to shoddy works with adverse repercussions for public safety. For instance, the investigations into the September 2004 collapse of the 5-storey building, which killed eleven (11) and injured over twenty-six (26) people in Kampala, the capital of

Uganda, established that there was no professional architect or engineer retained to be responsible for the supervision of the construction. The site workers who were acting as ‘engineers’ were only technicians and artisans, and not qualified engineers (Alinaitwe & Ekolu, 2014). Additionally, in 2006, the Council for the Regulation of Engineering in Nigeria (COREN) established a committee to inquire into some buildings that had collapsed in 2005 in Port-Harcourt – the fifth largest city in Nigeria. The investigations established that in all the cases, not a single registered engineer was involved in the construction (See Olajumoke et al, 2009). The Ghana Institution of Surveyors once bemoaned that at the core of building safety problems in the country is the non-involvement of professionals “in the design and the construction of buildings, especially when it is a private effort and informal sector” (GHIS, 2012). Keteku-Atiemo (2006) made similar findings. The findings of this study corroborate the Surveyor’s claim and Keteku-Atiemo’s findings.

There was the unanimous view among the multiple stakeholders engaged for the study that the many informal developers who dominate Ghana’s building supply market hardly engage well-credentialed building practitioners in building construction and supervision. Jobs are frequently outsourced to low-skilled artisans and craftsmen. However, the study has established that, as pertain to other developing countries (Stretton, 1981; Ndua and Ng’ethe, 1985), artisanal apprenticeship training in Ghana follows a “learning by doing” system where trainees learn their construction trade from a master artisan or craftswoman/man (Hedidor & Bondinuba, 2017). The master (trainer) transfers his/her knowledge informally to the apprentice or trainee (Stretton, 1981; Ndua and Ng’ethe, 1985). Within the period of training, the trainee remains with the master craftswoman/man, who determines when the trainee is competent enough to graduate from the trade.

A key feature of the artisanal apprenticeship system is that the masters teach their apprentices the way they (the masters) were taught with little or no infusion of new technology and new designs (Stretton, 1981; Ndua and Ng’ethe, 1985; Hedidor & Bondinuba, 2017). Therefore, there is the

possibility of such a system of training creating little to virtually no new knowledge – limiting the exposure and potential of the apprentices and the quality of work that they could execute. Further, their operations are labour intensive since they lack the capital needed to purchase the necessary batching and other equipment to measure, cut and lay materials in accordance with standardized scientific construction practices and procedures. They, therefore, follow clients’ instructions or previous experience in making technical decisions such as determining the ratios for mixing concrete and mortar, moulding and laying of sandcrete blocks (Hedidor & Bondinuba, 2017). The overall effect of the foregoing is that, while they may have some level of experience, craftswomen/men and artisans usually lack the technical wherewithal for important things such as proportioning or batching materials in accordance with scientific and standardized practices, ascertaining materials strength and the suitability of soil, which, then, leads to safety gaps during construction. In the end, either standard non-compliant materials are used or appropriate ones are improperly handled to create defective buildings and in most cases at unsafe locations, which then lead to collapse incidents in the event but also even in the absence of external stimuli such as physical hazards.

It was established in chapter two that one argument that is commonly raised to explain the widespread involvement of incompetent and/or low-skilled building practitioners in construction activities in developing countries is the dearth of qualified building practitioners– a problem observers say has been escalated by the ongoing scale of infrastructural developments in the new mega-cities growing rapidly in those parts of the world (See, for instance, Soane, 2016; Kumar, 2016; Matthews et al., 2012). The inadequacy of construction expertise in developing countries is a well-established problem. It is estimated, for instance, that the population served by a single engineer in Africa is up to thirteen thousand (13,000) people compared to hundred (100) to three hundred (300) people in most developed economies. For the civil engineering profession, the number of engineers serving a given population is even much smaller. For example, one civil engineer in local government in South Africa

serves a population of thirty-three thousand (33,000). These numbers are again much higher for other African countries, with estimated national engineering skills gap hovering around 30 to 50% across the continent (Alinaitwe & Ekolu, 2014). The Engineers for Africa 2012 study found evidence of shortages of engineers in all the countries for which data were available: South Africa, Rwanda, Mozambique, Malawi and Tanzania (Matthews et al, 2012).

The issue of shortage of construction expertise was one of the central foregrounds of the initial framing of the study problem (See Boateng, 2018). A combination of reasons: brain drain, limited capacity of educational institutions in developing countries to train more engineers and the diversion of engineering skills from construction into highly paid sectors such as information technology, software and finance are normally attributed to the shortage of construction engineering expertise in the developing world (See Kumar, 2016). The findings herein suggest, however, that the problem at hand could be much more complex and nuanced than a straightforward shortage of construction expertise. First, the finding that most of the unsanitary structures are located in the cities, which also are the hubs for practicing professional consulting firms sits in tension with the attribution of the problem to the lack or shortage of qualified building practitioners to take up construction services. The point here is that since practicing professional consulting firms are usually located in cities, surely, it should not be difficult for any builder so minded about hiring, say, a suitably qualified construction engineer to supervise her building project to find one.

Second, the framing the problem as the effect of shortage of construction expertise in developing countries overlooks the role factors such as inappropriate colonial planning laws and regulations; market deregulations; the emergence of large-scale construction companies financed by the international capital market and their clientele play in driving up the cost of housing construction, which, then, presses developers who are mostly low income to undertake such safety-undermining construction practices. As discussed elsewhere, the emergence of large-scale foreign banks-financed

private real estate companies and their clientele (mainly Ghanaians abroad, staff of foreign embassies and trans-national corporations) in the Ghanaian construction sector; inappropriate colonial building laws and regulations, which encourage dependence on expensive foreign materials; exchange rate volatility and inflation are driving up the prices of critical building inputs such as land and materials and, thus, the overall cost of housing construction. Given the circumstance of growing cost of building inputs, homebuilders, majority of whom are low-income (UN-Habitat, 2011; Arku, 2009), are always going to aim at cutting down the cost of construction as much as possible.

But without much control over the cost of key inputs like land and materials (as the analysis show, their prices are even influenced mainly by factors that emanate from beyond the borders of the country), the focus is always going to be on the cost of personnel. This, together with the high fees charged by so-called professionals or the perception of their being expensive (*not shortage of highly skilled practitioners* suggested by the conventional discourse), is what makes developers turn to artisans whose charges tend to be lower. The empirical evidence bears out this analysis in the submission of Researcher 1 (whose research explores the building practices, decisions and behaviours of Ghanaians) as follows:

It is mainly due to the quest of building owners to cut down cost of construction. The belief is that engaging professionals throughout the building process is very expensive. With the rising cost of building materials [and land], building owners already spend a lot, which they can do little about. Where they think they have much control is how much they spend on construction workers. So, they make up for the cost of materials in the cost of engaging workers. (Emphasis added)

Another issue established in the study that challenges the claim that the widespread involvement of low-skilled building practitioners in construction activities in developing countries is due to a lack of qualified building practitioners relates to the implications of the activities of land guards (land tenure insecurities in the broadest sense) in Ghana for professional practice. The study has established that a combination of factors including multiple sale of lands; long legal processes for the resolution of land conflicts by the courts; lack of faith in the police and court systems as a result of perceived corruption and bias; and weak law enforcement (Ayee et al., 2008; Darkwa & Attuquayefio, 2012) have generated

a widespread practice in Ghana where land buyers or developers hire armed gangs (known locally as ‘land guards’ – mainly young people) who engage in the use of illegitimate force to threaten and ward off competing rivals. The land guards threaten, maim, and kill people in addition to demolishing properties and preventing hired labourers and building inspectors from doing their job. The accounts of Engineer 2 on his colleagues’ ordeal with some land guards in Accra exemplify this point. He thus submitted,

Because of this land guard issue, a contract we had signed, we abrogated it. We had signed contract with the client to start construction. We had mobilized materials to the site and all of a sudden, we saw some guys on a motorbike –heavily built men. They asked us who gave us permission to come on the land. As we were explaining, one of them slapped my colleague. He slapped him heavily. Because of that we just moved our car from the site, we went to the office, we called the client and we just abrogated the contract.

The findings of the study have corroborated that of Arku et al (2016) that these security concerns have made qualified engineers, architects and other trained building practitioners reluctant to take up construction and supervision of buildings in some parts of Ghana’s cities – especially Accra. “*We are selective of projects*, Engineer 5, for instance, submitted. “*Because when these guys are coming, they come with all kinds of weapons – machetes – some of them even carry guns. And they are not hesitant to shoot to kill.*” Developers, however, could not wait long enough to find qualified personnel willing to brave the risk and take up such projects since they face risks of protracted litigation or loss of funds, if they delayed commencing the project. This situation, according to Arku et al (2016), has generated a common practice where land developers outsource building construction to these same gangs, who have no training and, worse still, do it in haste. The reluctance of building owners and qualified engineers as well as regulators to visit such sites to supervise the construction out of fear for their physical safety creates room for the gangs and their allies to put up weak buildings. Thus, the problem here is not exactly about *shortage of construction expertise*. Rather it is the *land litigations and ‘landguardism’* problem in the country that create room for people without any technical competence or whatsoever in

building construction and supervision to take charge of large-scale unregulated construction of buildings particularly in Accra, the capital, and its environs.

The repertoire of prescriptions that flow from the shortage of construction engineering expertise argument usually focus on supporting developing countries to train more engineers and improve the capacity of their construction professionals (see Kumar, 2016 and Soane, 2016, for instance). But if the findings herein were anything to go by, then the suggestion for improving the capacity of built environment professionals, while worthwhile, could be counterproductive or, at best, produce ambivalent impact. The reason is simple: Having more well-resourced construction engineers in a socio-economic context that provides little personal and economic security will only worsen the problems with brain drain and the diversion of construction engineering skills into other sectors of the economy.

Taken together, the analysis provided by the study does not only challenge the way the phenomenon of building collapse and the underlying causes are perceived and studied. It also raises issues with the way initiatives to improve building safety are usually structured – especially around what could be called *administrative/regulatory approach*. As severally asserted in the study, buildings are safety-critical infrastructure – their failures come or could come with significant human, material, environmental and other losses. As a result, virtually every society has some cultural protections – sets of laws and procedures (usually expressed as statutory and non-statutory demands –building regulations and codes) for the regulation of their built environment or construction industry – the activities of builders, architects, specialized design consultants, contractors and other built environment stakeholders in the design construction, management, repair, maintenance, occupation and even the demolishing of structures (Watt, 2007; Arku et al, 2016; Health & Safety Executive, 2015).

As rightly noted by Asante & Sasu (2018), building safety regulations usually go beyond requiring developers to seek prior permission before the commencement of projects. The regulations normally also specify, among other things, approved materials, design, and personnel to use in the construction

of every building (See also Watt, 2007; Health & Safety Executive, 2015, for instance). This implies that further to the circumvention of the building permit process, the many other factors such as outsourcing jobs to low skilled artisans and foremen; the use of substandard building materials and cutting down material specifications in designs (Kuta & Nyaanga, 2014; Windapo & Rotimi, 2012) that contribute to the occurrence of collapse incidents could all be traced to and placed under non-compliance with or violation of building regulations. Stated differently, all else being equal, high compliance with building regulations will lead to low incidence of building collapse.

But the general experience is that compliance with safety requirements is usually not all that high on developers' list of priorities. Such imperatives, therefore, fall on public bodies mandated to uphold public health and wellbeing by exercising oversight on the construction process and ensuring development control through the enforcement of the relevant construction and building use regulations. For this reason, building safety challenges are usually couched in terms of regulatory failure. For instance, the high rate of building risks in developing countries as compared to the advanced world is usually explained on the account of inadequate enforcement of building regulations and codes (See Berlinski, 2011; Kenny, 2012; Escaleras et al 2007; Lewis, 2005; Özerdem, 1999; Özerdem & Barakat, 2000; Thiruppugazh, 2008; Yates, 2002; Moullier, 2015 – to cite but a few of such studies). Similar sentiments were expressed throughout the engagements with the study participants. The Fellow from the Ghana Institution of Engineers, for instance remarked,

It has to do with how we are implementing and monitoring our regulatory frameworks. Not that we don't have laws. We have. If our laws are working, if you are not certified to do certain jobs, you cannot be there. You can't say you have your own choice and go and take instead of a professional, anyone you want to supervise your work for you.

One of the officers of the Physical Planning Unit of the Kumasi Metropolitan Assembly also submitted *"I think the punitive measures are not stringent enough: I think that if people do that [violate the regulations] and [their buildings are] demolished, they would come for permits before [building]."* Since *"we do not have [enough] people [building inspectors] to go out [and do monitoring at*

construction sites], most developers take advantage and do their own thing: cut corners-use unqualified personnel; cut down material requirements; use substandard ones”, the informant from the Engineering Unit of the Accra Metropolitan Assembly also remarked.

The repertoire of interventions or initiatives that emerge from this *administrative/regulatory approach* to dealing with building safety usually focus on building enforcement capabilities. For instance, as noted elsewhere, concerned by the pervasiveness of structural incidents in the developing world, the *Proceedings of the Institution of Civil Engineers Forensic Engineering Journal* published a themed issue in 2016 (Subbarao, 2016) to deepen the conversations on the need for “concentrated attention by governments, national and local, on initiating, legislating and enforcing measures to improve construction standards” (Soane, 2016, p. 127) in those parts of the world. The regulatory approach to dealing with building safety challenges is widely emphasized not just in Ghana (Ahmed & Dinye, 2011; Boamah et al., 2012; Botchway et al., 2014; Ametepey et al, 2015; Arku et al, 2016; Asante & Sasu, 2018) but also in other parts of the developing world (Kenny, 2009; 2012; Escaleras et al, 2007; Lewis, 2005; Berlinski, 2011; Moullier, 2015; Kuta & Nyaanga, 2014; Windapo & Rotimi, 2012).

There is little doubt that there is a place for the administrative enforcement of construction and building regulations in dealing with incidents of building collapse. But as the analysis herein has shown, the problem with building safety in developing countries does not seem a simple engineering issue that can easily or mainly be remedied through the enforcement of technical regulations and standards of construction. What the phenomenon represents, at least as the findings from Ghana suggest, is a symptom of a complex tangle of factors including but not limited to the emergence of large-scale foreign banks-financed private real estate companies and their clientele in the Ghanaian construction sector; inappropriate colonial building laws and regulations, which encourage dependence on expensive foreign materials; exchange rate volatility and inflation, which are driving up the prices of critical

building inputs such as land and materials and, thus, the overall cost of housing construction; exclusionary state housing policies that disadvantage low-income people; lack of meaningful access to stable or formal housing finance schemes; (urban) housing challenges; poverty; a political economy settlement of informal construction; land conflicts; poor building maintenance culture; institutional and planning failures to designate planned commercial spaces/infrastructure to contain the proliferation of informal businesses in cities—just to mention a few of the underlying causes – of which compromised enforcement of regulations is only one of them.

Thus, beneath the rubble of collapsed buildings, in addition to regulation challenges, are multiple underlying causes many of which share parallels with, and even overlap the discourses in social security and sustainable livelihoods (Bankoff et al., 2004; Wisner et al, 2003), implying, therefore, that interventions to reduce such risks must be broad, more-wider reaching and involve initiatives that address not only direct compliance and enforcement of building regulations, but the tangle of structural conditions including the broader socioeconomic factors that underlie and shape access and distribution of resources and the pursuit of building needs in ways that generate risk or force some people to build themselves into inadvertent disasters. In this sense, the study adds to the growing voice for a city-wide approach to urban policy making such as urged by Jennifer Robinson in her *ordinary cities approach* (See Robinson, 2006).

Taken together, in addition to contributing to understanding of building collapse in the urban context, the study also provides a deeper level of analysis that grounds intervention efforts within a comprehensive understanding of the vulnerabilities they are supposed to reduce. The study's departure from the overly technocratic or engineering focal approach to building safety does not seek to supplant or repudiate the need for technical or engineering measures to reduce the risk of collapses. On the contrary, it takes the centrality of technical and engineering imperatives to the construction process very seriously – the reason it advocates a comprehensive framework that offers insight into the complex

processes and factors that combine to undermine such imperatives. What do the overall findings of the study mean for other developing countries similarly situated; the discourses on building risks in developing countries as well as the theoretical literature on building safety in general? The remainder of the chapter is directed at addressing these issues in detail.

Implications of study findings for other developing countries similarly situated

First, as underscored elsewhere, the scholarly discourses on building safety in Ghana have long followed what could be termed as *internal focal paradigm or approach*. (See, for instance, Asante & Sasu, 2018; Danso & Boateng, 2013; 2015; Tutu & Bempong, 2018; Keteku-Atiemo, 2006; Arku et al, 2016; Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah, et al, 2012; Botchway, et al, 2014; Ametepey et al, 2015; Adinyira & Anokye, 2013; Ahadzie, 2013; Hedidor & Bondinuba, 2017; Hedidor et al, 2016; Offei-Nyako et al., 2014; Keteku-Atiemo, 2006 – to cite but a few of such studies). The marked feature of the internal focal scholarship on building collapse in the country is that they tend to conceptualize them as the consequences of individual factors such as carelessness, negligence, greed, and indiscipline; regulatory blunders or the interplay of both. However, this approach to the study or analysis of building collapse typifies not just Ghana – that is the way the scholarly discourses on building safety in developing countries in general are commonly framed. (For a review, see Oloyede et al., 2010; Wachira, 2015; Adewole et al, 2014; Adesanya & Olanrewaju, 2014; Fernandez, 2014; 2015; Babatunde, 2013; Fagbenle & Oluwunmi, 2010; Ayuba et al., 2012; Olajumoke et al, 2009; Ede, 2010; Fakere et al., 2012; Dimuna, 2010; Kuta & Nyaanga, 2014 in Asante & Sasu, 2018; Windapo & Rotimi, 2012; Alinaitwe & Ekolu, 2014; Tchamba & Bikoko, 2016).

Whether viewed as consequences of individual factors such as carelessness, negligence, greed, and indiscipline, as the consequences of regulatory blunders or the interplay of both, the key feature of the discourse is that it constructs building collapses as the unintended outcomes of the interplay of problems that are *internal* to the developing countries where they occur. The centrality or criticality of the issues

emphasized in the internal focal literature to building safety challenges in developing countries cannot be denied. Indeed, this study has made similar findings regarding how, for instance, the outsourcing of building construction and supervision services to low-skilled artisans and craftsmen; utilization of substandard materials and improper handling of even standard-compliant ones in the context of compromised enforcement of safe construction standards and practices, among other factors, contribute to the creation of unsafe buildings. But, nevertheless, it seems the approach could increase our learning only so much for there is even more to learn from examining how the '*micro*' problems it highlights are influenced by more *macro* issues of the political-economic influences of construction and building use practices and, especially, from how these two scales/levels of emphases interact with each other and other forces at local, national, and even global levels in nurturing and/or generating the inappropriate construction practices and behaviours that underprop the emergence of collapse incidents.

Drawing on the political economists' methodology of accident research (Molotch, 1970; Obeng-Odoom, 2010; 2018; Beamish, 2002; Matthewman, 2012; Wales, 2017; Freudenburg et al., 2009; Tierney, 2007; 2010) and with due attention to Charles Gore's call for the rejection of methodological separatism/nationalism (Gore, 1996; 2010), the study has demonstrated empirically that the causes of the deficient construction practices and behaviors that lead to the creation of unsafe buildings in Ghana just as much arise from *internal* as well as *externally imposed* and *inherited* conditions, processes and factors. All told, the insight from Ghana suggests that, contrary to the received wisdom, building collapses in the Global South are about but not just mistakes, carelessness or negligence of individual building practitioners or clients/developers and/or regulatory blunders. They have an institutional-historical context – the factors that give rise to such risks are just as much influenced by internal problems as underdevelopment (externally-imposed and inherited) conditions. The finding suggests that the ongoing scholarly conversations on building collapses in developing countries may need to take into account how the factors or conditions that give rise to vulnerabilities for such risks especially in the

rapidly urbanizing parts of those regions of the world may be partly subordinated to and/or enmeshed in broader processes that are expressions of international, national and local socio-political economic dynamics, factors and developments. This is especially so given the overwhelming scholarly consensus that the present political economy settlements of the construction sectors of many developing countries are the creations or products of not only internal processes and factors, but also of decades of colonial and postcolonial modernization and the recent market-led neoliberal order (See Wells, 1998; 2001; 2007; Wells & Wall, 2003).

Undoubtedly, the findings of the study must be read against the backdrop of how a unique set of socio-cultural and political-economic factors operate, shape and dictate the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices in ways that undermine, deprioritize and/or compromise safety, wellbeing and sustainability imperatives in the geographically specific context of Ghana's cities. Additionally, while the study's qualitative design on one hand well positions it to provoke sufficient discussion to interrogate established narratives, it on the other hand comes with some level of limitations regarding its potential to make representative claims. These contextual and methodological limitations of the study are duly acknowledged. But, nevertheless, it is apparent that the factors at play are untypical of just the Ghanaian context (most of them are discernible in other developing countries as well), which, thus, suggests that the findings from Ghana could be meaningful elsewhere.

First, some of the structural factors established as critical to understanding building safety challenges in Ghana include the country's informal sector-driven building supply market dominated by low income people. The study has established that their socio-economic situations create path dependency or ratchet effects, and, thus, limit their capacity to invest in safer building materials, construction, and highly skilled labourers. This forces them to cut corners by outsourcing jobs to cheap but technically challenged artisans and contractors; utilizing cheap but inferior materials; cutting down material and

other safety requirements specified in designs. However, the problems associated with this informal settlement of the provision of building needs in Ghana (Bondinuba et al., 2016; Bondinuba, 2012; Hedidor & Bondinuba, 2017; Bedu & Ankai, 2016; Hedidor et al., 2016; Keteku-Atiemo, 2006; Tutu & Bempong, 2018; NADMO, 2014; GhIE, 2012) is discernible in other developing countries as well (See, for instance, Wells & Wall, 2003; Wells, 2007; Ofori, 2007; Mitullah & Wachira, 2003, Adewole et al, 2014; Ayodele et al., 2011; Adenuga, 2012; Lizarralde, et al, 2013; Miekke, 2011; Arnott, 2008).

Related to the informal sector-driven structure of Ghana's building supply market is the incremental process of building construction. As noted elsewhere, in contrast with the practice in the advanced world where self-building a house involves the owner engaging construction professionals to build on his or her behalf (Merritt & Rickett, 2001; Rickett, 2001), Ghanaians self-build their houses through a protracted process of incremental construction (Ahadzie and Amoa-Mensah, 2010; Boamah 2014; Asante et al, 2018; Tipple et al., 1998). The study has established that this way of building construction also plays critical roles in the creation of unsafe buildings and lead to collapse incidents. The reason being that not only does the construction process take sufficiently long time (5 – 15 years or more) but also since the materials and every stage of the uncompleted structure are exposed to constant wetting and drying weather conditions throughout the many years it takes to complete the building, structural integrity or safety issues set in long before the buildings are even completed.

However, once again, this gradual step-by-step process of building construction, whereby owner-builders append or improve building components as funding, time, or materials become available is just as widespread in Ghana (Ahadzie and Amoa-Mensah, 2010; Boamah 2014; Asante et al, 2018; Tipple et al., 1998) as in almost all developing countries (Moullier, 2015; Ferguson & Smets, 2010; Soonsuk et al., 2014; Rojas, 2015; Ferguson, 1999; Smets, 1997; Yap & De Wandeler, 2010; Sengupta, 2010). Thus, the phased process of self-built construction, just as pertain to Ghana, is the dominant pattern of building construction in many developing countries. A World Bank study (Moullier, 2015) estimated

that incremental constructions account for 50 to 90 percent of new housing in developing countries. Furthermore, in addition to compromising compliance with building permit regulations, the study has also established that land tenure insecurities associated with Ghana's customary mode of land alienation and management (Arku et al, 2016; Ayee et al., 2008; Darkwa & Attuquayefio, 2012) also contribute to the prevalence of other inappropriate construction practices such as outsourcing jobs to incompetent people and uncontrolled hasty constructions in the country. Once again, the customary mode of land alienation and administration pertain to other developing countries as well (see for instance Kishindo, 2004 & Berry, 2008; Moullier, 2015; Ezigbalike et al., 1995; Henssen, & Williamson, 1990; Development Technical Committee, 2015; Hanstad, 1997).

Another critical factor discussed in the study as underlying building safety challenges in Ghana was deficient construction governance and urban management. The findings of the study have corroborated that of others (such as Yeboah & Obeng-Odoom, 2010; Ahmed & Dinye, 2011; Oosterbaan et al, 2012; Boamah, et al., 2012; Botchway et al., 2014; Ametepey et al., 2015; Arku et al, 2016; Asante & Sasu, 2018) that the intractable problem of institutional corruption; capacity or resource challenges – human and equipment; political interference undermine or compromise efficient and effective enforcement of safe building regulations in Ghana – especially in the cities where the will to develop is undermining the need to be prudent. In the end, huge stocks of unsafe buildings are created waiting for their day. But, once again, these problems are also evident in other developing countries as well (Kenny, 2009; 2012; Escaleras et al, 2007; Lewis, 2005; Berlinski, 2011; Moullier, 2015; Soane, 2016; Kuta & Nyaanga, 2014; Windapo & Rotimi, 2012).

Finally, the study has established that demographic and economic expansions in urban settings – i.e. urbanization play critical roles in exacerbating vulnerabilities for the occurrence of the collapse incidents in the Ghanaian society. Specifically, the findings suggest that the exigencies or pressures of accelerated demand for buildings in the cities, triggered by explosive demographic and economic

expansions, are worsening existing socio-economic and institutional-cultural or *structural* influences of adverse construction processes and building use practices in the Ghanaian society in ways that lead to widespread creation of structurally incompetent buildings in the cities, which, thus, explains the prevalence of collapse incidents in those parts of the country. However, yet again, the demographic and economic expansion phenomenon of urbanization is as ever-present in Ghana as other developing countries. For instance, as noted in chapter two, rapid urbanization is prevalent throughout the developing world (UN, 2014). Nearly 90% of the 2.5 billion people joining the world's urban population by 2050 will be concentrated in Asia and Africa – the hubs of developing countries (UN, 2014). Today, around 40 per cent of Africans are urban dwellers, about 500 million people – projected to swell to over 1.4 billion in the next few decades.

The overall import of the comparative analysis mounted between Ghana and other developing countries is to drive the rather clear point that there are situational semblances that strongly suggest that the factors unraveled in this study as underlying the collapse of buildings in cities in Ghana are not just culturally and/or geographically specific – they are discernible in other developing countries similarly situated. However, further studies are needed to validate that. Such an endeavor will be relevant for not just the validation or otherwise of the claims raised in this study, but also for developing a stronger global understanding of the phenomenon as well as unravelling contextual differences between and among cities and countries to inform well-targeted interventions.

Implications of findings for safety research in the construction sector

It was argued in chapter four and (Boateng, 2019b) that current level of knowledge on the impact of socio-cultural factors on building collapse is limited. Part of the reason lies with the way their influence on safety is framed in the construction sector: The scholarly discourses on societal or socio-cultural factors in the construction sector focus only on their impact on worker safety – i.e. health and safety management concerns during physical construction or at construction sites (Peckitt et al., 2004;

Rowlinson 2004; He et al., 2016; Tutt et al, 2013; Jia et al., 2016; 2017). Their impact on accidents caused by built structures or the *products* of the construction industry is barely engaged. The other part of the reason lies with the engagement of building collapse (and for that matter structural failures in general) in the domain of forensic structural engineering. Forensic structural engineering approaches failures as consequences of flaw(s) in the system of professional practice (Subbarao, 2016; Heywood, 2010). Emphasis is, therefore, placed on technical/physical causes (Kwasniewski, 2010; Fu, 2009; 2010). The de-emphasis of socio-cultural factors is, therefore, not an oversight, but a reflection of central assumptions.

However, first, as I argue elsewhere (Boateng, 2019b; 2019c), the principles of health and safety in the construction sector apply to not only those who are engaged in work (Rowlinson, 2004; McDermott et al., 2018); they also apply to those who are placed at risk by work activities, including members of the public (Hayes, 2017; Hackitt, 2018). Therefore, limiting the analysis of the impact of socio-cultural factors on safety in the sector to only worker safety, as being pursued currently (Peckitt et al, 2004; He et al., 2016; Tutt et al, 2013; Jia et al, 2016; 2017), obscures the impact of the factors on another vantage area of safety in the sector: the dangers posed by completed structures such as buildings to public health. Second, engineering considerations, while important, are not the only or even the primary considerations that influence construction decisions, practices and processes. Rather, socioeconomic, culture and other factors tend to play impactful roles (Hewitt, 1997; Tam et al., 2000; Habraken, 1988; Lawrence & Low, 1990; Low, 1996; Rapoport 1969; 1973; 1980; 1982; Moffat & Kohler, 2008; King, 1980; Smiley et al., 2014).

Buildings are not just assemblages of physical materials based only on technical or engineering considerations and specifications. They are constitutive or physical representation of complex and often-competing interests and various factors and different motivations of which structural integrity/engineering imperatives or safety is only one of them (Hewitt, 1997). Thus, underpinning the

construction process are not just technical or engineering imperatives—socio-economic considerations, institutional and cultural factors play influential roles (Kaminsky, 2018; Hall, 1997) and, thus, all together impact on not just the engineering components, but also the eventual structure that may emerge. Indeed, it is long established in the social production of built forms literature that the entire built environment are essentially socio-cultural products or artefacts (Kaminsky, 2018; Lawrence & Low, 1990; Low, 1996; Rapoport, 1969; 1973; Moffat & Kohler, 2008; King, 1980; Hall, 1997). For instance, “buildings”, King (1980) argues,

Result from social needs and accommodate a variety of functions –economic, social, political, religious and cultural. Their size, appearance, location and form are governed not simply by physical factors (climate, materials or topography) but by a society's ideas, its forms of economic and social organization, its distribution of resources..., its activities, beliefs and values" (King, 1980:1).

In this respect, the built structure is conceived not only as a product of structural integrity, but also of social, political, economic and cultural means – implying, therefore, that whatever will be the challenge to structural integrity or safety, the socio-cultural influences of poor construction processes and building use practices are what may culminate into it. Thus, whereas every collapse incident may be the inevitable consequence(s) of flaws in the system of professional engineering practice, holistic understanding of the underlying causes lies with the enduring socio-cultural influences of deficient construction processes and building use practices. Therefore, analysing collapse incidents without recourse to the wider societal influences of unsafe construction processes and building use practices (i.e. the engineering focal approach) risks context minimization error—the tendency to ignore the impact of socio-cultural factors on phenomena. This, limits the potential of arriving at a theoretically comprehensive understanding of the complex circumstances that collectively lead to such disasters and any systematic search for the technical as well as the social lessons needed to avoid repetition— the reason, once again, the study could be useful to safety research in the construction sector.

The findings of the study strongly corroborate the view that it is difficult to think adequately about building safety or collapse incidents in isolation from the wider socio-cultural or societal influences of the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices. The study has led evidence to show how the informal settlement of Ghana's construction sector; customary/cultural mode of land alienation; incremental culture of building construction; poor building maintenance culture and other similar structural or wider societal (socio-cultural) factors influence and reinforce the prevalence of inappropriate construction and building use practices, with adverse repercussions for building safety in the country. By bringing into sharp focus the impact of socio-cultural factors on building collapse, the study does not simply broaden the scope of building safety concerns for a deepened focus on such factors just for the sake of it.

Rather, it deepens awareness and provides systematic insights into how they operate, shape and dictate the demand and supply, design, construction, utilization and adaptation of buildings as well as the regulation of the underlying processes and culminate into the technical/engineering problems that later become the focus of forensic investigations when collapses or failures occur. In this sense, in departure from, but complementary to the traditional consideration of the phenomenon as an '*engineering*' problem, the study offers an intricately connected causal explication of building collapse that embraces diversity of factors: the social, economic, political and cultural influences of unsafe construction and building use practices. It, thus, projects broad and interdependent analytical conception of vulnerability for building collapse that extends, connects and discusses how such phenomena, while usually marked by engineering defect(s), are deeply embedded and inseparably connected to wider societal factors.

Implications of findings for practice

The findings of the study have different levels of practice implications. The first to be discussed is in respect of urban policy in Africa. Mainstream urban policy debates in Africa (but globally also

though) tend to be framed around two considerations: Urban agglomeration as an imperative for development or the ‘engine of growth’ (Potts, 2009; Njoh, 2003) or as a severe drain on development (See, World Bank 2000; Bryceson et al. 2009; Kamete et al, 2001). These analytical arcs underpin the two widely embraced public policies to either limit urban agglomeration in Africa or give it full expression without any impediments. The analysis presented in this study suggests that none of these policy approaches could be effective for addressing Africa’s urban problems. The study findings show that even as the Continent’s urban problems tend to be closely linked to population expansions, the underlying causes are usually structurally interwoven into the political economy settlement of their urban systems most of which were shaped and moulded from the dynamic interplay of indigenous, inherited and externally-imposed conditions, factors and ideologies. The study has led evidence in showing how the intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have shaped an informal settlement of building supply and an undisciplined land tenure systems, which undermine compliance and enforcement of safe building and construction practices in the Ghanaian society, with adverse repercussions for building safety. The mainstream population heavy-approach to urban problems in the Continent, therefore, serves as a convenient distraction by obfuscating their historical-institutional contexts– i.e. the impact of the programs, policies and ideologies of colonial and postcolonial governments and international bodies on the creation and magnification of urban pathologies in those parts of the world. Africa’s urban public policy should, therefore, be neither about limiting nor stimulating urban agglomeration. It rather must target the historically and socially created structural imbalances that shape, structure and dictate access and the distribution of resources and exercise of power in ways that produce progressive outcomes for a minority few and deleterious outcomes for the majority.

Aside from urban policy in Africa, the findings of the study also have implications for the way building collapse is traditionally approached. In the unfortunate event of building collapse, moved by

the loss of lives and properties, attention is usually directed mainly at addressing the immediate causes – the engineering or technical defects disclosed by the collapse. Such matters tend to be considered as primary and paradigmatic. This engineering focal approach to dealing with building collapse seems wholly plausible – after all in the final analysis, every collapse incident inevitably will eventually be marked by a technical or engineering defect. Since the engineering imperatives that undergird how buildings should be or are designed, built, managed, repaired, maintained, occupied and even demolished are usually embodied in statutory and non-statutory demands: building regulations and codes (Watt, 2007; Asante & Sasu, 2018; Health & Safety Executive, 2015), it is widely held that building collapses could be administratively addressed through the enforcement of such regulations and codes. Indeed, as noted elsewhere, the high incidence of building risks in developing countries as compared to the advanced world is usually explained on the account of inadequate enforcement of building regulations and codes (See Berlinski, 2011; Kenny, 2012; Escaleras et al 2007; Lewis, 2005; Özerdem, 1999; Özerdem & Barakat, 2000 Yates, 2002; Moullier, 2015; Soane, 2016 – to name but a few of such studies).

Undoubtedly, every collapse incident might eventually be due to noncompliance and/or non-enforcement of the appropriate engineering imperatives underlying the construction and use of buildings. However, as the analysis herein has shown, it is the wider socio-cultural influences of the pursuit and the provision of building needs and services that culminate to undermine compliance and enforcement of such engineering imperatives. This implies that vulnerability for building collapses is not just a matter of engineering that can easily or even mainly be dealt with through the enforcement of technical regulations. Built into the study's political economy emphasis regarding the need to connect the causal influences of vulnerability for accidents to their historical-institutional roots is the recognition that such phenomena, whatever their form or nature, cannot be adequately addressed without a deeper understanding of the structure of the social conditions and processes from which they emerge.

The analysis provided herein shows that incidents of building collapse are the logical and chronic systemic consequences of the workings of the prevailing socio-political economic conditions and factors that shape, dictate and/or constrain people's construction decisions, practices and behaviours in the Ghanaian society. Standing back from the extant framing or reading of the phenomena as some unfortunate '*events*', '*accidents*' or '*incidents*' resulting from isolated mistakes, carelessness or negligence of individual building practitioners or clients/developers and regulatory blunders, the study argues rather that it is more insightful to perceive the causes as structurally interwoven into the broader political-economic influences of the construction and building use practices in the country. This etiological analysis the study brings to the fore prevents excessive attention from being directed towards the immediate causes as it shows that such factors (for instance: outsourcing jobs to low-skilled practitioners), while undoubtedly precarious, are influenced or dictated by higher-level factors (such as the emergence of large-scale foreign banks-financed private real estate companies and their clientele in the Ghanaian construction sector, which is driving up the prices of critical building inputs such as land and the overall cost of housing construction) and are, therefore, not standalone factors.

The implication of this is that interventions to reduce vulnerability for such risks must be broad, more-wider reaching and involve initiatives that address not only direct compliance and enforcement of engineering imperatives, but the tangle of structural conditions including the broader socio-political economic factors that underlie and shape access, distribution of resources and exercise of power in society in ways that generate risk or force people to build themselves into disasters. In essence, the analysis provided herein directs attention toward root causes rather than treating symptoms. In this sense, the study adds to the growing voice in public health circles for an increased policy focus on addressing the 'causes of the causes' of risks (see McKee, 2017; Marmot, 2005; Njoh, 2012; Obeng-Odoom, 2014).

The study brings into strong focus the importance of non-technical interventions as a pre-emptive way of dealing with building collapse. For instance, it has led evidence in showing that the failure and/or inability of the public formal and private formal sectors to deliver the required affordable quantity of units to catch-up with the ever-growing building needs of the so many low income people in Ghana has meant that building needs provision, just as pertain to most developing countries (Lizarralde, et al, 2013; Miekle, 2011; Wells, 2007; Ofori, 2007; Arnott, 2008) is on the shoulders of the informal sector (Arku 2009; Hedidor & Bondinuba, 2017; Hedidor et al, 2016; Bedu & Ankai, 2016; Fugar et al., 2014; Owusu-Ansah et al., 2018; Obeng-Odoom, 2011). However, with the prevalence of poverty and rising cost of building inputs such as land and materials in Ghana (Arku, 2009; GSS, 2018; Cooke et al., 2016; World Bank, 2014; GSS, 2014), these low-income informal developers who are normally also burdened with other life course commitments (Asante et al, 2018) could not have enough resources to invest in safer materials, construction, and skilled laborers and periodic maintenance.

They are, therefore, forced by their socio-economic situations to undertake inappropriate corners cutting practices such as outsourcing jobs to cheap but incompetent artisans and contractors; utilizing cheap inferior construction materials and/or cutting down materials specifications in designs. The lack of enough and stable income has also meant that buildings are not completed at a go: Every part of the construction is done incrementally, in piecemeal – a process which takes sufficiently long time (5 – 15 years or more) that the structures would usually be ripe for integrity or safety crisis long before they are even completed due to constant exposure of materials and every stage of the uncompleted structure to wetting and drying weather conditions. From a prevention point of view, provision of public housing and institution of housing finance schemes that target low and middle-income urban dwellers may be a pre-emptive way of reducing vulnerability for risks of collapse in the cities. Further to the above, the study has also found that the intractable insecurities and conflicts associated with Ghana's customary

land tenure system are central to establishing the grounds for the prevalence of the inappropriate construction practices (a rather insightful finding likely to be concealed in any engineering focal study).

This may mean that resolving land problems could be a pre-emptive way of improving building safety in cities in Ghana. A recap of the nexus between land tenure insecurities and poor construction practices in the country may be necessary to convey this point with much clarity. The study found that, in many urban areas in Ghana, the state owns some land but (as pertain to other parts of Africa– see Kishindo, 2004 & Berry, 2008, for instance) customary tenure systems are the major custodians of land and typically govern land transactions (UN-Habitat, 2011; Arku et al, 2016; Ubink, 2008; Amanor & Ubink, 2008; Amanor, 2008). The system, however, is characterized by widespread disputes and uncertainty, where landowners commonly sell the same land to multiple people–taking advantage of the country’s intractable land registration/administration challenges (Arku et al, 2016; Ayee et al., 2008; Darkwa & Attuquayefio, 2012). The Land Development (Protection of Purchasers) Act, 1960 (Act 2) applicable to Accra and its environs, which automatically confers ownership of land on anybody who builds to lintel level on any land, even if it did not belong to him or her, has worsened the insecurities as it emboldens encroachers to claim land unjustly (Arku et al, 2016).

The combination of these factors put developers in perpetual anxiety of losing or having to litigate with other parties for their lands. To forestall this, they commence projects immediately on purchasing lands and thus circumvent due process fearing that their permit application may be refused or unnecessarily delayed. The constant contestations associated with land titles is also responsible for the security concerns underlying the reluctance of engineers, architects and other qualified building practitioners to take up construction and/or supervision of buildings in some parts of Ghanaian cities, and, hence, the widespread practice of outsourcing construction services to untrained gangs in the country (Arku et al, 2016). Further, due to resource constraints and even more importantly personal safety reasons, the cities’ development control and building inspection departments/directorates have

been unable to bring the practice under control. Thus, because of land tenure insecurities, armed gangs with no technical competence or whatsoever in building construction nor supervision are now in charge of large-scale unregulated construction and building developments in the cities. Clearly, addressing land title insecurities could create an upward spiral effect in minimizing regulations noncompliance and the other deleterious construction practices that developers are forced to undertake to protect their lands, which inadvertently adversely affect building safety.

Additionally, the findings show that one major issue at the heart of building collapse in cities in Ghana is the conversion of residential buildings to commercial uses— a rather dangerous response to the mismatch between the increased commercial activities in urban settings—some formal, but mostly informal and the needed infrastructure to support such activities. As one veteran city planner underscored in Oosterbaan et al: *“People desperately want to do business. But because there are not enough officially designated commercial spaces these people have no choice but to fall on the available residential properties and convert them to commercial units”* (Oosterbaan et al, 2012: 56). Thus, limited officially planned areas for commercial activities is at the heart of the widespread conversion of residential buildings to commercial uses, which, in turn, leads to disastrous outcomes. From a prevention point of view, problems like this would not require engineering or technical solutions: All that city authorities may need to do is simply earmark and develop spaces for commercial activities to reduce the incentives for the conversion of residential buildings to commercial uses, which then lead to collapses.

As conceded elsewhere, the study’s departure from the overly technocratic or engineering focal approach to building collapse does not seek to supplant or repudiate the need for technical or engineering measures to reduce such risks. It only advances a deeper level of analysis that grounds intervention efforts within a comprehensive understanding of the vulnerabilities they are supposed to reduce. It urges a greater focus on the socio-cultural influences of adverse construction and building

use practices as they influence the technical problems, which, albeit rather belatedly, become the subject of forensic investigations when disasters occur. Such an enterprise could be useful for identifying pathways to avoid, if not all, most of the catastrophic building incidents that tend to undermine public health.

To the global, national, and local actors working on the health of cities, perhaps, the utmost practice lessons of the study could be gleaned from its historical emphasis. Contrasted with existing studies (Asante & Sasu, 2018; Olajumoke et al, 2009) which explore the causes of building collapses without any coherent engagement with the underlying historical-institutional dynamics, the study integrates or situates their build-up processes within the relevant series of historical factors policies, developments, and, even more importantly, ideologies that have shaped them into the enduring conditions that recurrently generate vulnerability for such risks. This shows that the decisions about urban infrastructure, buildings, land use and management taken today could also have serious unintended impacts on development outcomes in the future and can prove critical in either preventing or locking cities into unsustainable development pathways that will expose them to increasingly intense and frequent urban shocks and stresses.

CHAPTER NINE

BRINGING IT ALL TOGETHER: CONCLUDING REMARKS & SUGGESTIONS/AREAS FOR FURTHER RESEARCH

The study's analysis of secondary and primary data shows that the strain on the informal settlement of building supply systems in Ghana; land tenure insecurities and weak regulation are critical to how the creation of unsafe buildings arise and are thus central to establishing the grounds or structural context for the deleterious consequences of building collapses in the country's cities. The intersectionality of colonial and postcolonial modernization and recent market-led neoliberal policies and their resulting transformations have shaped Ghana's customary land tenure system and informal settlement of construction into enduring impediments to the compliance and enforcement of safe construction regulations and practices in the country. In the cities' context, the deleterious impacts of the impediments have been exacerbated by accelerated demand for buildings triggered by rapid urban expansions leading to the creation of even more unsafe and poorly maintained buildings and to that end, the reason most collapse incidents occur in those places.

Put simply, the findings suggest that while closely linked to urban expansions, the phenomenon of building collapse in cities in Ghana has an historical-institutional context: the factors that give rise to them just as much arise from internal problems (such as regulatory blunders) as they do from underdevelopment (or externally imposed and inherited) conditions (such as colonial and neoliberal urban policies). Standing back from the extant framing or reading of the phenomena as some unfortunate '*events*', '*accidents*' or '*incidents*' resulting from isolated mistakes, carelessness and/or negligence of individual building practitioners or clients/developers or regulatory blunders, the study argues rather that it is more insightful to perceive the causes as structurally interwoven into the broader political-economic influences of construction and building use practices in the country. This analysis shows that the frequently asserted view that, as with developed countries, vulnerability for building collapses in developing countries, could be addressed administratively through the enforcement of

technical regulations and codes has shakier basis than is commonly assumed Interventions to reduce such risks must be broad, more-wider reaching and involve initiatives that tackle not only direct compliance and enforcement of technical regulations. They must also target structural issues including the historically and socially created socio-political-economic factors, processes and systems that shape, dictate and implicate the pursuit and the provision of building needs and services in ways that produce progressive outcomes for a minority few and largely deleterious outcomes for the majority.

The sustainability implications of the study's findings lie in its historical emphasis. Contrasted with existing studies which explore the causes of building collapses in developing countries without any coherent engagement with the underlying historical-institutional dynamics, the study integrates or situates their build-up processes within the relevant series of historical factors, policies, developments, and, even more importantly, ideologies that have shaped them into structural problems that recurrently generate vulnerability for such risks. The study goes to great lengths in amplifying the historical-institutional context of the phenomenon under the admittedly vainglorious presumption that the lessons may nudge the various global, national, and local actors working on the health of cities to be more reflective of the decisions they take today about urban infrastructure, land use and management, as they could have great unintended impacts on development outcomes in the future and prove critical in either preventing or locking cities into unsustainable development pathways that will expose them to increasingly intense and frequent urban shocks and stresses.

The study could claim the following modest contributions to knowledge. First, in departure from the extant explication of building collapse as just isolated 'unfortunate' events, accidents or incidents resulting from problems '*internal*' to developing countries (Asante & Sasu, 2018; Olajumoke et al, 2009), the study offers an historical institutional analytical conception of vulnerability for such risks that extends, connects and discusses how the underlying deleterious construction practices and behaviours are just as much connected to *internal* as well as *externally imposed* and *inherited*

conditions, factors and ideologies. Second, the study joins the growing wave of dissent (Obeng-Odoom, 2010; 2010b; 2016) from the mainstream abnormal urbanization thesis – the primary grounding around which questions on Africa's, and broadly, developing countries' urban conditions are framed (Bryceson et al., 2009; Ravallion et al., 2007; Todaro & Smith, 2006; World Bank, 2000 cited in Obeng-Odoom, 2010). The abnormal or over-urbanization thesis' intent focus on population tends to create the impression that urban problems are solely or even mainly derived from population characteristics, especially the size of urban populations (Molotch, 1976; Obeng-Odoom, 2016).

The empirical evidence on the causes of building collapse in cities in Ghana does not bear out this claim. The evidence bears out rather that, while closely linked to urban expansions (economically and demographically), the causes of building collapse in the country are structurally interwoven into the political economy settlement of the country's urban system, which were shaped from and by the intersectionality of the ever-enduring forces of colonial/historical and contemporary-modern policies and the more recent world system neoliberal-capitalist ideas that in untold ways have shaped and continue to shape the design and implementation of urban policies and other agenda of successive governments and international bodies in the country. The building need pressures induced by rapid urban expansions only worsen or exacerbate the scale of the problem by encouraging the creation of even more unsafe buildings in the cities and, hence, the reason most collapse incidents occur in such places. Focusing only or even mainly on population dynamics, therefore, obfuscates the historical-institutional context of the problem by serving as a convenient distraction.

Finally, with the construction literature, the study brings into sharp focus the social context of building collapse–i.e. the impact of wider socio-cultural factors on building safety/collapse. As argued in chapter four and elsewhere (Boateng, 2019c), current level of knowledge on their impact on such risks is limited. Two reasons were noted for why the state of the art on the phenomenon is so. The first lies with the way socio-cultural factors are framed as implicating but only on safety in the context of

physical construction – i.e. worker safety (Peckitt et al, 2004; He et al, 2016; Tutt et al, 2013; Jia et al, 2016; 2017). The second reason lies with the traditional conceptualization of such risks as ‘*engineering*’ problems (Kwasniewski, 2010; Fu, 2009; 2010). The de-emphasis of socio-cultural factors is, therefore, not an oversight, but a reflection of central assumptions.

However, regarding the narrowing of the implications of socio-cultural factors for safety in the construction sector to just physical construction, the study has argued that the principles of health and safety in the construction sector apply to not only those who are engaged in work; they also apply to those who are placed at risk by work activities, including members of the public. Therefore, limiting the analysis of the impact of socio-cultural factors on safety in the construction sector to only worker safety, as being pursued currently (Peckitt et al, 2004; He et al, 2016), obscures their impact on another vantage area of safety in the sector: the dangers posed by completed structures such as buildings to public health. And with the engineering focal approach to building safety, the study has led evidence in establishing that, when all is said and done, whereas every collapse incident may be the inevitable consequence(s) of flaws in the system of professional engineering practice, holistic understanding of the underlying causes lies with the wider socio-cultural influences of substandard construction and building use practices. This implies that, from a prevention point of view, it is difficult to think adequately about building safety or collapse in isolation from the wider socio-cultural or societal influences of the demand and supply, design, construction, utilization and adaptation of buildings and the regulation of such processes and practices.

Thus, approaching incidents of building collapse without recourse to the wider societal influences of inappropriate construction processes and building use practices risks context minimization error—the tendency to ignore the impact of socio-cultural factors on phenomena. This limits the potential of arriving at theoretically comprehensive understanding of the complex circumstances that collectively lead to such disasters and any systematic search for the technical and social lessons needed to avoid

repetition— the reason the findings herein could be of utmost importance to safety research in the construction sector. By bringing into sharp focus the social context of building collapse, the study does not simply broaden the scope of concerns for a deepened focus on the impact of socio-cultural factors on building safety just for the sake of it. Rather, it deepens awareness and provides systematic insights into how the factors operate, shape and dictate the demand and supply, design, construction, utilization and adaptation of buildings as well as the regulation of the underlying processes and culminate into the technical/engineering problems that later become the focus of forensic investigations when collapses or failures occur.

In this sense, in departure from, but complementary to the engineering focal approach, the study offers an intricately connected causal explication of building collapse that embraces a diversity of factors: the social, economic, political and cultural influences of poor construction and building use practices. It, thus, projects broad and interdependent analytical conception of vulnerability for building collapse that extends, connects and discusses how such phenomena, while usually marked by engineering defect(s), are deeply embedded and inseparably connected to wider societal factors.

Suggestions/areas for further research

The contributions above notwithstanding, the study has some limitations. First, as noted elsewhere, the findings from Ghana do not appear to be culturally and/or geographically specific; they strongly seem meaningful to other developing countries similarly situated. Nonetheless, further research is needed for this validation and such an endeavour will be relevant for developing not just a stronger global understanding of the phenomenon, but also for unravelling contextual differences between and among cities and countries to inform well-targeted recommendations and interventions. Second, having explained why buildings collapse in Ghana's cities, the study invites the corollary: why (some) buildings stand. Who is doing the right thing and why? Is there something going on that is not accounted for in the discourses on unsafe building construction and development control in the country? These

questions, while undoubtedly interesting and worthy of exploration, are beyond the scope of the study. Future studies may explore them.

I would like to spend my final words on the Sekondi-Takoradi Metropolis, the capital city as well as the industrial and commercial hub of the Western Region of Ghana. After the discovery of oil in commercial quantities in 2007 in Ghana, Sekondi-Takoradi (now called Ghana's 'Oil City') has been the point of attraction for both foreigners and Ghanaians. According to one prominent Ghanaian political economist, Franklin Obeng-Odoom, the arrival of the oil industry has triggered considerable activity in the real estate sector through, for example, renting of accommodation for their staff and renting of office space. Substantial numbers of new developments are springing up in the metropolis and selling even before they are completed (Obeng-Odoom, 2014b). Further, the real estate market has become increasingly dollarized and, consistent with a new exotic housing taste; new housing forms are being developed in the metropolis. For example, a gated and guarded housing community located between Ahanta West District and STMA, the 'Takoradi Oil Village', has been launched to target wealthy individuals and the oil workers in the Western Region. Rents range from US\$1,000 to US\$4,000, depending on the types of accommodation in the village.

Thus, the emergence of large scale private real estate companies and their clientele mainly (oil rich and other companies and their staff) is driving up land values and the general cost of housing in a city where the median household income is \$4.91 per day and most of the households (74 per cent) earn between \$60 and \$150 per month (CHF International, 2010). The lessons from Accra suggest that the land and other building-related challenges that come with such developments tend to incentivize many of the inappropriate construction practices that have earned the City the unenviable accolade of being Ghana's hotbed for building safety problems. Swift and proactive policy response is needed before Takoradi becomes Ghana's future hotbed for building safety problems.

REFERENCES

Chapter: 1

- Adesanya, A. T., & Olanrewaju, D. O. (2014). Study of factors responsible for incessant collapse of building in Lagos state. *Journal of Emerging Trends in Economics and Management Sciences*, 5(7), 57.
- Njoh, A. (2003). "Urbanization and Development in Sub-Saharan Africa," *Cities* 20(3): 167–174.
- Potts, D. (2009). The Slowing of Sub-Saharan Africa's Urbanization: Evidence and Implications for Urban Livelihoods. *Environment and Urbanization* 21(1): 253–259.
- Adjei, S. B. (2016). *Exploring the psychosocial, cultural, and structural accounts of spousal abuse in Ghana* (Doctoral dissertation, Department of Psychology and Behavioural Sciences, Aarhus University).
- Adugbo, D., Ibrahim, H. & Awka, T.E. (2019). Nigeria: 13 Building Collapse Incidence Kills 29, Injures 76 in 2019. Retrieved from: <https://allafrica.com/stories/201906030071.html> (Accessed: 03.07.19)
- Ahmed, A. and Dinye, R. D. (2011). "Urbanisation and the challenges of development controls in Ghana: a case study of Wa township". *Journal of Sustainable Development in Africa* Vol. 13(7). pp. 210 – 235.
- Ainuddin, S., Mukhtar, U., & Ainuddin, S. (2014). Public perception about enforcement of building codes as risk reduction strategy for seismic safety in Quetta, Baluchistan. *International journal of disaster risk reduction*, 9, 99-106.
- Akinyemi, A., Dare, G., Anthony, A., & Dabara, D. (2016). Building Collapse in Nigeria: Issues and Challenges In *Conference of the International Journal of Arts & Sciences*. Ede, Nigeria. Vol. 09(01). pp. 99–108
- Akwagyiram, A. (2015). Nigeria school building collapse killed 20 - Lagos health official. Retrieved from: <https://uk.reuters.com/article/uk-nigeria-school/nigeria-school-building-collapse-killed-20-lagos-health-official-idUKKCN1QW1QR> (Accessed: 30.03.19)
- Alinaitwe HM and Ekololu S (2014) Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First International Conference on Construction Materials and Structures* (Ekololu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Ametepey, S. O., Ansah, S. K., & Edu-Buandoh, K. B. M. (2015). Assessing factors affecting the implementation of the national building regulations (L.I. 1630) in Ghana. *Public Policy and Administration Research*, 5, 66-73.
- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Arnott, R. (2008). *Housing policy in developing countries: The importance of the informal economy*. Washington: World Bank
- Arya, S. A. (2000). Non-Engineered Construction in Developing Countries—An Approach Toward Earthquake Risk Reduction. *Bulletin Of The New Zealand National Society For Earthquake Engineering*, 33(3), 187-208.
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2). <https://doi.org/10.1177/2158244018778109>

- Asante, L. A., Gavu, E. K., Quansah, D. P. O., & Tutu, D. O. (2018). The difficult combination of renting and building a house in urban Ghana: analysing the perception of low and middle income earners in Accra. *GeoJournal*, 83(6), 1223-1237.
- Asante, L.A. & Sasu, A. (2015). Can Ghana Reduce the Incidence of Building Collapse?: An Examination of the Supervisory Role of the Building Inspectorate Division of the Kumasi Metropolitan Assembly. *International Conference on Engineering, Science, Technology and Entrepreneurship Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (2015)*
- Associated Press (AP) (2016). 'Officials: Collapsed Kenyan building had no occupancy permit'. See: <https://apnews.com/0d55d932ee1b46c390f75ab7c2ddc44c> (Accessed: 30. 03. 19).
- Ayee, J. R. A., Frempong, A. K. D., Asante, R., & Boafo-Arthur, K. (2008). The causes, dynamics and policy implications of land-related conflicts in the Greater Accra and Eastern Regions of Ghana (Ghana report). *African Studies Centre University of Leiden*.
- Bankoff, G., Freks, G. and Hilhorst, D. (2004). *Mapping Vulnerability*. London: Earthscan
- Bates, R. (1981). *Markets and States in Tropical Africa: The Political Basis of Agriculture Policies*. Berkeley: University of California Press.
- BBC Africa (2017). Kenya building collapse: Rescue teams search for missing people <https://www.bbc.com/news/av/world-africa-40257620/kenya-building-collapse> (Accessed: 18/07.19)
- BD (Buildings Department) (2007) Buildings Department Determined to Tackle Unauthorized Building Works [Press release]. BD, Hong Kong, China. Available from: <http://www.bd.gov.hk/english/documents/news/20070220ae.htm> [Accessed 30. 03.19]
- Beamish, T. D. (2002). *Silent spill: The organization of an industrial crisis*. Cambridge, MA: The MIT Press.
- Beard, M. (2015). *S.P.Q.R.: A History of Ancient Rome*. New York: W. W. Norton & Company, Inc.
- Bikçe, M., & Çelik, T. B. (2016) Failure analysis of newly constructed RC buildings designed according to 2007 Turkish Seismic Code during the October 23, 2011 Van earthquake. *Engineering Failure Analysis*, Vol. 64, pp. 67-84.
- Birkmann, J., & von Teichman, K. (2010). Integrating disaster risk reduction and climate change adaptation: key challenges—scales, knowledge, and norms. *Sustainability Science*, 5(2), 171-184. <https://doi.org/10.1007/s11625-010-0108-y>
- Bloom, D. E., Canning, D., & Fink, G. (2008). Urbanization and the wealth of nations. *Science*, 319(5864), 772-775.
- Boamah, N. A. (2010). Housing affordability in Ghana: a focus on Kumasi and Tamale. *Ethiopian Journal of Environmental Studies and Management*, 3(3).
- Boamah, N. A., Gyimah, C., & Nelson, J. K. B. (2012). Challenges to the enforcement of development controls in the Wa municipality. *Habitat International*, 36, 136-142.
- Boateng FG (2016). The collapse of buildings in cities in Ghana: Reasoning beyond 'scientism'. In *Refereed Proceedings of The Australian Sociological Association 2016 Conference* (Chou M (ed.)). (TASA), Melbourne, Australia
- Boateng FG (2017) Implications of building accidents in urban settings for building safety studies. In *Refereed Proceedings of Australasian Universities Building Education Association 2017 Conference*, Melbourne, Australia.
- Boateng, F. G. (2019b). A brief case for an organizational grounding for structural safety in the construction sector. *Construction Management and Economics*, 37(8), 472-47
- Boateng, F.G. & Wright, R. (2019). A conceptual inquiry into building collapse in cities in developing countries. *43rd Australasian Universities Building Education Association Conference*

- Boateng, F.G. (2017b). Why we need to start talking about the social context of building accidents. *Planning News*, Vol. 43, No. 8. pp 18 – 19.
- Boateng, F.G. (2018). Exploring the collapse of buildings in urban settings. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*.
- Boateng, F.G. (2018b). Why the de-emphasis of wider societal factors in construction failures analysis is fatal. *Proceedings of the Institution of Civil Engineers –Forensic Engineering*.
- Boateng, F.G. (2019a). Knowing what leads to building collapses can help make African cities safer. *The Conversation*, June 25.
- Boateng, F.G. (2019c). A brief essay on socio-cultural factors and building safety in the construction sector. *43rd Australasian Universities Building Education Association Conference 2019*
- Boateng, F.G. (forthcoming). ‘Building Safe and Resilient Cities: Lessons from Ghana’. In Churchill, S.A. [ed] (Forthcoming). *Moving from the Millennium to sustainable development goals: lessons and recommendations*. Basingstoke: Palgrave Macmillan
- Botchway, E. A., Afram, S. O., & Ankrah, J. (2014). Building permit acquisition in Ghana: The situation in Kumasi. *Developing Country Studies*, 4(20), 11-22.
- Bowen, A. G. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.
- Bradshaw, C. J., & Brook, B. W. (2014). Human population reduction is not a quick fix for environmental problems. *Proceedings of the National Academy of Sciences*, 111(46), 16610-16615.
- Brenner, N., & Schmid, C. (2014). The ‘urban age ’in question. *International journal of urban and regional research*, 38(3), 731-755.
- Bryceson, F., K. Gough, J. Rigg, and J. Agergaard. (2009). “Critical Commentary. The World Development Report 2009,” *Urban Studies* 46(4): 723–738
- Closs, V. M. (2013). *While Rome burned: Fire, leadership, and urban disaster in the Roman cultural imagination* (Doctoral thesis). University of Pennsylvania.
- Coen, S. E., Ross, N. A. & Turner, S. (2008) ‘Without tiendas it’s a dead neighbourhood’: The socio-economic importance of small trade stores in Cochabamba, Bolivia, *Cities*, 25, pp. 327–33
- Cowan, D. (1994). *The World Bank Urban Bias and Structural Adjustment* 67: 1–32. London: The Development Planning Unit, The Bartlett, UCL.
- Danso, H., & Boateng, I. (2013, August). Is the quality of cement a contributing factor for building collapse in Ghana?. In *The West Africa Built Environment Research (WABER) Conference* Accra Ghana, pp. 765 - 772
- Danso, H., & Boateng, I. (2015). Quality of type I Portland cement from Ghana and UK. *Civil and Environmental Research*, 7(1), 38-47
- Desai, V. (2012). Urbanisation and Housing the Poor: Overview. *International Encyclopedia of Housing and Home*. pp. 212 – 218
- Erling, S. & Watermeyer, R. (2009). Lessons learnt from collapse Spencer. *Structural Engineer*. 87(10). Pp. 17 – 20
- Feifei F (2014) Overview of Building Collapses in China. http://www.chinadaily.com.cn/china/2014-04/04/content_17408943.htm. (Accessed 30/03/2019).
- Fernandez, R. H. F. (2014). *Strategies to Reduce the Risk of Building Collapse in Developing Countries* (Doctoral Thesis). Carnegie Mellon University Carnegie Institute of Technology.
- Fox, S. (2012). Urbanization as a global historical process: Theory and evidence from Sub-Saharan Africa. *Population and Development Review*, 38(2), 285-310.
- Fox, S. (2013). *The political economy of urbanisation and development in sub-Saharan Africa* (Doctoral dissertation, The London School of Economics and Political Science (LSE)).

- Fox, S. (2014). The political economy of slums: Theory and evidence from Sub-Saharan Africa. *World Development*, 54, 191-203.
- Freudenburg, W. R., Gramling, R. B., Laska, S., & Erikson, K. (2009). *Catastrophe in the making: the engineering of Katrina and the disasters of tomorrow*. Island Press
- Ghana Institution of Engineers (GhIE) (2012). *Final Report: Melcom Disaster*. Accra: GhIE
- Ghana Statistical Service (GSS) (2012). *2010 Population and Housing Census Final Results*. Accra: Ghana Statistical Service
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77-122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.
- Gottdiener, M., Hutchison, R. (2006). *The new urban sociology*. Colorado: Westview Press
- Grant, R. (2007). Geographies of investment: how do the wealthy build new houses in Accra, Ghana?. In *Urban Forum* (Vol. 18, No. 1, pp. 31-59). Springer Netherlands.
- Harris, J.R. and Todaro, M.P. (1970). Migration, Unemployment and Development: A Two Sector Analysis. *American Economic Review*, 60 (1), pp. 126-142.
- Hartwell, C., (2001). *Pevsner Architectural Guides. Manchester*. London: Penguin Books.
- Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finn publishers
- He, Q., Dong, S., Rose, T., Li, H., Yin, Q., & Cao, D. (2016). Systematic impact of institutional pressures on safety climate in the construction industry. *Accident Analysis & Prevention*, 93, 230-239. <https://doi.org/10.1016/j.aap.2015.11.034>
- Health and Safety Executive (2015). *Managing health and safety in construction: Construction (Design and Management) Regulations 2015*. London: National Archives
- Herbert, D.T. & Smith, D.M. (1989). *Social Problems and the City: New Perspectives*, New York: Oxford University Press.
- Hodgson, R. L., Khan, I. A., Haynes, R., & Arnold, J. (2016). Rapid structural assessment of garment factories in Bangladesh. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4), 133-142.
- Hurst, L. (2001). *The Custom House collapse*, pp. 11-17, in *Learning from construction failures*, ed Peter Campbell, Latheronwheel: Whittles Publishing.
- Hurst, L. (2006). The rise and fall of the use of bond timbers in brick buildings in England. In *Proceedings of the Second International Congress on Construction History*.
- Ifedolapo, B.H. (2015) Building Collapse: Causes and Policy Direction in Nigeria. *International Journal of Scientific Research and Innovative Technology*. Vol. 2 No. 8
- Kamete, Y., A. Tostensen, and I. Tvedten. (2001). "From Global Village to Urban Globe: Urbanization and Poverty in Africa: Implications for Norwegian Aid Policy." *Chr. Michelsen Institute Report* 2:1-95.
- Kemp, P. (1989). The Housing Questions in Herbert, D.T. & Smith, D.M. (1989). *Social Problems and the City: New Perspectives*. New York: Oxford University Press.
- Keteku-Atiemo, W. (2006). Rampant Failure of Buildings in an Era of Massive Shelter Development in Ghana. Empowering The Informal Construction Labourer with Knowledge and Skill to help in providing a Solution to this Problem: <http://www.lth.se/fileadmin/hdm/alumni/papers/sdd2006/sdd2006-17.pdf> (Accessed: 30. 03. 19).
- Kidd, A., (3rd Ed.) (2002). *Manchester*. Edinburgh University Press
- Komorowski, S.M. (1985). 'Social Pathology: A comment'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finn publishers

- Koranteng, K. (2017). 6 KG pupils die in classroom collapse at Breman Gyambra. Retrieved (30. 03. 19) <http://citifmonline.com/2017/01/31/6-kg-pupils-die-in-classroom-collapse-at-breman-gyambra/>
- Kpamma, E. Z., & Adjei-Kumi, T. (2013). *Construction permits and flow of projects within the Sunyani municipality, Ghana*. Paper presented at the annual meeting of International Group of Lean Construction (IGLC-21), Fortaleza, Brazil.
- Kuklinski, A. (1985). 'Guidelines for a conference on the pathology of urban processes: Ustronie vision'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finn publishers
- Kwasniewski, L. (2010). Nonlinear dynamic simulations of progressive collapse for a multistory building. *Engineering Structures*, 32(5), 1223-1235
- Legters, L.H. (1985). 'Social Pathology: Toward Definition'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finn publishers
- Lewis, A. (1954) Economic Development with Unlimited Supplies of Labor. *The Manchester School*, 22, pp. 139–191.
- Lipton, M. (1977). *Why Poor People Stay Poor: A study of urban bias in world development*. London: Maurice Temple Smith.
- Lyu, H. M., Cheng, W. C., Shen, J. S., & Arulrajah, A. (2018). Investigation of collapsed building incidents on soft marine deposit: Both from social and technical perspectives. *Land*, 7(1), 20.
- Marshall, A. (1920). *Principles of Economics: An Introductory Volume*. London: Macmillan.
- Marshall, M. N. (1996). Sampling for qualitative research. *Family practice*, 13(6), 522-526.
- Masurkar, Y. S., & Attar, A. C. (2014). Investigating the causes for failures in construction by taking a case study. *Current Trends in Technology and Science*. Vol. 3(5). Pp. 376 – 380
- Matthewman, S. (2012). Accidentology: Towards a sociology of accidents and disasters. *International and Multidisciplinary Journal of Social Sciences*, 1(2), 193-215.
- Molotch, H. (1970). Oil in Santa Barbara and power in America. *Sociological Inquiry*, 40(1), 131_144.
- Molotch, H. (1976). The city as a growth machine. *American Journal of Sociology*, 82(2), 309–332
- Moullier, T. (2015). *Building regulation for resilience: Managing risks for safer cities*. Washington: World Bank
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Nevell, M. (2011). Living in the industrial city: housing quality, land ownership and the archaeological evidence from industrial Manchester, 1740–1850. *International Journal of Historical Archaeology*, 15(4), 594-606.
- Nicols, J. (n.d). Roman Life 2: Urban Life for the Ancient Romans: Living in the city of Rome. University of Oregon
- Obeng-Odoom, F. (2009). The Political Economy of Urban Policies. *ICFAI Journal of Urban Policy* 4(1): 7–20.
- Obeng-Odoom, F. (2010a). An urban twist to politics in Ghana. *Habitat International*, 34(4), 392-399.
- Obeng-Odoom, F. (2010b). 'Abnormal' Urbanization in Africa: A Dissenting View. *African Geographical Review*, 29(2).
- Obeng-Odoom, F. (2010c). Drive left, look right: the political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1-2), 33-48.
- Obeng-Odoom, F. (2016). *Reconstructing urban economics: towards a political economy of the built environment*. London: Zed Books Ltd.
- Obeng-Odoom, F. (2018). Petroleum Accidents in the Global South. In *Environmental Impacts of Transnational Corporations in the Global South* (pp. 111-142). Emerald Publishing Limited.

- Ofori, G. (2007). Construction in developing countries. *Construction Management and Economics*, 25(1), 1-6.
- Ojikpong, B. E., Agbor, E. A., & Emri, S. I. (2016). The Impact of Building Use Conversion on Residential Accommodation in Calabar, Cross River State, Nigeria. *International Journal of Science, Environment and Technology*, 5(3), 1445-1462.
- Okolie, K. C., Okorie, V. N., & Ikekpeazu, F. O. (2016). Development of a Leadership Model for Effective Reduction of Building Collapse in Nigeria. *PM World Journal*, 4, 1-16.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Oosterbaan, C., Arku, G., & Asiedu, A. B. (2012) Conversion of residential units to commercial spaces in Accra, Ghana: a policy dilemma. *International Planning Studies*, 17(1), pp. 45-66
- Oteng-Ababio, M. (2016). Was 'Black Wednesday' avoidable? The Melcom disaster in Accra puts a generation on trial. *Singapore Journal of Tropical Geography*, 37(3), 401-417.
- Owusu, R. & Bowang, C. (2017). The collapse of buildings in Ghana: The role of stakeholders. *Asia Pacific Journal of Research Vol: I. Issue LI. Pp. 53 – 67*
- Owusu-Ansah, A., Ohemeng-Mensah, D., Abdulai, R. T., & Obeng-Odoom, F. (2018). Public choice theory and rental housing: an examination of rental housing contracts in Ghana. *Housing Studies*, 33(6), 938-959
- Parfitt, M. K. (2012). Why Buildings Fail: Are We Learning From Our Mistakes? *Buildings*, 2(3), 326-331.
- Payne, G., and J. Payne. (2004). *Key concepts in social research*. London: Sage
- Peckitt, S. J., Glendon, A. I., & Booth, R. T. (2004). 'Societal influences on safety culture in the construction industry'. *Construction safety management systems* pp.14 – 46
- Pelling, M. (2003). *The Vulnerability of Cities: Natural Disasters and Social Resilience*. London: Earthscan Publications.
- Pink, S., Tutt, D., Dainty, A. and Gibb, A. 2010. 'Ethnographic methodologies for construction research: knowing, practice and interventions'. *Building Research and Information*, 38(6), 647-659. doi.org/10.1080/09613218.2010.512193
- Pitcher, B. L. (1997). "Urban Pathology". *SSWA Faculty Publications*. Paper 442.
- Polkinghorne, D. (2007). Validity issues in narrative research. *Qualitative Inquiry*, 13, 471-478
- Premium Times (2018). "Two feared dead, many trapped in Abuja building" [〈https://www.premiumtimesng.com/video/280577-developing-story-two-feared-dead-many-trapped-in-abuja-building-collapse-2.html〉](https://www.premiumtimesng.com/video/280577-developing-story-two-feared-dead-many-trapped-in-abuja-building-collapse-2.html) (Accessed: 30.03.19).
- Pye, L. W. (1969). The Political Implications of Urbanization and the Development Process. In Breese, G. (ed.). *The City in Newly Developing Countries: Readings on Urbanism and Urbanization*. Englewood Cliffs, N.J.: Prentice Hall, pp. 401-406.
- Reuters (2016). Death toll in Kenya building collapse rises to 49: police: <http://www.reuters.com/article/us-kenya-accident-idUSKCN0XZ0IZ> (Accessed: 30.03.19).
- Robinson, J. (2006). *Ordinary Cities: Between Modernity and Development*. London: Routledge
- Rostow, W.W. (1960). *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge: Cambridge University Press.
- Rowlinson, S., & Jia, Y. A. (2015). 'Construction accident causality: An institutional analysis of heat illness incidents on site'. *Safety science*, 78, 179-189. <https://doi.org/10.1016/j.ssci.2015.04.021>
- Rowlinson, S., YunyanJia, A., Li, B., & ChuanjingJu, C. (2014). Management of climatic heat stress risk in construction: a review of practices, methodologies, and future research. *Accident Analysis & Prevention*, 66, 187-198. <https://doi.org/10.1016/j.aap.2013.08.011>

- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Harlow, UK: Pearson.
- Sheuya, A. S. (2009) Urban poverty and housing transformations in informal settlements: The case of Dar-es-Salam, Tanzania. *International Development Planning Review*, 31, pp. 81–108.
- Smith, A. (1991). *An Inquiry into the Cause of the Wealth of Nations*. New York: Knopf Doubleday Publishing Group.
- Soane, A. (2016). Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Somiah, M. K. (2014). *Factors that account for construction of unauthorized buildings in Ghana*. Master's thesis, Department of Building Technology, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- Sovani, N.V. (1964) The Analysis of “Over-Urbanization”. *Economic Development and Cultural Change*, 12 (2), pp. 113-122.
- Subbarao, H. (2016). Editorial. *Forensic Engineering*. Vol. 169 (4), 121 – 122
- Symonds, J. (2005). ‘Dirty Old Town? Industrial archaeology and the Urban Historic Environment’, in Gwyn D & Palmer M, (eds), *Understanding the Workplace. A Research Framework for Industrial Archaeology in Britain*. *Industrial Archaeology Review* XXVII, 57-66.
- Tchamba, J. C., & Bikoko, T. G. L. (2016). Failure and Collapse of Building Structures in the Cities of Yaoundé and Douala, Cameroon from 2010 to 2014. *Modern Applied Science*, 10(1), 23.
- The Guardian, (2016) ‘Owners of collapsed Nairobi building 'had no occupancy permit'. See: <https://www.theguardian.com/world/2016/apr/30/owners-collapsed-nairobi-building-kenya-no-occupancy-permit> (Accessed 09.11.18).
- Tierney, K. (2010). Growth Machine Politics and the Social Production of Risk. *Contemporary Sociology*, Vol. 39, No. 6. pp. 660-663
- Tierney, K. J. (2007). From the margins to the mainstream? Disaster research at the crossroads. *Annu. Rev. Sociol.*, 33, 503-525.
- Tsang, H. H., & Wenzel, F. (2016). Setting structural safety requirement for controlling earthquake mortality risk. *Safety science*, 86, 174-183.
- Tutt, D., Pink, S., Dainty, A. R. J. and Gibb, A. 2013. “In the air’ and below the horizon: migrant workers in UK construction and the practice-based nature of learning and communicating OHS’. *Construction Management and Economics*. <https://doi.org/10.1080/01446193.2012.756145>
- UN-Habitat (2011). *Ghana Housing Profile*. Nairobi: United Nations Human Settlements Programme (UN-HABITAT)
- United Nations (2008) *World Population Policies 2007*. New York: United Nations, Department of Economic and Social Affairs/Population Division
- United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision, Highlights*. NY: United Nations.
- United Nations, Department of Economic and Social Affairs, Population Division (2016). *The world's cities in 2016*. NY: United Nations.
- Wang, C. (2014). Regulating land development in a natural disaster-prone area: The roles of building codes. *Resource and Energy Economics*, 36(1), pp. 209-228
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Wells, J. (2007). Informality in the construction sector in developing countries. *Construction Management and Economics*, 25(1), 87-93.
- Windapo, A. O., & Rotimi, J. O. (2012). Contemporary issues in building collapse and its implication for sustainable development. *Buildings*, 2, 283-299.

- Wisner, B. Blaikie, P. Cannon, T. & Davis, I. (2003) *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge
- World Bank. (2000). Dynamic Cities as Engines of Growth. *World Development Report*, World Bank, 125–138. Oxford: Oxford University Press.
- World Bank. (2009). *World Development Report 2009: Reshaping Economic Geography*. Washington, D.C.: The World Bank.
- Yates, A. (2002). The nexus between regulation enforcement and catastrophic engineering failures. In *Current Issues in Regulation: Enforcement and Compliance*. Melbourne.
- Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 2

- Adenuga, A. O. (2012). Professionals in the Built Environment and the Incidence of Building Collapse In Nigeria. *Organization, technology & management in construction: an international journal*, 4(2), 461-473.
- Adesanya, A. T., & Olanrewaju, D. O. (2014). Study of factors responsible for incessant collapse of building in Lagos state. *Journal of Emerging Trends in Economics and Management Sciences*, 5(7), 57.
- Adewole, K. K., Oladejo, J. O., & Ajagbe, W. O. (2014). Incessant collapse of buildings in Nigeria: The possible role of the use of inappropriate cement grade/strength class. *World Academy of Science, Engineering and Technology, International Journal of Civil, Structural, Construction and Architectural Engineering*, 8(7), 818-820.
- Agbola, T., & Onibokun, P. (1990). 'Urban Housing Problems: Implications for the Construction Industry in Nigeria'. In P. Onibokun (Ed.), *Urban Housing in Nigeria* (pp. 392–410). Ibadan: NISER.
- Aini, M. S., Fakhru'l-Razi, A., Daud, M., Adam, N. M., & Abdul Kadir, R. (2005). Analysis of Royal Inquiry Report on the collapse of a building in Kuala Lumpur: Implications for developing countries. *Disaster Prevention and Management: An International Journal*, 14(1), 55-79.
- Akanni, P. O., Oke, E. A., & Akpomiemie, O. A. (2014). Impact of environmental factors on building project performance in Delta State, Nigeria. *HBRC Journal*. Advance online publication. doi:10.1016/j.hbrj.2014.02.010
- Akinyemi, A., Dare, G., Anthony, A., & Dabara, D. (2016). Building Collapse in Nigeria: Issues and Challenges In *Conference of the International Journal of Arts & Sciences*. Ede, Nigeria. Vol. 09(01). pp. 99–108
- Alinaitwe H.M. & Ekolu S. (2014). Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First International Conference on Construction Materials and Structures* (Ekolu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Alinaitwe, H. M., Mwakali, J. A., & Hansson, B. (2007). Factors affecting the productivity of building craftsmen-studies of Uganda. *Journal of Civil Engineering and Management*, 13(3), 169-176.
- Anosike, P. (2009, April 6). Nigerian groans under high cost of building material. *The Daily Sun*, pp. 38-39.

- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Arnott, R. (2008). *Housing policy in developing countries: The importance of the informal economy*. Washington: World Bank
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2).<https://doi.org/10.1177/2158244018778109>
- Asante, L.A. & Sasu, A. (2015). Can Ghana Reduce the Incidence of Building Collapse?: An Examination of the Supervisory Role of the Building Inspectorate Division of the Kumasi Metropolitan Assembly. *International Conference on Engineering, Science, Technology and Entrepreneurship Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*
- Atolagbe, A. M. O., & Fadamiro, J. A. (2014). Indigenous African building techniques and the prospects for sustainable housing and environmental development. *Environment, development and sustainability*, 16(5), 1041-1051
- Awale, S. (2015). Substandard construction material still a threat. Retrieved from: <https://thehimalayantimes.com/real-estate/substandard-construction-material-still-a-threat/> (Accessed: 07.04.19)
- Ayodeji, O. (2011). An examination of the causes and effects of building collapse in Nigeria. *Journal of Design and Built Environment*, Vol. 9 (1), pp. 37–47
- Ayodele, E. O., Ogunbode, A. B., Ariyo, I. E. & Alabi, O. M. (2011). Corruption in the Construction Industry of Nigeria, Causes and Solutions. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. Vol. 2 issue 3, pp. 156-159
- Bakar, A. H. A., & Tufail, M. A. (2012). Transforming Capability of Indigenous Contractors through Technology Transfer: A Malaysia Experience. *World Applied Sciences Journal*, 16(10), 1450-1461
- Batchelder, D., Caiola, R.E. & Davenport, S.W. (1985). *A Sourcebook for the Use of Local Materials in Construction*. The Experiment in International Living, Brattleboro, Vermont, USA
- Berlinski, C. (2011). 1 Million Dead in 30 Seconds: Retrieved from: <http://www.city-journal.org/html/1-million-dead-30-seconds-13396.html> (Accessed: 07.014.19).
- Boamah, N. A. (2010). Housing affordability in Ghana: a focus on Kumasi and Tamale. *Ethiopian Journal of Environmental Studies and Management*, 3(3).
- Boateng, F. G. (2016). The Collapse of Buildings in Cities in Ghana: Reasoning Beyond ‘Scientism’. In *Refereed Proceedings of TASA 2016 Conference*. Chou, M. (2016) (ed). Melbourne, Australia pp. 7 – 12
- Carr, R. I. (1982). General bidding model. *J. Constr. Div.*, Vol. 108 (4). Pp. 639–650.
- Cockburn, C. (1970). *Construction in Overseas Development: A search for appropriate aid and trade measures for the 1970's*. London: Overseas Development Institute,
- Danso, H. (2013). Building houses with locally available materials in Ghana: benefits and problems. *International Journal of Science and Technology*, 2(2), 225-231.
- Dominica News Online** (2018). Gov’t clamps down on inferior building materials. Retrieved from: <http://dominicanewsonline.com/news/homepage/news/economy-development/govt-clamps-down-on-inferior-building-materials/> (Accessed: 23.11.18).
- Drew, D., Skitmore, M., and Lo, H. P. (2001). The effect of client and type and size of construction work on a contractor’s bidding strategy. *Build. Environ.* Vol 36 (3). Pp. 393–406.
- Drewer, S. (1980) Construction and development: A new perspective. *Habitat International*, Vol. 5, 3/4, pp. 395-428.

- Elkhalifa, A. (2016). The magnitude of barriers facing the development of the construction and building materials industries in developing countries, with special reference to Sudan in Africa. *Habitat International*, 54, 189-198.
- Engbø, A., Kjesbu, N., Lædre, O., & Lohne, J. (2017). Perceived Consequences of Counterfeit, Fraudulent and Sub-standard Construction Materials. *Procedia Engineering*, 196, 343-350.
- Escaleras, M., Anbarci, N., & Register, C. A. (2007). Public sector corruption and major earthquakes: a potentially deadly interaction. *Public Choice*, 132(1), 209-230
- European Union (EU) (2018). *Report on the EU customs enforcement of intellectual property rights*: Luxembourg: European Commission
- Fagbenle, O. I., & Oluwunmi, A. O. (2010). Building failure and collapse in Nigeria: The influence of the informal sector. *Journal of sustainable development*, 3(4), 268-276.
- Fernandez, R. H. F. (2014). *Strategies to Reduce the Risk of Building Collapse in Developing Countries* (Doctoral Thesis). Carnegie Mellon University Carnegie Institute of Technology.
- Fleddermann, C. B. (1999). *Engineering ethics*. Upper Saddle River, NJ: Prentice Hall.
- Friedman, L. (1956). A competitive bidding strategy. *Oper. Res.*, Vol. 4(1). pp. 104–112
- Gbonegun, V. (2017). Lack of enforcement, bane of substandard building materials. Retrieved from: <https://guardian.ng/property/lack-of-enforcement-bane-of-substandard-building-materials/> (Accessed: 07.04.19)
- Ghana Institution of Engineers (GhIE) (2012). *Final Report: Melcom Disaster*. Accra: GhIE
- Goering, L. (1998). Rio Building Collapses, But `With Big Thieves, Nothing Happens': http://articles.chicagotribune.com/1998-03-06/news/9803060117_1_barra-shoddy-construction-sersan (Accessed: 07.04.19)
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77-122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.
- Green, S. D. (2011) *Making Sense of Construction Improvement*. Oxford: Wiley-Blackwell Publishing
- Grogan, T. (1992). Low bids raise hidden costs. *Eng. News-Rec.* Vol. 228 (13). Pp. 30–31.
- Health and Safety Executive (2015). *Managing health and safety in construction: Construction (Design and Management) Regulations 2015*. London: National Archives
- Hedidor, D., & Bondinuba, F. (2017). Exploring Concrete Materials Batching Behaviour of Artisans in Ghana's Informal Construction Sector. *Journal of Civil Engineering and Construction Technology*, Vol. 8(5), pp. 35-52.
- Henriod, E. E., and Lanteran, J. M. (1988). *Trends in contracting practice for civil works*, Task Force on Innovative Practice, Washington, D.C: World Bank.
- Ifedolapo, B.H. (2015) Building Collapse: Causes and Policy Direction in Nigeria. *International Journal of Scientific Research and Innovative Technology*. Vol. 2 No. 8
- Ifesanya, A.O. (2007). 'Building materials production and use'. In T. Agbola, L. Egunjobi, & C. O. Olatubara (Eds.), *Housing Development and Management* (pp 310–349). Ibadan, Nigeria: Department of Urban and Regional Planning, University of Ibadan.
- Johnson, N. (2015). Grocon says CFMEU is “ill-informed” after union accuses project of using substandard building product. Retrieved from: <https://www.architectureanddesign.com.au/news/grocon-says-cfmeu-is-ill-informed-after-union-accu> (Accessed: 07.04.19).
- Kenny, C. (2009). “Why do people die in earthquakes? The Costs, benefits and institutions of disaster risk reduction in developing countries.” World Bank Policy Research Working Paper.
- Kenny, C. (2012). Disaster risk reduction in developing countries: costs, benefits and institutions. *Disasters*, 36(4), pp. 559-588. <https://doi.org/10.1111/j.1467-7717.2012.01275.x>

- Kumar R.S. (2016) Lessons from structural failures in India. *Proceedings of the Institution of Civil Engineers – Forensic Engineering* 169(4): 143–148, <https://doi.org/10.1680/jfoen.16.00019>.
- Kuta, J., & Nyaanga, D. M. (2014). Effect of quality of engineering materials on construction and quality of buildings: A case study of Nairobi, Kenya. *Prime Journal of Social Science*, 3, 608-611.
- Lewis, J. (2005). Earthquake destruction: Corruption on the fault line. *Transparency International, Global corruption report, 2005*, 23-30.
- Lizarralde, G., Tomiyoshi, S., Bourgault, M., Malo, J., & Cardosi, G. (2013). Understanding differences in construction project governance between developed and developing countries. *Construction Management and Economics*, 31(7), 711-730.
- Lo, W., Lin, C. L., & Yan, M. R. (2007). Contractor's opportunistic bidding behavior and equilibrium price level in the construction market. *Journal of construction engineering and management*, 133(6), 409-416.
- Magutu, J. (2015). Towards populization of low cost building Materials and technologies for urban housing in Developing countries. *International Journal of Scientific Research and Innovative Technology*. Vol. 2 No. 1
- Matthews P, Ryan-Collins L, Wells J, Sillem H and Wright H (2012) Briefing: Engineers for Africa: identifying engineering capacity needs in sub-Saharan Africa. *Proceedings of the Institution of Civil Engineers – Municipal Engineer* 165(4): 187–188, <https://doi.org/10.1680/muen.12.00052>.
- Mekson, J. (2008). Prices change of building materials in developing communities in Nigeria. *The Professional Builders*, pp. 21-27.
- Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Miekle, J. (2011). *Note on informal construction*. Washington, DC: ICP
- Mitullah, W. and Wachira, I.N. (2003). *Informal labour in the construction industry in Kenya: a case study of Nairobi. Working Paper 204, Sectoral Activities Programme*. Geneva: International Labour Office.
- Mlinga, R. S., & Lema, N. M. (2000). Informal contractors in Tanzania: Their characteristics and reasons for informality. *Proceedings of the 2nd international conference of the CIB Task Group 29 (TG29) on construction in developing countries, Gaberone, Botswana, 15–17 November*.
- Moavenzadeh, F (1978) Construction in developing countries. *World Development*, Vol. 6, No. 1, pp. 97-116.
- Moavenzadeh, F and Hagopian, F (1984). The construction industry and economic growth. *Asian National Development*. pp. 56-60.
- Mohammed, H. Y. (2008, December 25). Nigeria: Builders groan on rising cost of building materials. *Daily Trust*, p. 29.
- Moullier, T. (2015). *Building regulation for resilience: Managing risks for safer cities*. Washington: World Bank
- Mpakati-Gama, E. C., Wamuziri, S. C., & Sloan, B. (2011). *The use of alternative building materials in developing countries: Addressing challenges faced by stakeholders*. World Construction Conference 2012 – Global Challenges in Construction Industry 28 – 30 June 2012, Colombo, Sri Lanka
- Najjir, G.R. & Love, P.C. (2012). Issue for the Global Construction Market. *The Australian Journal of Construction Economics & Building*. 1(2), pp. 73 – 81
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Nganga, G. (2011). Kenya: Professional bodies reject degrees. Retrieved: <http://www.universityworldnews.com/article.php?story=20110708163324160> (Accessed: 31. 03. 19)

- Nhlabatsi, R. (2014). Cheap Chinese imports in Africa: Implications and remedies. Retrieved from: <http://www.polity.org.za/article/cheap-chinese-imports-in-africa-implications-and-remedies-2014-03-06> (Accessed: 07.04.19)
- Nigeria Real Estate Hub (NREH) (2016). The dangers of using substandard materials. Retrieved from: <https://nigeriarealestatehub.com/the-dangers-of-using-substandard-building-materials.html/> (Accessed: 07.04.19)
- Njoku, J. (2007, April 9). Grappling with escalating cost of construction materials. *The Vanguard*, pp. 36-37.
- Ofori, G. & Chan, S.L. (2000). Factors influencing growth of construction enterprises in Singapore. *Construction Management and Economics* (in press).
- Ofori, G. (2000). Challenges of construction industries in developing countries: Lessons from various countries. In *2nd International Conference on Construction in Developing Countries: Challenges Facing the Construction Industry in Developing Countries, Gaborone, November* (Vol. 5, No. 24, pp. 15-17).
- Ofori, G. (2007). Construction in developing countries. *Construction Management and Economics*, 25(1), 1-6.
- Okolie, K. C., Okorie, V. N., & Ikekpeazu, F. O. (2016). Development of a Leadership Model for Effective Reduction of Building Collapse in Nigeria. *PM World Journal*, 4, 1-16.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Oruwari, Y., Jef, M., & Owei, O. (2002). *Acquisition of technological capability in Africa: A case study of indigenous building materials firms in Nigeria*. ATPS Working Paper Series No. 33.
- Osabutey, E. L., Williams, K., & Debrah, Y. A. (2014). The potential for technology and knowledge transfers between foreign and local firms: A study of the construction industry in Ghana. *Journal of world business*, 49(4), 560-571.
- Oxford Group (2017). Ghana government looks to increase domestic production of cement and other special materials. Retrieved from: <https://oxfordbusinessgroup.com/analysis/building-blocks-government-taking-steps-increase-domestic-production-special-materials-and-cement> (Accessed: 07.04. 19)
- Özdem, A. (1999). Tiles, taps and earthquake-proofing: lessons for disaster management in Turkey. *Environment and urbanization*, 11(2), 177-180.
- Özdem, A., & Barakat, S. (2000). After the Marmara earthquake: Lessons for avoiding short cuts to disasters. *Third World Quarterly*, 21(3), 425-439
- Pelling, M. (2003). *The Vulnerability of Cities: Natural Disasters and Social Resilience*. London: Earthscan Publications.
- Raftery, J, Pasadilla, B, Chiang, Y H, Hui, E.C.M. & Tang, B.S. (1998) Globalization and construction industry development: implications of recent developments in the construction sector in Asia. *Construction Management and Economics*, 16, 729-737.
- Ricketts, J.T. (2001). 'System Fundamental'. In Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Satterthwaite, D. (2017). The impact of urban development on risk in sub-Saharan Africa's cities with a focus on small and intermediate urban centres. *International journal of disaster risk reduction*, 26, 16-23.
- SGI Architectural (n.d.). *The Real Costs of Buying Cheap Building Products*. Melbourne: SGI Architectural
- Shaw, R., Atta-ur-Rahman, Surjan, A., Paryin, G.A. (2016). *Urban Disasters and Resilience in Asia*. Butterworth-Heinemann: Kidlington

- Soane, A. (2016) Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Strassman, P.A. and Wells, J. (1988). 'Introduction'. In Strassman, P.A. & J. Wells (eds.) (1998). *The Global Construction Industry*. New York: Unwin Hyman.
- Subbarao, H. (2016). Editorial. *Forensic Engineering*. Vol. 169 (4), 121 – 122
- Tam, C. M., Deng, Z. M., Zeng, S. X., & Ho, C. S. (2000). Quest for continuous quality improvement for public housing construction in Hong Kong. *Construction Management & Economics*, 18(4), 437-446.
- Tamakloe, W. (2012). Initiate Research to Promote Use of Local Materials in Building. <http://www.newtimes.com.gh/story/initiate-research-to-promote-use-of-local-materials-in-building>. (Accessed: 07. 04. 19).
- Tchamba, J. C., & Bikoko, T. G. L. (2016). Failure and Collapse of Building Structures in the Cities of Yaoundé and Douala, Cameroon from 2010 to 2014. *Modern Applied Science*, 10(1), 23.
- Than, K. (2013). Bangladesh Building Collapse Due to Shoddy Construction. Retrieved from: <https://news.nationalgeographic.com/news/2013/13/130425-bangladesh-dhaka-building-collapse-world/> (Accessed: 07.04.19)
- Tibaijuka, A. (2013). *Building prosperity: Housing and economic development*. London: Earthscan.
- Turin, D.A. (1973). *The Construction Industry: Its economic significance and its role in development, 2nd Edition*. Building Economics Research Unit, University College London
- Tutu, K. A., & Bempong, K. G. (2018). Our Concrete Quality: The Tip of an Iceberg? In the *50th Ghana Institution of Engineers (GhIE) Annual Conference*. Accra, Ghana, pp. 1 – 3
- UN-Habitat (2011). *Ghana Housing Profile*. Nairobi: United Nations Human Settlements Programme (UN-HABITAT)
- United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision, Highlights*. NY: United Nations.
- United Nations, Department of Economic and Social Affairs, Population Division (2016). *The world's cities in 2016*. NY: United Nations.
- Veel, C., & Skitmore, C. (2003). Professional ethics in the construction industry. *Engineering, Construction and Architectural Management*, 10(2), 117-127.
- Wang, C. (2014). Regulating land development in a natural disaster-prone area: The roles of building codes. *Resource and Energy Economics*, 36(1), pp. 209-228
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Wells, J. (2007). Informality in the construction sector in developing countries. *Construction Management and Economics*, 25(1), 87-93.
- Wells, J., & Wall, D. (2003). The expansion of employment opportunities in the building construction sector in the context of structural adjustment: some evidence from Kenya and Tanzania. *Habitat International*, 27(3), 325-337
- Winch, G. M. (2000). Institutional reform in British construction: Partnering and private finance. *Build. Res. Inf.*, 28_2_, 141–155.
- Windapo, A. O., & Rotimi, J. O. (2012). Contemporary issues in building collapse and its implication for sustainable development. *Buildings*, 2, 283-299.
- Wong, E. (2008). China Admits Building Flaws in Quake. <http://www.nytimes.com/2008/09/05/world/asia/05china.html> (Accessed: 07.04.19)
- Yardley, J. (2013). Report on Deadly Factory Collapse in Bangladesh Finds Widespread Blame. <http://www.nytimes.com/2013/05/23/world/asia/report-on-bangladesh-building-collapse-finds-widespread-blame.html> (Accessed: 07.04.19)

Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 3

- Adarkwa, K. K., & Oppong, R. A. (2005). Gentrification, use of conversion and traditional architecture in Kumasi's central business district – Case study of Adum precinct. *Journal of the University of Science and Technology*, 25(2), 80
- Aini, M. S., Fakhru'l-Razi, A., Daud, M., Adam, N. M., & Abdul Kadir, R. (2005). Analysis of Royal Inquiry Report on the collapse of a building in Kuala Lumpur: Implications for developing countries. *Disaster Prevention and Management: An International Journal*, 14(1), 55-79.
- Alinaitwe HM and Ekolu S (2014) Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First International Conference on Construction Materials and Structures* (Ekolu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Alland, A., Jr. (1972). *The Human Imperative*. Columbia Univ. Press, New York.
- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2). <https://doi.org/10.1177/2158244018778109>
- Associated Press (AP) (2016). 'Officials: Collapsed Kenyan building had no occupancy permit'. See: <https://apnews.com/0d55d932ee1b46c390f75ab7c2ddc44c> (Accessed: 10.08.19).
- Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International journal of project management*, 17(6), 337-342.
- Barakat, S. (2003). Housing reconstruction after conflict and disaster. *Humanitarian Policy Group, Network Papers*, 43, 1-40.
- Barredo, I. J. & Demicheli, L. 2003. Urban sustainability in developing countries' megacities: Modelling and predicting future urban growth in Lagos, *Cities*, 20(5), pp. 297–310.
- BBC Africa (2016). Kenya building collapse: Demolition of unfit houses starts. Retrieved from: <https://www.bbc.com/news/world-africa-36227914> (Accessed: 10.08.19)
- Beard, M. (2015). *S.P.Q.R.: A History of Ancient Rome*. New York: W. W. Norton & Company, Inc.
- Bennett, P. (2007). The architecture of happiness: building utopia in the last romances of William Morris. *Spaces of Utopia: An Electronic Journal*, 4, 113-34.
- Berlinski, C. (2011). 1 Million Dead in 30 Seconds: Retrieved from: <https://www.city-journal.org/html/1-million-dead-30-seconds-13396.html> (Accessed: 10.08.19)
- Bhatta, B. (2010). 'Causes and consequences of urban growth and sprawl'. In *Analysis of urban growth and sprawl from remote sensing data* (pp. 17-36). Berlin, Heidelberg: Springer
- Blockley, D. I. (1980). *The Nature of Structural Design and Safety*. New York: Halsted Press
- Bowen, A. G. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40
- Buildings Department (BD). 2007. Buildings Department Determined to Tackle Unauthorized Building Works [Press release]. BD, Hong Kong, China. Available from: <http://www.bd.gov.hk/english/documents/news/20070220ae.htm> [Accessed 18.08.19].

- Calhoun, J. B. (1962). Population density and social pathology. *Scientific American*, 206(2), 139-149
- Choldin, H. M. (1978). Urban density and pathology. *Annual Review of Sociology*, 4(1), 91-113.
<https://www.jstor.org/stable/2945966>.
- Closs, V. M. (2013). *While Rome burned: Fire, leadership, and urban disaster in the Roman cultural imagination* (Doctoral thesis). University of Pennsylvania.
- Cobbinah, P. B., & Niminga-Beka, R. (2017). Urbanisation in Ghana: Residential land use under siege in Kumasi central. *Cities*, 60, 388-401.
- Coen, S. E., Ross, N. A. & Turner, S. 2008. 'Without tiendas it's a dead neighbourhood': The socio-economic importance of small trade stores in Cochabamba, Bolivia, *Cities*, 25, pp. 327–339
- Davis, K. (1965). The urbanization of the human population. *Scientific American* 213(3): 40–53.
- De Botton, A. (2008). *The architecture of happiness*. New York: Vintage.
- Dow, A. (2016) Melbourne's faulty building crisis. See: <http://www.theage.com.au/victoria/melbournes-faulty-building-crisis-20161217-gtdbb0.html> (Accessed: 10.08.19)
- Drew, D., Skitmore, M., and Lo, H. P. (2001). The effect of client and type and size of construction work on a contractor's bidding strategy. *Build. Environ.* Vol 36 (3). Pp. 393–406.
- Engels, F., & Dutt, C. P. (1935). *The housing question* (Vol. 23). New York: International Publishers.
- Feifei F (2014). Overview of Building Collapses in China. See http://www.chinadaily.com.cn/china/2014-04/04/content_17408943.htm (accessed 10.08.19).
- Fischer, C. S. (1975). The myth of "territoriality" in Van Der Berghe's "bringing beasts back in." *American Sociological Review* 40: 674-676.
- Fleddermann, C. B. (1999). *Engineering ethics*. Upper Saddle River, NJ: Prentice Hall.
- Fox, S. (2013). *The political economy of urbanisation and development in sub-Saharan Africa* (Doctoral dissertation, The London School of Economics and Political Science (LSE)).
- Freedman, J. L. (1975). *Crowding and Behavior*. Viking, New York.
- Freedman, J. L., Heska, S., and Levy, A. (1974). Population density and pathology: Is there a relationship. *Journal of Experimental Social Psychology* 11 (4): 539-551.
- Galle, O. R., Gove, W. R., & McPherson, J. M. (1972). Population density and pathology: what are the relations for man?. *Science*, 176(4030), 23-30
- Ghanaweb (2012). AMA to demolish 4 buildings belonging to Melcom shop owner if...: <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/AMA-to-demolish-4-buildings-belonging-to-Melcom-shop-owner-if-255852> (Accessed: 10.08.19)
- Gilbert, A. (1999). 'Urbanization and security' (Vol. 31) in Rosan, C., Ruble, B.A. & Tulchin, J.S. (1999). *Urbanization, Population, Environment, and Security: A Report of the Comparative Urban Studies Project*. Woodrow Wilson International Center for Scholars.
- Gillis, A. R. (1974). Population density and social pathology: The case of building type, social allowance and juvenile delinquency. *Social forces*, 53(2), 306-314.
- Habraken, N. J. (1988). 'Type as a Social Agreement'. In *refereed proceedings of the Asian Congress of Architects*. Seoul, South Korea. Pp. 1 – 18
- Hartwell, C., (2001). *Pevsner Architectural Guides. Manchester*. London: Penguin Books.
- Harvey, D. (1996). *Justice, Nature and the Geography of Difference*. Oxford: Blackwell
- Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finn publishers
- He J. & Wu J. (2016). Doing well by doing good? The case of housing construction quality in China. *Regional Science and Urban Economics* 57: 46–53
- Herbert, D.T. & Smith, D.M. (1989). *Social Problems and the City: New Perspectives*, New York: Oxford University Press.

- Hodgson, R. L., Khan, I. A., Haynes, R., & Arnold, J. (2016). Rapid structural assessment of garment factories in Bangladesh. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4), 133-142
- Hurst, L. (2001). *The Custom House collapse*, pp. 11-17, in *Learning from construction failures*, ed Peter Campbell, Latheronwheel: Whittles Publishing.
- Hurst, L. (2006). The rise and fall of the use of bond timbers in brick buildings in England. In *Proceedings of the Second International Congress on Construction History*.
- Ifedolapo, B.H. (2015) Building Collapse: Causes and Policy Direction in Nigeria. *International Journal of Scientific Research and Innovative Technology*. Vol. 2 No. 8
- Kemp, P. (1989). The Housing Questions in Herbert, D.T. & Smith, D.M. (1989). *Social Problems and the City: New Perspectives*. New York: Oxford University Press.
- Kenny, C. (2012). Disaster risk reduction in developing countries: costs, benefits and institutions. *Disasters*, 36(4), pp. 559-588. <https://doi.org/10.1111/j.1467-7717.2012.01275.x>
- Kidd, A., (3rd Ed.) (2002). *Manchester*. Edinburgh University Pres
- King, A. [ed] (1980). *'Buildings and Society: Essays on the Social Development of the Built Environment'*. London: Routledge & Kegan Paul.
- Kirmeyer, S. L. (1978). Urban density and pathology: A review of research. *Environment and Behavior*, 10(2), 247-269.
- Komorowski, S.M. (1985). 'Social Pathology: A comment'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finnnpublishers
- Kuklinski, A. (1985). 'Guidelines for a conference on the pathology of urban processes: Ustronie vision'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finnnpublishers
- Lawrence, L. D. and Low, S. M. (1990) 'The Built Environment and Spatial Form', *Annual Review of Anthropology*, Vol. 19, pp. 453-505.
- Legters, L.H. (1985). 'Social Pathology: Toward Definition'. In Haynes, K.E., Kuklinski, A. & Kultalahti, O. (1985). *Pathologies of Urban Processes*. Helsinki: Finnnpublishers
- Lewis, J. (2005). Earthquake destruction: Corruption on the fault line. *Transparency International, Global corruption report, 2005*, 23-30.
- Low, S. M. (1996). 'The Anthropology of Cities: Imagining and Theorizing the City', *Annual Review of Anthropology*, Vol. 25, pp. 383-409.
- Lyu, H. M., Cheng, W. C., Shen, J. S., & Arulrajah, A. (2018). Investigation of collapsed building incidents on soft marine deposit: Both from social and technical perspectives. *Land*, 7(1), 20.
- Manyuira, W. (2018). What really causes housing shortage? Retrieved from: <https://www.nation.co.ke/lifestyle/dn2/Root-cause-of-housing-crisis/957860-4680890-60gecq/index.html> (Accessed: 10.08. 19).
- McGranahan, G., & Satterthwaite, D. (2014). *Urbanisation: Concepts and Trends*. IIED.
- Mills, C. W. (1959). *The sociological imagination*. New York: Oxford UP
- Moffat, S., and Kohler, N. (2008). 'Conceptualizing the built environment as a social-ecological system', *Building Research & Information*, Vol. 36, No. 3, pp. 248 –268.
- Moullier, T. (2015). *Building regulation for resilience: Managing risks for safer cities*. Washington: World Bank
- Nevell, M. (2011). Living in the industrial city: housing quality, land ownership and the archaeological evidence from industrial Manchester, 1740–1850. *International Journal of Historical Archaeology*, 15(4), 594-606.
- Newman, P., & Hogan, T. (1981). A review of urban density models: Toward a resolution of the conflict between populace and planner. *Human Ecology*, 9(3), 269-303.

- Nicols, J. (n.d). Roman Life 2: Urban Life for the Ancient Romans: Living in the city of Rome. University of Oregon
- Obeng-Odoom, F. (2010a). An urban twist to politics in Ghana. *Habitat International*, 34(4), 392-399.
- Ogunlana, S. O. (2010). Beyond the 'iron triangle': Stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects. *International journal of project management*, 28(3), 228-236.
- Oosterbaan, C., Arku, G., & Asiedu, A. B. (2012). Conversion of residential units to commercial spaces in Accra, Ghana: a policy dilemma. *International Planning Studies*, 17(1), pp. 45-66.
- Pelling, M. (2003). *The Vulnerability of Cities: Natural Disasters and Social Resilience*. London: Earthscan Publications.
- Pelling, M., & Wisner, B. (2012). *Disaster risk reduction: Cases from urban Africa*. New York: Routledge.
- Pitcher, B. L. (1997). "Urban Pathology". *SSWA Faculty Publications*. Paper 442.
- Polkinghorne, D. (2007). Validity issues in narrative research. *Qualitative Inquiry*, 13, 471-478
- Quang, N. & Kammeier, H. D. 2002. Changes in the political economy of Vietnam and their impacts on the built environment of Hanoi, *Cities*, 19(6), pp. 373–388.
- Rakodi, C. (1997). Residential property markets in African cities. In C. Rakodi (Ed.). *The urban challenge in Africa* (pp. 371–410). Tokyo: United Nations University Press.
- Ramsden, E. (2009). The urban animal: population density and social pathology in rodents and humans. *Bull World Health Organ*. doi:10.2471/BLT.09.062836
- Rapoport, A. (1969). *'House form and culture'*. London: Prentice-Hall International Press.
- Rapoport, A. (1973). 'An Approach to the Construction of Man-Environment Theory' *The Environmental Design Research Association EDRA 4: Fourth International EDRA Conference*, Vol. 2, pp. 124 – 135
- Reuters, T. (2017). Kenya has a housing problem, this is how to fix it. Retrieved from: <https://www.cnbc.com/news/east-africa/2017/04/13/kenya-slums/> (Accessed: 10.08. 19).
- Salazar, A. (1999). 'Disasters, the World Bank and participation: relocation housing after the 1993 earthquake in Maharashtra, India', *Third World Planning Review*, 21(1), pp. 83–108.
- Schilderman, T. (2004). Adapting traditional shelter for disaster mitigation and reconstruction: experiences with community-based approaches. *Building research & information*, 32(5), 414-426.
- Selye, H. A. (1936). Syndrome produced by diverse nocuous agents. *Nature*. 138:32. doi: 10.1038/138032a0
- Sengel, R. A. (1978). A graph analysis of the relationship between population density and social pathology. *Behavioral science*, 23(3), 213-224.
- Shaw, R., Atta-ur-Rahman, Surjan, A., Paryin, G.A. (2016). *Urban Disasters and Resilience in Asia*. Butterworth-Heinemann: Kidlington
- Smiley, J-P., Fernie, S. and Dainty, A.R.J., (2014) 'Understanding construction reform discourses', *Construction Management and Economics*, Vol. 32, No. 7-8, pp. 804 – 815
- Soane, A. (2016). Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Sparke, P. (2004). Studying the modern home. *The Journal of Architecture*, 9: 4, 413 – 417
- Subbarao, H. (2016). Editorial. *Forensic Engineering*. Vol. 169 (4), 121 – 122
- Sutton, K. & Fahmi, W. (2001). Cairo's urban growth and strategic master plans in the light of Egypt's 1996 population census results, *Cities*, 18(3), pp. 135–149.
- Symonds, J. (2005). 'Dirty Old Town? Industrial archaeology and the Urban Historic Environment', in Gwyn D & Palmer M, (eds), *Understanding the Workplace. A Research Framework for Industrial Archaeology in Britain*. Industrial Archaeology Review XXVII, 57-66.

- Szabo, S. (2015). *Urbanisation and inequalities in a post-Malthusian context: challenges for the sustainable development agenda*. New York: Springer
- Tam, C. M., Deng, Z. M., Zeng, S. X., & Ho, C. S. (2000). Quest for continuous quality improvement for public housing construction in Hong Kong. *Construction Management & Economics*, 18(4), 437-446.
- The Guardian, (2016). Owners of collapsed Nairobi building 'had no occupancy permit'. See: <https://www.theguardian.com/world/2016/apr/30/owners-collapsed-nairobi-building-kenya-no-occupancy-permit> (Accessed 10.08.19).
- Thiessen, D. D. Population density and behavior: a review of theoretical and physiological contributions. *Texas Reports on Biology and Medicine*, 1964, 22, 266-314.
- Thiruppugazh, V. (2008). Urban vulnerability reduction: regulations and beyond. In *The Indian Economy Sixty Years After Independence* (pp. 200-212). London: Palgrave Macmillan.
- Tipple, G. (2005). Housing and urban vulnerability in rapidly-developing cities. *Journal of contingencies and crisis management*, 13(2), 66-75.
- Tuchman, G. (2003). 'Historical Methods'. In Lewis-Beck, M., Bryman, A. E., & Liao, T. F. (2003). *The Sage encyclopedia of social science research methods*. Sage Publications.
- United Nations (UN) (2014). World urbanization prospects: The 2014 revision, highlights. Department of economic and social affairs. *Population Division, United Nations*.
- Vee, C., & Skitmore, C. (2003). Professional ethics in the construction industry. *Engineering, Construction and Architectural Management*, 10(2), 117-127.
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Wisner, B. Blaikie, P. Cannon, T. & Davis, I. (2003) *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge
- Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 4

- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2). <https://doi.org/10.1177/2158244018778109>
- Asante, L.A. & Sasu, A. (2015). Can Ghana Reduce the Incidence of Building Collapse?: An Examination of the Supervisory Role of the Building Inspectorate Division of the Kumasi Metropolitan Assembly. *International Conference on Engineering, Science, Technology and Entrepreneurship Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (2015)*
- Bankoff, G., Freks, G. and Hilhorst, D. 2004. *Mapping Vulnerability*. London: Earthscan
- Barakat, S. (2003). Housing reconstruction after conflict and disaster. *Humanitarian Policy Group, Network Papers*, 43, 1-40.
- Beamish, T. D. (2002). *Silent spill: The organization of an industrial crisis*. Cambridge, MA: The MIT Press.
- Blockley, D. I. (1980). *The Nature of Structural Design and Safety*. New York: Halsted Press
- Blockley, D.I. (1999). Man Made Disasters (Second Edition) by Brian A. Turner and Nick Pidgeon. *Risk Management*. Vol. 1 (1), pp. 73-75
- Boateng, F. G. (2016). The Collapse of Buildings in Cities in Ghana: Reasoning Beyond 'Scientism'. In *Refereed Proceedings of TASA 2016 Conference*. Chou, M. (2016) (ed). Melbourne, Australia pp. 7 – 12.

- Boateng, F.G. (2018). Exploring the collapse of buildings in urban settings. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*. doi.org/10.1680/jmuen.17.00033
- Bowen, A. G. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.
- Brady, S. P. (2012). Role of the forensic process in investigating structural failure. *Journal of performance of constructed facilities*, 26(1), 2-6.
- Branford, K., Hopkins, A., & Naikar, N. (2009) “Guidelines for AcciMap analysis”. In Hopkins, A. (2009). *Learning from high reliability organisations*. CCH Australia Ltd.
- Carper, K. L. (2nd Ed.). (2001). *Forensic Engineering*. New York: CRC Press

Chapter: 5

- Chen, Y., McCabe, B., & Hyatt, D. (2018). A resilience safety climate model predicting construction safety performance. *Safety Science*, 109, 434-445.
- Choudhry, R., Fang, D., Mohamed, S., (2007). Developing a model of construction safety culture. *J. Manage. Eng.* 23 (4), 207–212.
- Choudhry, R.M., Fang, D., Mohamed, S., (2007b). The nature of safety culture: a survey of the state-of-the-art. *Saf. Sci.* 45 (10), 993–1012.
- Cooke, E., Hague, S., & McKay, A. (2016). *The Ghana poverty and inequality report: Using the 6th Ghana living standards survey*. University of Sussex.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). London: SAGE Publications Ltd.
- Dechy, N., Dien, Y., Funnemark, E., Roed-Larsen, S., Stoop, J., Valvisto, T., & Arellano, A. L. V. (2012). 'Results and lessons learned from the ESReDA's accident investigation working group: Introducing article to "safety science" special issue on "Industrial events investigation"'. *Safety Science*, 50(6), 1380-1391.
- Dekker, S. (2011) *Drift into failure: From hunting broken components to understanding complex systems*. Farnham: Ashgate.
- Dekker, S. W. (2015). The psychology of accident investigation: epistemological, preventive, moral and existential meaning-making. *Theoretical issues in ergonomics science*, 16(3), 202-213.
- Dekker, S. W., & Leveson, N. G. (2014). The systems approach to medicine: controversy and misconceptions. *BMJ Qual Saf*, bmjqs-2014.
- Delatte, N. J. (2009). *Beyond Failure – Forensic Case Studies for Civil Engineers'*. Virginia: American Society of Civil Engineers Press.
- Dien, Y., Dechy, N., & Guillaume, E. (2012). Accident investigation: From searching direct causes to finding in-depth causes–Problem of analysis or/and of analyst? *Safety science*, 50(6), 1398-1407.
- Douglas, J., & Ransom, B. (2013). *Understanding building failures*. NY: Routledge.
- Fang, D. P., Huang, X. Y., & Hinze, J. (2004). Benchmarking studies on construction safety management in China. *Journal of Construction Engineering and Management*, 130(3), 424-432. Doi: 10.1061/(ASCE)0733-9364(2004)130:3(424)
- Fellows, R. F., & Liu, A. M. (2015). *Research methods for construction*. Chichester: John Wiley & Sons.
- Freudenburg, W. R., Gramling, R. B., Laska, S., & Erikson, K. (2009). *Catastrophe in the making: the engineering of Katrina and the disasters of tomorrow*. Washington DC: Island Press.

- Fu, F. (2009). 'Progressive collapse analysis of high-rise building with 3-D finite element modeling method'. *Journal of Constructional Steel Research*, 65, 1269-1278.
- Fu, F. (2010). '3-D nonlinear dynamic progressive collapse analysis of multi-storey steel composite frame buildings — Parametric study'. *Engineering Structures*, 32, 3974-3980.
- Ghana Institution of Engineers (GhIE) (2012). *Final Report: Melcom Disaster*. Accra: GhIE
- Gilkey, D., del Puerto, C., Keefe, T., Bigelow, P., Herron, R., Rosecrance, J., Chen, P., (2012). Comparative analysis of safety culture perceptions among homesafe managers and workers in residential construction. *J. Constr. Eng. Manage.* 138 (9), 1044–1052.
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77-122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.
- Grant, E., Salmon, P. M., Stevens, N. J., Goode, N., & Read, G. J. (2018). Back to the future: What do accident causation models tell us about accident prediction? *Safety Science*, 104, 99-109.
- Habraken, N. J. (1988). 'Type as a Social Agreement'. In *refereed proceedings of the Asian Congress of Architects*. Seoul, South Korea. Pp. 1 – 18
- Hammarberg, K., Kirkman, M., & de Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human reproduction*, 31(3), 498-501.
- He, Q., Dong, S., Rose, T., Li, H., Yin, Q., & Cao, D. 2016. 'Systematic impact of institutional pressures on safety climate in the construction industry'. *Accident Analysis & Prevention*, 93, 230-239. <https://doi.org/10.1016/j.aap.2015.11.034>
- Health and Safety Executive (2015). *Managing health and safety in construction: Construction (Design and Management) Regulations 2015*. London: National Archives
- Heinrich, H. (1931). *Industrial Accident Prevention; A Scientific Approach*. New York: McGraw-Hill.
- Hewitt, K. (1997). *Regions of Risk: A Geographical Introduction to Disasters* Edinburgh Gate, Harlow: Addison Wesley Longman Limited.
- Heywood, R. J. (2010). Responding to failure: An introduction to forensic structural engineering. *Australian Journal of Structural Engineering*, 11(1), 1-9.
- Hinze, J., Thurman, S., & Wehle, A. (2013). Leading indicators of construction safety performance. *Safety science*, 51(1), 23-28.
- Hollnagel, E. (2008). Investigation as an impediment to learning. In E. Hollnagel, C. Nemeth & S. Dekker (Eds.), *Remaining sensitive to the possibility of failure (Resilience engineering series)*. Aldershot, UK: Ashgate.
- Hollnagel, E. (2014). *Safety-I and Safety-II: The Past and Future of Safety Management* Ashgate Publishing Ltd.
- Hollnagel, E., (2012). *FRAM: The Functional Resonance Analysis Method: Modelling Complex Socio-Technical Systems*. Ashgate Publishing Ltd.
- Hopkins, A. (1999). *Managing Major Hazards: The lessons of the Moura mine disaster*, Crows Nest, Australia: Allen & Unwin, Australia
- Hopkins, A. (2000). *Lessons from Longford: the Esso gas plant explosion*. Sydney: CCH Australia limited.
- Jenkins, D.P., Salmon, P.M., Stanton, N.A., Walker, G.H., (2010). A systemic approach to accident analysis: a case study of the Stockwell shooting. *Ergonomics* 53 (1), 1–17. <http://dx.doi.org/10.1080/00140130903311625>.
- Jia, A. Y., Rowlinson, S., Loosmore, M., Xu, M., Li, B. and Gibb, A. (2017). 'Institutions and institutional logics in construction safety management: the case of climatic heat stress'. *Construction Management and Economics*, 35(6), 338-367. <https://doi.org/10.1080/01446193.2017.1296171>

- Jia, Y. A., Rowlinson, S., & Ciccarelli, M. (2016). 'Climatic and psychosocial risks of heat illness incidents on construction site'. *Applied ergonomics*, 53, 25-35.
<https://doi.org/10.1016/j.apergo.2015.08.008>
- King, A. [ed] (1980). '*Buildings and Society: Essays on the Social Development of the Built Environment*'. London: Routledge & Kegan Paul.
- Kvale, S. & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd Ed). London: Sage Inc.
- Kvale, S. (1995). The social construction of validity. *Qualitative Inquiry*, 1(1), 19-40.
- Kwasniewski, L. 2010. 'Nonlinear dynamic simulations of progressive collapse for a multistory building'. *Engineering Structures*, 32(5), 1223-1235
- LaPorte, T. R., & Consolini, P. M. (1991). Working in practice but not in theory: Theoretical challenges of" High-Reliability Organizations. *Journal of Public Administration Research and Theory*, 1(1) (1991): 19-47
- Lawrence, L. D. and Low, S. M. (1990). 'The Built Environment and Spatial Form', *Annual Review of Anthropology*, Vol. 19, pp. 453-505.
- Leveson, N. (2004). A new accident model for engineering safer systems. *Saf. Sci.* 42 (4), 237-270.
- Leveson, N. (2012). *Engineering a Safer World: Systems Thinking Applied to Safety*. Cambridge: MIT Press.
- Leveson, N.G. (2011). Applying systems thinking to analyze and learn from events. *Saf. Sci.* 49 (1), 55-6
- Levitt, P. (2014). Challenging the systems approach: why adverse event rates are not improving. *BMJ Qual Saf*, 23(12), 1051-1052.
- Low, S. M. (1996). 'The Anthropology of Cities: Imagining and Theorizing the City', *Annual Review of Anthropology*, Vol. 25, pp. 383-409.
- Lundberg, J., Rollenhagen, C., & Hollnagel, E. (2009). What-You-Look-For-Is-What-You-Find—The consequences of underlying accident models in eight accident investigation manuals. *Safety science*, 47(10), 1297-1311.
- Marshall, M. N. (1996). Sampling for qualitative research. *Family Practice*, 13(6), 522-525.
- Masurkar, Y. S., & Attar, A. C. (2014). Investigating the causes for failures in construction by taking a case study. *Current Trends in Technology and Science*. Vol. 3(5). Pp. 376 – 380
- Matthewman, S. (2012). Accidontology: Towards a sociology of accidents and disasters. *International and Multidisciplinary Journal of Social Sciences*, 1(2), 193-215.
- McDermott, V., Zhang, R. P., Hopkins, A., & Hayes, J. 2018. 'Constructing safety: investigating senior executive long-term incentive plans and safety objectives in the construction sector'. *Construction Management and Economics*, 36(5), 276-290.
- Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Moffat, S., and Kohler, N. (2008). 'Conceptualizing the built environment as a social-ecological system', *Building Research & Information*, Vol. 36, No. 3, pp. 248 –268.
- Molotch, H. (1970). Oil in Santa Barbara and power in America. *Sociological Inquiry*, 40(1), 131-144.
- Moura, R., Beer, M., Patelli, E., Lewis, J., Knoll, F. (2016). Learning from major accidents to improve system design. *Saf. Sci.* 84, 37-45.
- Nadhim, E. A., Hon, C., Xia, B., Stewart, I., & Fang, D. (2016). Falls from height in the construction industry: A critical review of the scientific literature. *International journal of environmental research and public health*, 13(7), 638. doi:[10.3390/ijerph13070638](https://doi.org/10.3390/ijerph13070638)
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Noon, R. K. (2001). *Forensic Engineering Investigation*. New York: CRC Press

- Obeng-Odoom (2018). 'Petroleum Accidents in the Global South'. In Cooney, P., & Freslon, W. S. (2018). *Introduction', Environmental Impacts of Transnational Corporations in the Global South*. Emerald Publishing Limited.
- Obeng-Odoom, F. (2010). Drive left, look right: the political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1-2), 33-48.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Oteng-Ababio, M. (2016). Was 'Black Wednesday' avoidable? The Melcom disaster in Accra puts a generation on trial. *Singapore Journal of Tropical Geography*, 37(3), 401-417.
- Parfitt, M. K. (2012). Why Buildings Fail: Are We Learning From Our Mistakes? *Buildings*, 2(3), 326-331.
- Patton, M. Q. (2001). *Qualitative evaluation and research methods* (3rd Ed.). Thousand Oaks, CA: Sage Publications.
- Payne, G., & Payne, J. (2004). 'Key informants'. In *Key concepts in social research*. London: SAGE Publications Ltd. Available at: <http://srmo.sagepub.com/view/key-concepts-in-social-research>, (28).
- Peckitt, S. J., Glendon, A. I., & Booth, R. T. (2004). 'Societal influences on safety culture in the construction industry'. *Construction safety management systems* pp.14 – 46
- Perrow, C. (1981). Normal accident at three mile island. *Society*, 18(5), 17-26.
- Perrow, C. (1984) *Normal accidents: Living with high-risk systems*. New Jersey: Princeton University
- Perttula, P., Korhonen, P., Lehtela, J., Rasa, P., Kitinoja, J., Makimattila, S., Leskinen, T., (2006). Improving the safety and efficiency of materials transfer at a construction site by using an elevator. *J. Constr. Eng. Manage.* 132 (8), 836–843
- Pidgeon, N. (2010) Systems Thinking, Culture of Reliability and Safety. *Civil Engineering and Environmental Systems*, 27(3), 211-217.
- Pidgeon, N. (2011). In retrospect: normal accidents. *Nature*, 477(7365), 404-405
- Pidgeon, N.F. and Turner, B.A. (1986) H.E and sociotechnical system failure, in *Modeling Human Error in Structural Design and Construction*, Nowak, A.S. (ed.), American Society of Civil Engineering, New York, pp. 193–203
- Pidgeon, N.F., Blockley, D.I., and Turner, B.A. (1988) Site investigations: lessons from a late discovery of hazardous waste. *The Structural Engineer*, 66 (19): 311–315
- Pink, S., Tutt, D., Dainty, A. and Gibb, A. 2010. 'Ethnographic methodologies for construction research: knowing, practice and interventions'. *Building Research and Information*, 38(6), 647-659. doi.org/10.1080/09613218.2010.512193
- Pinto, A., Nunes, I.L., Ribeiro, R.A., (2011). Occupational risk assessment in construction industry – overview and reflection. *Saf. Sci.* 49 (5), 616–624.
- Polkinghorne, D. E. (2005). Language and meaning: Data collection in qualitative research. *Journal of counseling psychology*, 52(2), 137.
- Potter, J. (2003). Discourse analysis and discursive psychology. In P. M. Camic, J. E. Rhodes, & L. Yardley (Eds.), *Qualitative research in psychology: Expanding perspectives in methodology and designs* (pp. 73-93). Washington, DC: American Psychological Association.
- Rapoport, A. (1969). *'House form and culture'*. London: Prentice-Hall International Press.

- Rapoport, A. (1973). 'An Approach to the Construction of Man-Environment Theory' *The Environmental Design Research Association EDRA 4: Fourth International EDRA Conference*, Vol. 2, pp. 124 – 135
- Rapoport, A. (1980). 'Vernacular architecture and the cultural determinants of form', pp. 283 - 305 in King, A. [ed] (1980) *Buildings and Society: Essays on the Social Development of the Built Environment*, London: Routledge & Kegan Paul.
- Rapoport, A. (1982). *The Meaning of the Built Environment*, London: SAGE Publications
- Rasmussen, J. (1997). Risk Management in a dynamic society: a modelling problem. *Safety Science*, 27(2/3), 183 – 213
- Ratay, R. T. (2nd Ed.) (2010), *Forensic Structural Engineering Handbook*. NY: McGraw-Hill.
- Reason J. (2000) Human error: models and management, *Western Journal of Medicine*, 172(6): 393-6.
- Reason, J. (1990). The contribution of latent human failures to the breakdown of complex systems. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 327(1241), 475-484
- Reason, J. (1997). *Managing the risks of organizational accidents*. New York: Routledge.
- Ricketts, J.T. (2001). 'System Fundamental'. In Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Rowlinson, S., & Jia, Y. A. (2015). 'Construction accident causality: An institutional analysis of heat illness incidents on site'. *Safety science*, 78, 179-189. <https://doi.org/10.1016/j.ssci.2015.04.021>
- Rowlinson, S., YunyanJia, A., Li, B., & ChuanjingJu, C. (2014). Management of climatic heat stress risk in construction: a review of practices, methodologies, and future research. *Accident Analysis & Prevention*, 66, 187-198. <https://doi.org/10.1016/j.aap.2013.08.011>
- Salmon, P.M., Walker, G.H., M. Read, G.J., Goode, N., Stanton, N.A., (2016). Fitting methods to paradigms: are ergonomics methods fit for systems thinking? *Ergonomics*. pp. 1–12.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (1st ed.). Essex: Pearson Education Limited.
- Smiley, J-P., Fernie, S. and Dainty, A.R.J., (2014) 'Understanding construction reform discourses', *Construction Management and Economics*, Vol. 32, No. 7-8, pp. 804 – 815
- Soane, A. (2016) Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Sparke, P. (2004). Studying the modern home. *The Journal of Architecture*, 9: 4, 413 – 417
- Subbarao, H. (2016). Editorial. *Forensic Engineering*. Vol. 169 (4), 121 – 122
- Tierney, K. J. (2007). From the margins to the mainstream? Disaster research at the crossroads. *Annu. Rev. Sociol.*, 33, 503-525
- Tierney, K.J. (2010). Growth Machine Politics and the Social Production of Risk [Review of the book *Catastrophe in the Making: The Engineering of Katrina and the Disasters of Tomorrow* by Freudenburg, W.R., Gramling, R., Laska, S. & Erikson, K. (2009). *Contemporary Sociology*, Vol. 39, No. 6. pp. 660-663
- Toole, T. M. (2002). Construction site safety roles. *Journal of Construction Engineering and Management*, 128(3), 203-210. Doi: 10.1061/(ASCE)0733-9364(2002)128:3(203)
- Trotter, M.J., Salmon, P.M., Lenne, M.G. (2014). Impromaps: applying Rasmussen's risk management framework to improvisation incidents. *Saf. Sci.* 64, 60–70
- Turner, B.A. (1978) *Man-Made Disasters*. London: Wykeham Publications Ltd
- Turner, B.A., (1976). The development of disasters—a sequence model for the analysis of the origins of disasters. *Sociol. Rev.* 24 (4), 753–774.
- Turner, B.A., (1979). The social aetiology of disasters. *Disasters* 3 (1), 53–59.

- Tutt, D., Pink, S., Dainty, A. R. J. and Gibb, A. 2013. "In the air' and below the horizon: migrant workers in UK construction and the practice-based nature of learning and communicating OHS'. *Construction Management and Economics*. <https://doi.org/10.1080/01446193.2012.756145>
- Wales, J. (2017). The political economy of road safety: a policy-oriented literature review. *ODI Report*, 61, 877-881.
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (1999). Organizing for high reliability: Processes of collective mindfulness. In R. I. Sutton & B. M. Staw (Eds.), *Research in organizational behavior*, Vol. 21, pp. 81-123).
- Willig, C. (2013). *Introducing qualitative research in psychology* (3rd ed.). Berkshire: McGraw-Hill.
- Wisner, B. Blaikie, P. Cannon, T. & Davis, I. 2003. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge
- Woods, D. D., & Cook, R. I. (2002). Nine steps to move forward from error. *Cognition, Technology & Work*, 4(2), 137-144.
- World Bank. (2014). *Rising through cities in Ghana: Ghana urbanization review overview report*. Washington:<http://documents.worldbank.org/curated/en/613251468182958526/pdf/96449-WP-PUBLIC-GhanaRisingThroughCities-Overview-full.pdf>.
- Zhou, Z., Goh, Y. M., & Li, Q. (2015). 'Overview and analysis of safety management studies in the construction industry'. *Safety science*, 72, 337-350. [doi.10.1016/j.ssci.2014.10.006](https://doi.org/10.1016/j.ssci.2014.10.006)

Chapter: 6

- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Addo, I. A. (2014). *Urban Low Income Housing Development in Ghana: Politics, Policy and Challenges*. *Urban Planning: Practices, Challenges and Benefits*. New York: Nova Science Publishers.
- Adenuga, A. O. (2012). Professionals in the Built Environment and the Incidence of Building Collapse In Nigeria. *Organization, technology & management in construction: an international journal*, 4(2), 461-473.
- Adesanya, A. T., & Olanrewaju, D. O. (2014). Study of factors responsible for incessant collapse of building in Lagos state. *Journal of Emerging Trends in Economics and Management Sciences*, 5(7), 57.
- Adewole, K. K., Oladejo, J. O., & Ajagbe, W. O. (2014). Incessant collapse of buildings in Nigeria: The possible role of the use of inappropriate cement grade/strength class. *World Academy of Science, Engineering and Technology, International Journal of Civil, Structural, Construction and Architectural Engineering*, 8(7), 818-820.
- Afram, S. O., Bangdome-dery, A., Eghan, G. E., & Kwofie, T. E. (2015). Analysis of causes of delay in middle and high income self-build housing projects (SBHPs) in Wa, Ghana. *Journal of Building Construction and Planning Research*, 3, 171-179. <https://doi.org/10.4236/jbcpr.2015.34017>
- Afrane, S. (2017). Poor maintenance culture cause of rapid infrastructure deterioration. Retrieved from: <https://www.graphic.com.gh/features/opinion/poor-maintenance-culture-cause-of-rapid-infrastructure-deterioration.html> (Accessed: 21. 08.19)

- Agyefi-Mensah, S., Post, J. M., De Ligny, E. D. W., Mohammadi, M., & Badu, E. (2011). *Towards Sustainable Housing Solutions for the Low/Moderate Income Group in Ghana: Policy Change or Design Innovation?* (No. eres2011_350). European Real Estate Society (ERES)
- Ahadzie, D. K., & Amoa-Mensah, K. (2010). Management practices in the Ghanaian house building industry. *Journal of Science and Technology*, 30(2), 62–75.
- Ahmed, A. and Dinye, R. D. (2011). “Urbanisation and the challenges of development controls in Ghana: a case study of Wa Township”. *Journal of Sustainable Development in Africa* Vol. 13(7). pp. 210 – 235
- Akinyemi, A., Dare, G., Anthony, A., & Dabara, D. (2016). Building Collapse in Nigeria: Issues and Challenges In *Conference of the International Journal of Arts & Sciences*. Ede, Nigeria. Vol. 09(01). pp. 99–10
- Alinaitwe HM and Ekelu S (2014) Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First International Conference on Construction Materials and Structures* (Ekelu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Ametepye, S. O., Ansah, S. K., & Edu-Buandoh, K. B. M. (2015). Assessing factors affecting the implementation of the national building regulations (L.I. 1630) in Ghana. *Public Policy and Administration Research*, 5, 66-73.
- Antwi, A. (2002). *A study of informal urban land transactions in Accra, Ghana. Our Common Estate*. Londong: Royal Institution of Chartered Surveyors Foundation.
- ANWU, J. C. A. (1992). President Babangida's structural adjustment programme and inflation in Nigeria. *Journal of Social Development in Africa*, 7, 1-5.
- Arku, G. (2006). Housing and development strategies in Ghana, 1945 – 2000. *International Development Planning Review*, 28, 333-358.
- Arku, G. (2009). Housing policy changes in Ghana in the 1990s: Policy review. *Housing Studies*, 24(2), 261-272
- Arku, G., Luginaah, I., & Mkandawire, P. (2012). “You Either Pay More Advance Rent or You Move Out”: Landlords/Ladies’ and Tenants’ Dilemmas in the Low-income Housing Market in Accra, Ghana. *Urban Studies*, 49(14), 3177-3193.
- Arnott, R. (2008). *Housing policy in developing countries: The importance of the informal economy*. Washington: World Bank
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2).<https://doi.org/10.1177/2158244018778109>
- Asante, L. A., Gavu, E. K., Quansah, D. P. O., & Tutu, D. O. (2018). The difficult combination of renting and building a house in urban Ghana: analysing the perception of low and middle income earners in Accra. *GeoJournal*, 83(6), 1223-1237.
- Awale, S. (2015). Substandard construction material still a threat. Retrieved from: <https://thehimalayantimes.com/real-estate/substandard-construction-material-still-a-threat/> (Accessed: 21.08.19)
- Awonyo, L. (2009). Meeting housing-space demand through in situ housing adjustments in the Greater Metropolitan Area, Ghana, *Environment and Planning C*, 27, pp. 302–318.
- Ayee, J. R. A., Frempong, A. K. D., Asante, R., & Bofo-Arthur, K. (2008). The causes, dynamics and policy implications of land-related conflicts in the Greater Accra and Eastern Regions of Ghana (Ghana report). *African Studies Centre University of Leiden*.
- Ayodele, E. O., Ogunbode, A. B., Ariyo, I. E. & Alabi, O. M. (2011). Corruption in the Construction Industry of Nigeria, Causes and Solutions. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. Vol. 2 issue 3, pp. 156-159

- Bank of Ghana, (2007). Housing market in Ghana. Retrieved from: <https://www.bog.gov.gh/privatecontent/Research/Research%20Papers/bog%20housing.pdf> (Accessed: 21.08.19).
- Beamish, T. D. (2002). *Silent spill: The organization of an industrial crisis*. Cambridge, MA: The MIT Press
- Benzoni, S. (2013). Did Informal Construction Practices Play a Part in the Bangladesh Building Collapse? <https://nextcity.org/informalcity/entry/did-informal-construction-play-a-part-in-the-bangladesh-building-collapse> (Accessed: 21.08.19)
- Berger, J. (2002). American dream is a Ghana home; mark of immigrant success to the folks back in Accra. <http://www.nytimes.com/2002/08/21/nyregion/american-dream-ghana-home-mark-immigrantsuccess-folks-back-accra.html>. (Accessed: 21.08.19)
- Berlinski, C. (2011). 1 Million Dead in 30 Seconds: Retrieved from: <http://www.city-journal.org/html/1-million-dead-30-seconds-13396.html> (Accessed: 07.014.19)
- Berry, S. (2008). Ancestral property: land, politics and 'the deeds of the ancestors' in Ghana and Côte d'Ivoire. *Contesting Land and Custom in Ghana; Ubink, JM, Amanor, KS, Eds*, 27-54.
- Blockley, D. I. (1980). *The Nature of Structural Design and Safety*. New York: Halsted Press
- Boamah, N. A. (2010). Housing affordability in Ghana: a focus on Kumasi and Tamale. *Ethiopian Journal of Environmental Studies and Management*, 3(3).
- Boamah, N. A. (2013). Urban land market in Ghana: a study of the Wa Municipality. In *Urban forum* (Vol. 24, No. 1, pp. 105-118).
- Boamah, N. A. (2014). Housing policy in Ghana: The feasible paths. *Ghana Journal of Development Studies*, 11(1), 1–18.
- Boamah, N. A., Gyimah, C., & Nelson, J. K. B. (2012). Challenges to the enforcement of development controls in the Wa municipality. *Habitat International*, 36, 136-142.
- Bondinuba, F.K. (2012). Exploring the challenges and barriers in accessing financial facilities by small and medium construction firms in Ghana. *Civil Environ. Res.* 2(6):25-35.
- Botchway, E. A., Afram, S. O., & Ankrah, J. (2014). Building permit acquisition in Ghana: The situation in Kumasi. *Developing Country Studies*, 4(20), 11-22.
- Buckley, R. M., & Mathema, A. S. (2008). Real estate regulations in Accra: some macroeconomic consequences?. *Urban Studies*, 45(11), 2249-2271.
- Centre for Democratic Development. (2002). *Organizational study of land sector agencies*. Accra: CDD.
- Crook, C. R. (2004). Access to justice and land disputes in Ghana's state courts: the litigants' perspective. *Journal of Legal Pluralism*, 2004-nr. 50.
- Darkwa, L., & Attuquayefio, P. (2012). Killing to protect: Land guards, state subordination and human rights in Ghana. *SUR-Int'l J. on Hum Rts.*, 17, 141.
- Dauda, A (2011). Tackling the Poor Maintenance Culture in Ghana through Green Retrofits. Retrieved from: <https://www.modernghana.com/news/315701/tackling-the-poor-maintenance-culture-in-ghana-through-green.html> (Accessed: 21. 08.19)
- De Soto, H. (2000). *The mystery of capital: why capitalism triumphs in the West and fails everywhere else*. New York: Basic Books.
- Diko, J. and Tipple, A. G. (1992)Migrants build at home: long distance housing development by Ghanaians in London, *Cities*, 9, pp. 288–294.
- Dollar, D., & Svensson, J. (2000). What explains the success or failure of structural adjustment programmes?. *The Economic Journal*, 110(466), 894-917.
- Engbø, A., Kjesbu, N., Lædre, O., & Lohne, J. (2017). Perceived Consequences of Counterfeit, Fraudulent and Sub-standard Construction Materials. *Procedia Engineering*, 196, 343-350.

- Escaleras, M., Anbarci, N., & Register, C. A. (2007). Public sector corruption and major earthquakes: a potentially deadly interaction. *Public Choice*, 132(1), 209-230
- Fernandez, R. H. F. (2014). *Strategies to Reduce the Risk of Building Collapse in Developing Countries* (Doctoral Thesis). Carnegie Mellon University Carnegie Institute of Technology.
- Field, M.J. (1940). *Social Organization of the Gã People*. London: Oxford Univeristy Press
- Fleddermann, C. B. (1999). *Engineering ethics*. Upper Saddle River, NJ: Prentice Hall.
- Flyvbjerg, B. 1998, *Rationality and Power. Democracy in Practice*. Chicago: The University of Chicago Press.
- Fox, S. (2013). *The political economy of urbanisation and development in sub-Saharan Africa* (Doctoral dissertation, The London School of Economics and Political Science (LSE)).
- Fox, S. (2014). The political economy of slums: Theory and evidence from Sub-Saharan Africa. *World Development*, 54, 191-203.
- Freiku, S.R. (2003) Kumasi's Development Getting Worse, Chaotic: <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Kumasi-s-Development-Getting-Worse-Chaotic-32265> Accessed (21.08.19)
- Freudenburg, W. R., Gramling, R. B., Laska, S., & Erikson, K. (2009). *Catastrophe in the making: the engineering of Katrina and the disasters of tomorrow*. Washington DC: Island Press.
- Gbonegun, V. (2017). Lack of enforcement, bane of substandard building materials. Retrieved from: <https://guardian.ng/property/lack-of-enforcement-bane-of-substandard-building-materials/> (Accessed: 21.08.19)
- Geest, S. (1998). *Yebisa wo fie*: Growing old and building a house in the Akan culture of Ghana. *Journal of Cross Cultural Gerontology*, 13(4), pp. 333–359. DOI: 10.1023/A:1006563032706
- Ghana Institution of Surveyors (GHIS) (2012). Ghana Institution of Surveyors statement on Melcom collapse: <https://www.modernghana.com/news/429356/ghana-institution-of-surveyors-statement-on-melcom.html> (Accessed: 21.08.19).
- Ghana Statistical Service. (2014). *Ghana living standard survey round 6 (GLSS 6): Poverty profile in Ghana (2005–2013)*. Accra: Ghana Statistical Service.
- Ghana Statistical Service. (2014). *Ghana living standard survey round 6 (GLSS 6): Poverty profile in Ghana (2005–2013)*. Accra: Ghana Statistical Service.
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77-122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.
- Gough, K. V. & Yankson, P. W. K. (2000) Land markets in African cities: the case of peri-urban Accra, Ghana, *Urban Studies*, 37, pp. 2485–2500.
- Government of Ghana, Ministry of Works and Housing (1989). *The Economic Impact of Government Policies on the Housing Sector*. Prepared by Management Development and Productivity Unit.
- Grant, R. & Yankson, P. (2003) City profile: Accra, *Cities*, 20(1), pp. 65–74.
- Grant, R. (2007) Geographies of investment: how do the wealthy build new houses in Accra, Ghana? *Urban Forum*, 18(1), pp. 31–59.
- GSS (2018). *Ghana Living Standard Survey Round 7: Poverty trends in Ghana (2005 – 2017)*. Accra: Ghana Statistical Service
- Gyampo R, (2008). Direct Election of District Chief Executives and Mayors – A tool for effective decentralisation and political stability in Ghana. *Ghana Policy Journal*, pp.70-92.
- Health and Safety Executive (2015). *Managing health and safety in construction: Construction (Design and Management) Regulations 2015*. London: National Archives

- Hedidor, D., & Bondinuba, F. (2017). Exploring Concrete Materials Batching Behaviour of Artisans in Ghana's Informal Construction Sector. *Journal of Civil Engineering and Construction Technology*, 8(5), 35-52.
- Hedidor, D., Bondinuba, F. K., & Sadique, M. A. (2016). Spatial Planning in Ghana: Antecedents and the Role of Local Artisans. *Journal of Building Construction and Planning Research*, 4(03), 201.
- IFC Report (2012). *Doing Business: Doing Business in a more Transparent Way*. Washington: The International Bank for Reconstruction and Development/The World Bank.
- Juul, K., & Lund, C (2002). *Negotiating Property in Africa*. Portsmouth: Heinemann
- Kaminsky, J. (2018): The global influence of national cultural values on construction permitting, *Construction Management and Economics*, DOI: 10.1080/01446193.2018.1506140
- Karley, N. K. (2008). Ghana Residential Property Delivery Constraints and Affordability Analysis. *Housing Finance International*, 22(4), 22
- Kenny, C. (2012). Disaster risk reduction in developing countries: costs, benefits and institutions. *Disasters*, 36(4), pp. 559-588. <https://doi.org/10.1111/j.1467-7717.2012.01275.x>
- Keteku-Atiemo, W. (2006). Rampant Failure of Buildings in an Era of Massive Shelter Development in Ghana. Empowering The Informal Construction Labourer with Knowledge and Skill to help in providing a Solution to this Problem: <http://www.lth.se/fileadmin/hdm/alumni/papers/sdd2006/sdd2006-17.pdf> (Accessed: 21.08.19).
- Kishindo, P. (2004). Customary land tenure and the new land policy in Malawi. *Journal of Contemporary African Studies*, 22(2), 213-225.
- Konadu-Agyemang, K. (2001). Structural adjustment programs and housing affordability in Accra, Ghana. *Canadian Geographer/Le Géographe Canadien*, 45(4), 528-544.
- Konadu-Agyemang, K. (2001b). A survey of housing conditions and characteristics in Accra, an African city. *Habitat International*, 25(1), 15-34.
- Korboe, D. (1992). Family-houses in Ghanaian cities: To be or not to be?. *Urban Studies*, 29(7), 1159-1171.
- Kumar R.S. (2016). Lessons from structural failures in India. *Proceedings of the Institution of Civil Engineers – Forensic Engineering* 169(4): 143–148, <https://doi.org/10.1680/jfoen.16.00019>.
- Lewis, J. (2005). Earthquake destruction: Corruption on the fault line. *Transparency International, Global corruption report, 2005*, 23-30.
- Lizarralde, G., Tomiyoshi, S., Bourgault, M., Malo, J., & Cardosi, G. (2013). Understanding differences in construction project governance between developed and developing countries. *Construction Management and Economics*, 31(7), 711-730.
- Mahama, C., & Antwi, A. (2006). *Land and property markets in Ghana*. Discussion paper, Prepared by Royal Institution of Chattered Surveyors, World Urban Forum III, June 19–23, 2006.
- Manoukian, M. (1950). *Akan and Ga-Adangme Peoples of the Gold Coast*. London: Oxford University Press.
- Matthewman, S. (2012). Accidontology: Towards a sociology of accidents and disasters. *International and Multidisciplinary Journal of Social Sciences*, 1(2), 193_215.
- Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Miekle, J. (2011). *Note on informal construction*. Washington, DC: ICP
- Mitullah, W. and Wachira, I.N. (2003). *Informal labour in the construction industry in Kenya: a case study of Nairobi*. Working Paper 204, Sectoral Activities Programme. Geneva: International Labour Office.

- Mlambo, A. S. (1997). *The economic structural adjustment programme: The case of Zimbabwe, 1990-1995*. University of Zimbabwe Publications Office.
- Moullier, T. (2015). *Building regulation for resilience: Managing risks for safer cities*. Washington: World Bank
- National Building Regulations (LI 1630) 1996. S. 46.1(Gh).
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Ndua G, Ng'ethe N (1985). 'Education, training, and welfare in the informal sector: A study of carpentry and metalwork in the Eastlands of Nairobi'. In *Workshop on Technology, Employment, Education and Development (TEED)*, International Development Research Centre, Nairobi, Kenya 21(24).
- Nhlabatsi, R. (2014). Cheap Chinese imports in Africa: Implications and remedies. Retrieved from: <http://www.polity.org.za/article/cheap-chinese-imports-in-africa-implications-and-remedies-2014-03-06> (Accessed: 21.08.19)
- Nigeria Real Estate Hub (NREH) (2016). The dangers of using substandard materials. Retrieved from: <https://nigeriarealestatehub.com/the-dangers-of-using-substandard-building-materials.html/> (Accessed: 21.08.19)
- Obeng Mensah, R. (2008). A change in attitude: Culture of maintenance in Ghana. Retrieved from: <https://www.modernghana.com/news/176588/a-change-in-attitude-culture-of-maintenance-in-ghana.html> (Accessed: 21. 08.1
- Obeng-Odoom (2018). 'Petroleum Accidents in the Global South'. In Cooney, P., & Freslon, W. S. (2018). *Introduction', Environmental Impacts of Transnational Corporations in the Global South*. Emerald Publishing Limited.
- Obeng-Odoom F. (2011). Real estate agents in Ghana: A suitable case for regulation? *Regional Studies*, vol.45, issue 3, pp. 403 - 416.
- Obeng-Odoom F. (2011b). Private rental housing in Ghana: Reform or renounce? *Journal of International Real Estate and Construction Studies*, vol.1, no.1., pp. 71-90.
- Obeng-Odoom, F. (2010). Drive left, look right: the political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1-2), 33-48
- Obeng-Odoom, F. (2010c). Urban Real Estate in Ghana: A Study of Housing-related Remittances from Australia. *Housing Studies* 25 (3): 357-73
- Obeng-Odoom, F. (2013). *Governance for pro-poor urban development: Lessons from Ghana*. NY: Routledge.
- Obeng-Odoom, F. (2015). The social, spatial, and economic roots of urban inequality in Africa: Contextualizing Jane Jacobs and Henry George. *American Journal of Economics and Sociology*, 74(3), 550-586.
- Obeng-Odoom, F., & Amedzro, L. (2011). Inadequate housing in Ghana. *Urbani izziv*, 22(1).
- Offei-Nyako K, Osei-Tutu E, Fugar FD, Adinyira E (2014). Skilled Artisanal Availability in the Ghanaian Construction Industry. *Covenant J. Res. Built Environ.* 1(1):1-9.
- Ofori, E. (2006). *SUF: Pilot Programme Report on Community-Led Enumeration for Ashaiman – Tulaku Community, Ghana*. Accra, Report commissioned by UN-HABITAT Sub-Programme 4: Human Settlements Financing Slum Upgrading Facility (SUF) - Design Phase.
- Ofori, G. (2007). Construction in developing countries. *Construction Management and Economics*, 25(1), 1-6.
- Oke, A., & Abiola-Falemu, J. (2009). Relationship between building collapse and poor quality of materials and workmanship in Nigeria. In *Proceedings: Royal Institution of Chartered Surveyors Construction and Building and Research (COBRA) 2009 Conference, Cape Town*.

- Okyere, S. A., Tasantab, J.C., Abunyewah, M. (2018). Accra's informal settlements are easing the city's urban housing crisis. *The Conversation*: <https://theconversation.com/accras-informal-settlements-are-easing-the-citys-urban-housing-crisis-104266> (Accessed: 21.08.19)
- Olukoshi, A. O. (Ed.). (1993). *The politics of structural adjustment in Nigeria*. London: James Currey.
- Oosterbaan, C., Arku, G., & Asiedu, A. B. (2012) Conversion of residential units to commercial spaces in Accra, Ghana: a policy dilemma. *International Planning Studies*, 17(1), pp. 45-66
- Oteng-Ababio, M. (2016). Was 'Black Wednesday' avoidable? The Melcom disaster in Accra puts a generation on trial. *Singapore Journal of Tropical Geography*, 37(3), 401-417
- Owusu, S.E. and Boapeah, S.N. (2003). Housing Policy in Ghana: Experiences and Interventions for Public/Private Sector Support Systems. *Bi-Annual Journal of the Building and Road Research Institute* (CSIR), Ghana, Vol. 8.
- Owusu-Ansah, A., Ohemeng-Mensah, D., Abdulai, R. T., & Obeng-Odoom, F. (2018). Public choice theory and rental housing: an examination of rental housing contracts in Ghana. *Housing Studies*, 33(6), 938-959.
- Pacione, M., (2005) *Urban Geography: A Global Perspective*. London: Routledge
- Rakodi, C. (1997). 'Residential property markets in African cities'. In C. Rakodi (1997) (Ed.). *The urban challenge in Africa* (pp. 371–410). Tokyo: United Nations University Press.
- Ratay, R. T. (2nd Ed.) (2010), *Forensic Structural Engineering Handbook*. NY: McGraw-Hill.
- Reerink, G., & van Gelder, J. L. (2010). Land titling, perceived tenure security, and housing consolidation in the kampongs of Bandung, Indonesia. *Habitat International*, 34(1), 78-85.
- Ricketts, J.T. (2001). 'System Fundamental'. In Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Sackeyfio, N. (2012). The politics of land and urban space in colonial Accra. *History in Africa*, 39, 293-329.
- Soane, A. (2016). Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Solomon, N. (2018). Ghana's dilemma: Maintenance culture or facility management? Retrieved from: <https://citinewsroom.com/2018/05/31/ghanas-dilemma-maintenance-culture-or-facility-management/> (Accessed: 21. 08.19)
- Sonsore, J. (2003). "The Urban Housing Crisis in Ghana: Capital, the State versus the People" *Ghana Journal of Social Science*, vol. 2, pp 1-31.
- Stretton AW (1981). The building industry and urbanization in third world countries: a Philippine case study. *Econ. Dev. Cultural Change* pp. 325-339.
- Tchamba, J. C., & Bikoko, T. G. L. (2016). Failure and Collapse of Building Structures in the Cities of Yaoundé and Douala, Cameroon from 2010 to 2014. *Modern Applied Science*, 10(1), 23.
- The Ghana Building Code 2018* (Gh.)
- Tipple, A. G., & Korboe, D. (1998). Housing policy in Ghana: Towards a supply oriented future. *Habitat International*, 22(3), 245–257.
- Tipple, A. G., Korboe, D., Willis, K., & Garrod, G. (1998). Who is building what in urban Ghana? Housing supply in three towns. *Cities*, 15(6), 399–416. [https://doi.org/10.1016/S0264-2751\(98\)00036-5](https://doi.org/10.1016/S0264-2751(98)00036-5).
- Tipple, G. (1987) Housing policy and culture in Kumasi, Ghana: A study of constraints and resources. *Environment and Behaviour*, 19(3), pp. 331–352. DOI: 10.1177/0013916587193005
- Tutu, K. A., & Bempong, K. G. (2018). Our Concrete Quality: The Tip of an Iceberg? In the *50th Ghana Institution of Engineers (GhIE) Annual Conference*. Accra, Ghana, pp. 1 – 3
- UN-Habitat (2011). *Ghana Housing Profile*. Nairobi: United Nations Human Settlements Programme (UN-HABITAT)

- UN-Habitat (United Nations Human Settlements Programme). (2008). *Municipal Financing and Urban Development*. Nairobi: UN-HABITAT.
- Vee, C., & Skitmore, C. (2003). Professional ethics in the construction industry. *Engineering, Construction and Architectural Management*, 10(2), 117-127.
- Wales, J. (2017). The political economy of road safety: a policy-oriented literature review. *ODI Report*, 61, 877-881.
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Wells, J. (2007). Informality in the construction sector in developing countries. *Construction Management and Economics*, 25(1), 87-93.
- Wells, J., & Wall, D. (2003). The expansion of employment opportunities in the building construction sector in the context of structural adjustment: some evidence from Kenya and Tanzania. *Habitat International*, 27(3), 325-337.
- Willis, K. & Tipple, G. (1991) Economics of multihabitation: Housing conditions, household occupancy and household structure under rent control, inflation, and nonmarketability of ownership rights. *World Development*, 19(12), pp. 1705–1720. DOI: 10.1016/0305-750X(91)90014-9
- World Bank. (2003). *Land policies for growth and poverty reduction, a World Bank policy research report*. Washington, DC: World Bank.
- Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 7

- Adarkwa, K. K., & Oppong, R. A. (2005). Gentrification, use of conversion and traditional architecture in Kumasi's central business district – Case study of Adum precinct. *Journal of the University of Science and Technology*, 25(2), 80
- Addo, I. A. (2014). Urban Low Income Housing Development in Ghana: Politics, Policy and Challenges. *Urban Planning: Practices, Challenges and Benefits*. New York: Nova Science Publishers.
- Adenuga, A. O. (2012). Professionals in the Built Environment and the Incidence of Building Collapse In Nigeria. *Organization, technology & management in construction: an international journal*, 4(2), 461-473.
- Adewole, K. K., Oladejo, J. O., & Ajagbe, W. O. (2014). Incessant collapse of buildings in Nigeria: The possible role of the use of inappropriate cement grade/strength class. *World Academy of Science, Engineering and Technology, International Journal of Civil, Structural, Construction and Architectural Engineering*, 8(7), 818-820.
- Adinyira, E., & Anokye, P. (2013). Illegal Appendages to Residential Buildings in Kumasi, Ghana—a Case Study of North Suntreso. *Journal of Construction Project Management and Innovation* Vol. 3 (1). pp. 511-529.
- Ahadzie, D. K., & Amoah-Mensah, K. (2010). Management practices in the Ghanaian house building industry. *Journal of Science and Technology*, 30(2), 62–75.
- Ahmed, A. and Dinye, R. D. (2011). “Urbanisation and the challenges of development controls in Ghana: a case study of Wa township”. *Journal of Sustainable Development in Africa* Vol. 13(7). pp. 210 – 235.
- Alinaitwe HM and Ekololu S (2014) Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First*

- International Conference on Construction Materials and Structures* (Ekolu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Amanor, K. & Ubink, J. (2008). ‘Contesting land and custom in Ghana: Introduction’. In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Amanor, K. (2008). ‘The changing face of customary land tenure’. In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Ametepey, S. O., Ansah, S. K., & Edu-Buandoh, K. B. M. (2015). Assessing factors affecting the implementation of the national building regulations (L.I. 1630) in Ghana. *Public Policy and Administration Research*, 5, 66-73
- Antwi, A. (2002). *A study of informal urban land transactions in Accra, Ghana. Our Common Estate*. Londong: Royal Institution of Chartered Surveyors Foundation.
- Arku, G. (2009). Housing policy changes in Ghana in the 1990s: Policy review. *Housing Studies*, 24(2), 261-272
- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2).<https://doi.org/10.1177/2158244018778109>
- Asante, L. A., Gavu, E. K., Quansah, D. P. O., & Tutu, D. O. (2018). The difficult combination of renting and building a house in urban Ghana: analysing the perception of low and middle income earners in Accra. *GeoJournal*, 83(6), 1223-1237.
- Associated Press (AP) (2016). ‘Officials: Collapsed Kenyan building had no occupancy permit’. See: <https://apnews.com/0d55d932ee1b46c390f75ab7c2ddc44c> (Accessed: 30. 03. 19).
- Ayee, J. R. A., Frempong, A. K. D., Asante, R., & Bofo-Arthur, K. (2008). The causes, dynamics and policy implications of land-related conflicts in the Greater Accra and Eastern Regions of Ghana (Ghana report). *African Studies Centre University of Leiden*.
- Ayodele, E. O., Ogunbode, A. B., Ariyo, I. E. & Alabi, O. M. (2011). Corruption in the Construction Industry of Nigeria, Causes and Solutions. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. Vol. 2 issue 3, pp. 156-159
- BD (Buildings Department) (2007) Buildings Department Determined to Tackle Unauthorized Building Works [Press release]. BD, Hong Kong, China. Available from: <http://www.bd.gov.hk/english/documents/news/20070220ae.htm> [Accessed 30. 03.19]
- Beamish, T. D. (2002). *Silent spill: The organization of an industrial crisis*. Cambridge, MA: The MIT Press.
- Beard, M. (2015). *S.P.Q.R.: A History of Ancient Rome*. New York: W. W. Norton & Company, Inc.
- Benzoni, S. (2013). Did Informal Construction Practices Play a Part in the Bangladesh Building Collapse? <https://nextcity.org/informalcity/entry/did-informal-construction-play-a-part-in-the-bangladesh-building-collapse> (Accessed: 21.08.19)
- Bhatta, B. (2010). Causes and consequences of urban growth and sprawl. In *Analysis of urban growth and sprawl from remote sensing data* (pp. 17-36). Springer, Berlin, Heidelberg.
- Boamah, N. A. (2010). Housing affordability in Ghana: a focus on Kumasi and Tamale. *Ethiopian Journal of Environmental Studies and Management*, 3(3).
- Boamah, N. A. (2013). Urban land market in Ghana: a study of the Wa Municipality. In *Urban forum* (Vol. 24, No. 1, pp. 105-118).

- Boamah, N. A. (2014). Housing policy in Ghana: The feasible paths. *Ghana Journal of Development Studies*, 11(1), 1–18.
- Boamah, N. A., Gyimah, C., & Nelson, J. K. B. (2012). Challenges to the enforcement of development controls in the Wa municipality. *Habitat International*, 36, 136–142.
- Boateng FG (2016). The collapse of buildings in cities in Ghana: Reasoning beyond ‘scientism’. In *Refereed Proceedings of The Australian Sociological Association 2016 Conference* (Chou M (ed.)). (TASA), Melbourne, Australia
- Boateng, F.G. (2018). Exploring the collapse of buildings in urban settings. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*.
- Bondinuba, F.K. (2012). Exploring the challenges and barriers in accessing financial facilities by small and medium construction firms in Ghana. *Civil Environ. Res.* 2(6):25–35.
- Boni, S. (2008). ‘Traditional ambiguities and authoritarian interpretations in Sefwi land disputes’. In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Botchway, E. A., Afram, S. O., & Ankrah, J. (2014). Building permit acquisition in Ghana: The situation in Kumasi. *Developing Country Studies*, 4(20), 11–22.
- Closs, V. M. (2013). *While Rome burned: Fire, leadership, and urban disaster in the Roman cultural imagination* (Doctoral thesis). University of Pennsylvania.
- Cobbinah, P. B., & Niminga-Beka, R. (2017). Urbanisation in Ghana: Residential land use under siege in Kumasi central. *Cities*, 60, 388–401.
- Coen, S. E., Ross, N. A. & Turner, S. (2008) ‘Without tiendas it’s a dead neighbourhood’: The socio-economic importance of small trade stores in Cochabamba, Bolivia, *Cities*, 25, pp. 327–339
- Cooke, E., Hague, S., & McKay, A. (2016). *The Ghana poverty and inequality report: Using the 6th Ghana living standards survey*. University of Sussex.
- Crook, R.C. (2008). ‘Customary justice institutions and local Alternative Dispute Resolution: What kind of protection can they offer to customary landholders?’ In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Darkwa, L., & Attuquayefio, P. (2012). Killing to protect: Land guards, state subordination and human rights in Ghana. *SUR-Int’l J. on Hum Rts.*, 17, 141.
- Desai, V. (2012). Urbanisation and Housing the Poor: Overview. *International Encyclopedia of Housing and Home*. pp. 212 – 218
- Freudenburg, W. R., Gramling, R. B., Laska, S., & Erikson, K. (2009). *Catastrophe in the making: the engineering of Katrina and the disasters of tomorrow*. Island Press
- Geest, S. (1998). *Yebisa wo fie*: Growing old and building a house in the Akan culture of Ghana. *Journal of Cross Cultural Gerontology*, 13(4), pp. 333–359. DOI: 10.1023/A:1006563032706
- Ghana Institution of Engineers (GhIE) (2012). *Final Report: Melcom Disaster*. Accra: GhIE
- Ghana Institution of Surveyors (GHIS) (2012). Ghana Institution of Surveyors statement on Melcom collapse: <https://www.modernghana.com/news/429356/ghana-institution-of-surveyors-statement-on-melcom.html> (Accessed: 21.08.19).
- Ghana Statistical Service (GSS) (2012). *2010 Population and Housing Census Final Results*. Accra: Ghana Statistical Service
- Glaeser, E. L., Gyourko, J., & Saks, R. E. (2005). Urban growth and housing supply. *Journal of economic geography*, 6(1), 71–89.
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77–122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.

- Gough, K. V., & Kellett, P. (2001). Housing consolidation and home-based income generation: evidence from self-help settlements in two Colombian cities. *Cities*, 18(4), 235-247.
- Grant R., Nijman J. (2004) Post-Colonial Cities in the Global Era: A Comparative Study of Mumbai and Accra. In: Dutt A.K., Noble A.G., Venugopal G., Subbiah S. (eds) Challenges to Asian Urbanization in the 21st Century. The GeoJournal Library, vol 75. Springer, Dordrecht
- Grant, R. & Yankson, P. (2003) City profile: Accra, *Cities*, 20(1), pp. 65–74.
- Grant, R. (2001). Liberalization policies and foreign companies in Accra, Ghana. *Environment and planning A*, 33(6), 997-1014.
- GSS (2018). *Ghana Living Standard Survey Round 7: Poverty trends in Ghana (2005 – 2017)*. Accra: Ghana Statistical Service
- Harrison, A. (1994). Just-in-time manufacturing. In Storey, J. (Ed). *New Wave Manufacturing Strategies*. Retrieved from: <https://books.google.com>
- Hartwell, C., (2001). *Pevsner Architectural Guides. Manchester*. London: Penguin Books.
- Hedidor, D., & Bondinuba, F. (2017). Exploring Concrete Materials Batching Behaviour of Artisans in Ghana's Informal Construction Sector. *Journal of Civil Engineering and Construction Technology*, Vol. 8(5), pp. 35-52.
- Hedidor, D., Bondinuba, F. K., & Sadique, M. A. (2016). Spatial Planning in Ghana: Antecedents and the Role of Local Artisans. *Journal of Building Construction and Planning Research*, 4(03), 201.
- Hurst, L. (2001). *The Custom House collapse*, pp. 11-17, in *Learning from construction failures*, ed Peter Campbell, Latheronwheel: Whittles Publishing.
- Hurst, L. (2006). The rise and fall of the use of bond timbers in brick buildings in England. In *Proceedings of the Second International Congress on Construction History*.
- Hutchful, E. (2002) Ghana's Adjustment Experience: *The Paradox of Reform: Geneva/Accra/Portsmouth, NH/ Oxford: UNRISD/Woeli/ Heinemann/James Currey*.
- Karley, N. K. (2008). Ghana Residential Property Delivery Constraints and Affordability Analysis. *Housing Finance International*, 22(4), 22
- Kemp, P. (1989). The Housing Questions in Herbert, D.T. & Smith, D.M. (1989). *Social Problems and the City: New Perspectives*. New York: Oxford University Press.
- Keteku-Atiemo, W. (2006). Rampant Failure of Buildings in an Era of Massive Shelter Development in Ghana. Empowering The Informal Construction Labourer with Knowledge and Skill to help in providing a Solution to this Problem: <http://www.lth.se/fileadmin/hdm/alumni/papers/sdd2006/sdd2006-17.pdf> (Accessed: 30. 03. 19).
- Kidd, A., (3rd Ed.) (2002). *Manchester*. Edinburgh University Press
- Konadu-Agyemang, K. & Adanu, S. (2003). The changing geography of export trade in Ghana under structural adjustment programs: Some socioeconomic and spatial implications, *The Professional Geographer*, 55(4), pp. 514–527.
- Konadu-Agyemang, K. (2000) The best of times and the worst of times: Structural adjustment programs and uneven development in Africa: The case of Ghana. *Professional Geographer*, 52, pp. 469–483.
- Konadu-Agyemang, K. (2001). Structural adjustment programs and housing affordability in Accra, Ghana. *Canadian Geographer/Le Géographe Canadien*, 45(4), 528-544.
- Konadu-Agyemang, K. (2001b). A survey of housing conditions and characteristics in Accra, an African city. *Habitat International*, 25(1), 15-34.
- Kpamma, E. Z., & Adjei-Kumi, T. (2013). *Construction permits and flow of projects within the Sunyani municipality, Ghana*. Paper presented at the annual meeting of International Group of Lean Construction (IGLC-21), Fortaleza, Brazil.

- Kuta, J., & Nyaanga, D. M. (2014). Effect of quality of engineering materials on construction and quality of buildings: A case study of Nairobi, Kenya. *Prime Journal of Social Science*, 3, 608-611.
- Lawrence, L. D. and Low, S. M. (1990) 'The Built Environment and Spatial Form', *Annual Review of Anthropology*, Vol. 19, pp. 453-505.
- Levy, M., & Salvadori, M. (1992). *Why buildings fall down: How structures fail*. London: WW Norton & Company
- Lewis, J. (2005). Earthquake destruction: Corruption on the fault line. *Transparency International, Global corruption report, 2005*, 23-30
- Lyu, H. M., Cheng, W. C., Shen, J. S., & Arulrajah, A. (2018). Investigation of collapsed building incidents on soft marine deposit: Both from social and technical perspectives. *Land*, 7(1), 20.
- Mahama, C., & Antwi, A. (2006). *Land and property markets in Ghana*. Discussion paper, Prepared by Royal Institution of Chattered Surveyors, World Urban Forum III, June 19–23, 2006.
- Mankiw, N. G., & Weil, D. N. (1989). The baby boom, the baby bust, and the housing market. *Regional science and urban economics*, 19(2), 235-258.
- Manyuira, W. (2018). What really causes housing shortage? Retrieved from: <https://www.nation.co.ke/lifestyle/dn2/Root-cause-of-housing-crisis/957860-4680890-60gecq/index.html> (Accessed: 10.08. 19).
- Maskell, B. (1987). Just-in-time manufacturing. *Industrial Management & Data Systems*, 87(9/10), pp. 17-20.
- Matthewman, S. (2012). Accidentology: Towards a sociology of accidents and disasters. *International and Multidisciplinary Journal of Social Sciences*, 1(2), 193-215.
- Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Mitullah, W. and Wachira, I.N. (2003). *Informal labour in the construction industry in Kenya: a case study of Nairobi. Working Paper 204, Sectoral Activities Programme*. Geneva: International Labour Office.
- Moller-Jensen, L. & Knudsen, M. (2008) Patterns of population change in Ghana (1984–2000): Urbanization and frontier development, *Geojournal*, 73, pp. 307–320. National Building Regulations 1996, (Li 1630).
- Molotch, H. (1970). Oil in Santa Barbara and power in America. *Sociological Inquiry*, 40(1), 131_144.
- Muellbauer, J., & Murphy, A. (1997). Booms and busts in the UK housing market. *The Economic Journal*, 107(445), 1701-1727.
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Nevell, M. (2011). Living in the industrial city: housing quality, land ownership and the archaeological evidence from industrial Manchester, 1740–1850. *International Journal of Historical Archaeology*, 15(4), 594-606.
- Nicols, J. (n.d). *Roman Life 2: Urban Life for the Ancient Romans: Living in the city of Rome*. University of Oregon
- Obeng-Odoom (2018). 'Petroleum Accidents in the Global South'. In Cooney, P., & Freslon, W. S. (2018). *Introduction', Environmental Impacts of Transnational Corporations in the Global South*. Emerald Publishing Limited.
- Obeng-Odoom, F. (2010). Drive left, look right: the political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1-2), 33-48.
- Obeng-Odoom, F. (2010a). An urban twist to politics in Ghana. *Habitat International*, 34(4), 392-399
- Obeng-Odoom, F., & Amedzro, L. (2011). Inadequate housing in Ghana. *Urbani izziv*, 22(1).

- Ofori, G. (2007). Construction in developing countries. *Construction Management and Economics*, 25(1), 1-6.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Oosterbaan, C., Arku, G., & Asiedu, A. B. (2012) Conversion of residential units to commercial spaces in Accra, Ghana: a policy dilemma. *International Planning Studies*, 17(1), pp. 45-6
- Oteng-Ababio, M. (2016). Was 'Black Wednesday' avoidable? The Melcom disaster in Accra puts a generation on trial. *Singapore Journal of Tropical Geography*, 37(3), 401-417.
- Otiso, K. M. & Owusu, G. (2008) Comparative urbanization in Ghana and Kenya in time and space, *Geoforum*, 71, pp. 143–157.
- Peckitt, S. J., Glendon, A. I., & Booth, R. T. (2004). 'Societal influences on safety culture in the construction industry'. *Construction safety management systems* pp.14 – 46
- Reuters, T. (2017). Kenya has a housing problem, this is how to fix it. Retrieved from: <https://www.cnbc.com/news/east-africa/2017/04/13/kenya-slums/> (Accessed: 10.08. 19).
- Ricketts, J.T. (2001). 'System Fundamental'. In Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- S Arya, A. (2000). Non-Engineered Construction in Developing Countries—An Approach Toward Earthquake Risk Reduction. *Bulletin Of The New Zealand National Society For Earthquake Engineering*, 33(3), 187-208.
- Sakakibara, S., Flynn, B. B., Schroeder, R. G., & Morris, W. T. (1997). The impact of just-in-time manufacturing and its infrastructure on manufacturing performance. *Management Science*, 43(9), pp. 1246-1257.
- Satterthwaite, D. (2017). The impact of urban development on risk in sub-Saharan Africa's cities with a focus on small and intermediate urban centres. *International journal of disaster risk reduction*, 26, 16-23
- Soane, A. (2016). Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Swanson, C. A., & Lankford, W. M. (1998). Just-in-time manufacturing. *Business Process Management Journal*, 4(4), pp. 333-341
- Symonds, J. (2005). 'Dirty Old Town? Industrial archaeology and the Urban Historic Environment', in Gwyn D & Palmer M, (eds), *Understanding the Workplace. A Research Framework for Industrial Archaeology in Britain*. Industrial Archaeology Review XXVII, 57-66.
- The Guardian, (2016) 'Owners of collapsed Nairobi building 'had no occupancy permit'. See: <https://www.theguardian.com/world/2016/apr/30/owners-collapsed-nairobi-building-kenya-no-occupancy-permit> (Accessed 09.11.18).
- Thiruppugazh, V. (2008). Urban vulnerability reduction: regulations and beyond. In *The Indian Economy Sixty Years After Independence* (pp. 200-212). London: Palgrave Macmillan.
- Tipple, A. G., & Korboe, D. (1998). Housing policy in Ghana: Towards a supply oriented future. *Habitat International*, 22(3), 245–257.
- Tipple, A. G., Korboe, D., Willis, K., & Garrod, G. (1998). Who is building what in urban Ghana? Housing supply in three towns. *Cities*, 15(6), 399–416. [https://doi.org/10.1016/S0264-2751\(98\)00036-5](https://doi.org/10.1016/S0264-2751(98)00036-5).
- Tipple, G. (1987) Housing policy and culture in Kumasi, Ghana: A study of constraints and resources. *Environment and Behaviour*, 19(3), pp. 331–352. DOI: 10.1177/0013916587193005
- Tonah, S. (200). 'Chiefs, earth priests and the state: Irrigation agriculture, competing institutions and the transformation of land tenure arrangements in Northeastern Ghana. In Ubink, J. & Amanor,

- K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press]
- Tutt, D., Pink, S., Dainty, A. R. J. and Gibb, A. 2013. "In the air' and below the horizon: migrant workers in UK construction and the practice-based nature of learning and communicating OHS'. *Construction Management and Economics*. <https://doi.org/10.1080/01446193.2012.756145>
- Tutu, K. A., & Bempong, K. G. (2018). Our Concrete Quality: The Tip of an Iceberg? In the *50th Ghana Institution of Engineers (GhIE) Annual Conference*. Accra, Ghana, pp. 1 – 3
- Ubink, J. M. (2008). 'Struggles for land in peri-urban Kumasi and their effect on popular perceptions of chiefs and chieftaincy' In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- UN-Habitat (2011). *Ghana Housing Profile*. Nairobi: United Nations Human Settlements Programme (UN-HABITAT)
- United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision, Highlights*. NY: United Nations.
- United Nations, Department of Economic and Social Affairs, Population Division (2016). *The world's cities in 2016*. NY: United Nations.
- Wales, J. (2017). The political economy of road safety: a policy-oriented literature review. *ODI Report*, 61, 877-881.
- Wells, J. (2007). Informality in the construction sector in developing countries. *Construction Management and Economics*, 25(1), 87-93.
- Yates, A. (2002). The nexus between regulation enforcement and catastrophic engineering failures. In *Current Issues in Regulation: Enforcement and Compliance*. Melbourne.
- Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 8

- Abu-Lughod, J. (1991). *Before European Hegemony: the world system A.D. 1250-1350*. Oxford: Oxford University Press.
- Adenuga, A. O. (2012). Professionals in the Built Environment and the Incidence of Building Collapse In Nigeria. *Organization, technology & management in construction: an international journal*, 4(2), 461-473.
- Adewole, K. K., Oladejo, J. O., & Ajagbe, W. O. (2014). Incessant collapse of buildings in Nigeria: The possible role of the use of inappropriate cement grade/strength class. *World Academy of Science, Engineering and Technology, International Journal of Civil, Structural, Construction and Architectural Engineering*, 8(7), 818-820.
- Adinyira, E., & Anokye, P. (2013). Illegal Appendages to Residential Buildings in Kumasi, Ghana—a Case Study of North Suntreso. *Journal of Construction Project Management and Innovation* Vol. 3 (1). pp. 511-529.
- Ahadzie, D. K., & Amoah-Mensah, K. (2010). Management practices in the Ghanaian house building industry. *Journal of Science and Technology*, 30(2), 62–75.
- Ahmed, A. and Dinye, R. D. (2011). "Urbanisation and the challenges of development controls in Ghana: a case study of Wa township". *Journal of Sustainable Development in Africa* Vol. 13(7). pp. 210 – 235.
- Alinaitwe HM and Ekololu S (2014) Failure of structure in East Africa with focus on the causes of failures in the construction phase. In *Construction Materials and Structures – Proceedings of the First*

- International Conference on Construction Materials and Structures* (Ekolu SO, Dundu M and Gao X (eds)). IOS Press, Amsterdam, the Netherlands, vol. 1, pp. 76–85.
- Amanor, K. & Ubink, J. (2008). 'Contesting land and custom in Ghana: Introduction'. In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Amanor, K. (2008). 'The changing face of customary land tenure'. In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- Ametepey, S. O., Ansah, S. K., & Edu-Buandoh, K. B. M. (2015). Assessing factors affecting the implementation of the national building regulations (L.I. 1630) in Ghana. *Public Policy and Administration Research*, 5, 66-73.
- Arku, G. (2009). Housing policy changes in Ghana in the 1990s: Policy review. *Housing Studies*, 24(2), 261-272
- Arku, G., Mensah, K. O., Allotey, N. K., & Addo Frempong, E. (2016). Non-compliance with building permit regulations in Accra-Tema city-region, Ghana: exploring the reasons from the perspective of multiple stakeholders. *Planning Theory & Practice*, 17(3), 361-384
- Arnott, R. (2008). *Housing policy in developing countries: The importance of the informal economy*. Washington: World Bank
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2).<https://doi.org/10.1177/2158244018778109>
- Asante, L. A., Gavu, E. K., Quansah, D. P. O., & Tutu, D. O. (2018). The difficult combination of renting and building a house in urban Ghana: analysing the perception of low and middle income earners in Accra. *GeoJournal*, 83(6), 1223-1237.
- Ayee, J. R. A., Frempong, A. K. D., Asante, R., & Bofo-Arthur, K. (2008). The causes, dynamics and policy implications of land-related conflicts in the Greater Accra and Eastern Regions of Ghana (Ghana report). *African Studies Centre University of Leiden*.
- Ayodele, E. O., Ogunbode, A. B., Ariyo, I. E. & Alabi, O. M. (2011). Corruption in the Construction Industry of Nigeria, Causes and Solutions. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*. Vol. 2 issue 3, pp. 156-159
- Bairoch, P. (1988). *Cities and Economic Development: From the Dawn of History to the Present*. Chicago: University of Chicago Press.
- Bankoff, G., Freks, G. and Hilhorst, D. (2004). *Mapping Vulnerability*. London: Earthscan
- Bates, R. (1981). *Markets and States in Tropical Africa: The Political Basis of Agriculture Policies*. Berkeley: University of California Press.
- Beamish, T. D. (2002). *Silent spill: The organization of an industrial crisis*. Cambridge, MA: The MIT Press.
- Berlinski, C. (2011). 1 Million Dead in 30 Seconds: Retrieved from: <http://www.city-journal.org/html/1-million-dead-30-seconds-13396.html> (Accessed: 07.014.19).
- Berry, S. (2008). Ancestral property: land, politics and 'the deeds of the ancestors' in Ghana and Côte d'Ivoire. *Contesting Land and Custom in Ghana; Ubink, JM, Amanor, KS, Eds*, 27-54.
- Boamah, N. A. (2014). Housing policy in Ghana: The feasible paths. *Ghana Journal of Development Studies*, 11(1), 1–18.
- Boamah, N. A., Gyimah, C., & Nelson, J. K. B. (2012). Challenges to the enforcement of development controls in the Wa municipality. *Habitat International*, 36, 136-142.
- Boateng FG (2016). The collapse of buildings in cities in Ghana: Reasoning beyond 'scientism'. In *Refereed Proceedings of The Australian Sociological Association 2016 Conference* (Chou M (ed.)). (TASA), Melbourne, Australia

- Boateng FG (2017) Implications of building accidents in urban settings for building safety studies. *In Refereed Proceedings of Australasian Universities Building Education Association 2017 Conference*, Melbourne, Australia.
- Boateng, F. G. (2019b). A brief case for an organizational grounding for structural safety in the construction sector. *Construction Management and Economics*, 37(8), 472-47
- Boateng, F.G. & Wright, R. (2019). A conceptual inquiry into building collapse in cities in developing countries. *43rd Australasian Universities Building Education Association Conference*
- Boateng, F.G. (2017b). Why we need to start talking about the social context of building accidents. *Planning News*, Vol. 43, No. 8. pp 18 – 19.
- Boateng, F.G. (2018). Exploring the collapse of buildings in urban settings. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*.
- Boateng, F.G. (2018b). Why the de-emphasis of wider societal factors in construction failures analysis is fatal. *Proceedings of the Institution of Civil Engineers –Forensic Engineering*.
- Boateng, F.G. (2019a). Knowing what leads to building collapses can help make African cities safer. *The Conversation*, June 25.
- Boateng, F.G. (2019c). A brief essay on socio-cultural factors and building safety in the construction sector. *43rd Australasian Universities Building Education Association Conference 2019*
- Botchway, E. A., Afram, S. O., & Ankrah, J. (2014). Building permit acquisition in Ghana: The situation in Kumasi. *Developing Country Studies*, 4(20), 11-22.
- Braudel, F. (1984). *Civilization and Capitalism, 15th-18th Century*, Vol. 3, *The Perspectives of the World*. New York: Harper & Row.
- Bryceson, F., K. Gough, J. Rigg, and J. Agergaard. (2009). “Critical Commentary. The World Development Report 2009,” *Urban Studies* 46(4): 723–738
- Cooke, E., Hague, S., & McKay, A. (2016). *The Ghana poverty and inequality report: Using the 6th Ghana living standards survey*. University of Sussex.
- Danso, H., & Boateng, I. (2013, August). Is the quality of cement a contributing factor for building collapse in Ghana?. In *The West Africa Built Environment Research (WABER) Conference* Accra Ghana, pp. 765 - 772
- Danso, H., & Boateng, I. (2015). Quality of type I Portland cement from Ghana and UK. *Civil and Environmental Research*, 7(1), 38-47
- Darkwa, L., & Attuquayefio, P. (2012). Killing to protect: Land guards, state subordination and human rights in Ghana. *SUR-Int'l J. on Hum Rts.*, 17, 141.
- Davis, M. (2006). Planet of slums. *New Perspectives Quarterly*, 23(2), 6-11.
- Development Technical Committee. (2015). Formalising Land rights in developing countries: moving from past controversies to future strategies. *Ministère des Affaires étrangères et du Développement international (Maedi)*, Agence française de développement, Paris.
- Escaleras, M., Anbarci, N., & Register, C. A. (2007). Public sector corruption and major earthquakes: a potentially deadly interaction. *Public Choice*, 132(1), 209-230
- Ezigbalike, I. C., Rakai, M. T., & Williamson, I. P. (1995). Cultural issues in land information systems.
- Ferguson, B. (1999). Micro-finance of housing: a key to housing the low or moderate-income majority? *Environment & Urbanization*, 11, 185e199.
- Ferguson, B., & Smets, P. (2010). Finance for incremental housing; current status and prospects for expansion. *Habitat International*, 34(3), 288-298.
- Fox, S. (2012). Urbanization as a global historical process: Theory and evidence from Sub-Saharan Africa. *Population and Development Review*, 38(2), 285-310.
- Fox, S. (2013). *The political economy of urbanisation and development in sub-Saharan Africa* (Doctoral dissertation, The London School of Economics and Political Science (LSE)).

- Fox, S. (2014). The political economy of slums: Theory and evidence from Sub-Saharan Africa. *World Development*, 54, 191-203.
- Fu, F. (2009). Progressive collapse analysis of high-rise building with 3-D finite element modeling method. *Journal of Constructional Steel Research*, 65, 1269-1278.
- Fu, F. (2010). 3-D nonlinear dynamic progressive collapse analysis of multi-storey steel composite frame buildings — Parametric study. *Engineering Structures*, 32, 3974-3980
- Ghana Institution of Engineers (GhIE) (2012). *Final Report: Melcom Disaster*. Accra: GhIE
- Ghana Institution of Surveyors (GHIS) (2012). Ghana Institution of Surveyors statement on Melcom collapse: <https://www.modernghana.com/news/429356/ghana-institution-of-surveyors-statement-on-melcom.html> (Accessed: 21.08.19).
- Ghana Statistical Service. (2014). *Ghana living standard survey round 6 (GLSS 6): Poverty profile in Ghana (2005–2013)*. Accra: Ghana Statistical Service.
- Gore, C. (1996). Methodological nationalism and the misunderstanding of East Asian industrialisation. *The European Journal of Development Research*, 8(1), 77-122.
- Gore, C. (2013). *Regions in Question (Routledge Revivals): Space, Development Theory and Regional Policy*. Routledge.
- Grant R., Nijman J. (2004) Post-Colonial Cities in the Global Era: A Comparative Study of Mumbai and Accra. In: Dutt A.K., Noble A.G., Venugopal G., Subbiah S. (eds) *Challenges to Asian Urbanization in the 21st Century*. The GeoJournal Library, vol 75. Springer, Dordrecht
- Grant, R. & Yankson, P. (2003) City profile: Accra, *Cities*, 20(1), pp. 65–74.
- Grant, R. (2001). Liberalization policies and foreign companies in Accra, Ghana. *Environment and planning A*, 33(6), 997-1014.
- Grant, R. (2009). *Globalizing city: The urban and economic transformation of Accra, Ghana*. NY: Syracuse University Press.
- GSS (2018). *Ghana Living Standard Survey Round 7: Poverty trends in Ghana (2005 – 2017)*. Accra: Ghana Statistical Service
- Habraken, N. J. (1988). 'Type as a Social Agreement'. In *refereed proceedings of the Asian Congress of Architects*. Seoul, South Korea. Pp. 1 – 18
- Hackitt, J. (2018). Building a Safer Future. *Independent Review of Building Regulations and Fire Safety: Interim Report*.
- Hall, S. (1997). 'Cultural representations and signifying practices'. In *Representation: Introduction to Book 2 Cultural Studies MA Course*. London: Open/Sage University
- Hanstad, T. (1997). Designing land registration systems for developing countries. *Am. U. Int'l L. Rev.*, 13, 647.
- Harris, J.R. and Todaro, M.P. (1970). Migration, Unemployment and Development: A Two Sector Analysis. *American Economic Review*, 60 (1), pp. 126-142.
- Hayes, J. (2017). Disaster incubation: Grenfell Tower's unnecessary lessons. *Construction Research and Innovation*, 8(3), 76-79. <https://doi.org/10.1080/20450249.2017.1367559>
- He, Q., Dong, S., Rose, T., Li, H., Yin, Q., & Cao, D. 2016. 'Systematic impact of institutional pressures on safety climate in the construction industry'. *Accident Analysis & Prevention*, 93, 230-239. <https://doi.org/10.1016/j.aap.2015.11.034>
- Health and Safety Executive (2015). *Managing health and safety in construction: Construction (Design and Management) Regulations 2015*. London: National Archives
- Hedidor, D., & Bondinuba, F. (2017). Exploring Concrete Materials Batching Behaviour of Artisans in Ghana's Informal Construction Sector. *Journal of Civil Engineering and Construction Technology*, Vol. 8(5), pp. 35-52.
- Henssen, J. L. G., & Williamson, I. P. (1990). Land registration, cadastre and its interaction; a world perspective. In *Proceedings XIX FIG Congress, Commission* (Vol. 7, pp. 14-43).

- Hewitt, K. (1997). *Regions of Risk: A Geographical Introduction to Disasters* Edinburgh Gate, Harlow: Addison Wesley Longman Limited.
- Hussin, A. A., & Omran, A. (2009). Roles of professionals in construction industry. In *The International Conference on Economics and Administration, Faculty of Administration and Business, University of Bucharest, Romania ICEA-FAA Bucharest*.
- Jia, A. Y., Rowlinson, S., Loosmore, M., Xu, M., Li, B. and Gibb, A. (2017). 'Institutions and institutional logics in construction safety management: the case of climatic heat stress'. *Construction Management and Economics*, 35(6), 338-367. <https://doi.org/10.1080/01446193.2017.1296171>
- Jia, Y. A., Rowlinson, S., & Ciccarelli, M. (2016). 'Climatic and psychosocial risks of heat illness incidents on construction site'. *Applied ergonomics*, 53, 25-35. <https://doi.org/10.1016/j.apergo.2015.08.008>
- Kamete, Y., A. Tostensen, and I. Tvedten. (2001). "From Global Village to Urban Globe: Urbanization and Poverty in Africa: Implications for Norwegian Aid Policy." *Chr. Michelsen Institute Report* 2:1-95.
- Kaminsky, J. (2018): The global influence of national cultural values on construction permitting, *Construction Management and Economics*, DOI: 10.1080/01446193.2018.1506140
- Kenny, C. (2009). "Why do people die in earthquakes? The Costs, benefits and institutions of disaster risk reduction in developing countries." World Bank Policy Research Working Paper.
- Kenny, C. (2012). Disaster risk reduction in developing countries: costs, benefits and institutions. *Disasters*, 36(4), pp. 559-588. <https://doi.org/10.1111/j.1467-7717.2012.01275.x>
- Keteku-Atiemo, W. (2006). Rampant Failure of Buildings in an Era of Massive Shelter Development in Ghana. Empowering The Informal Construction Labourer with Knowledge and Skill to help in providing a Solution to this Problem: <http://www.lth.se/fileadmin/hdm/alumni/papers/sdd2006/sdd2006-17.pdf> (Accessed: 30. 03. 19).
- King, A. [ed] (1980). *Buildings and Society: Essays on the Social Development of the Built Environment*. London: Routledge & Kegan Paul.
- Kishindo, P. (2004). Customary land tenure and the new land policy in Malawi. *Journal of Contemporary African Studies*, 22(2), 213-225.
- Konadu-Agyemang, K. (2001). Structural adjustment programs and housing affordability in Accra, Ghana. *Canadian Geographer/Le Géographe Canadien*, 45(4), 528-544.
- Kumar R.S. (2016). Lessons from structural failures in India. *Proceedings of the Institution of Civil Engineers – Forensic Engineering* 169(4): 143-148, <https://doi.org/10.1680/jfoen.16.00019>.
- Kuta, J., & Nyaanga, D. M. (2014). Effect of quality of engineering materials on construction and quality of buildings: A case study of Nairobi, Kenya. *Prime Journal of Social Science*, 3, 608-611.
- Kwasniewski, L. (2010). Nonlinear dynamic simulations of progressive collapse for a multistory building. *Engineering Structures*, 32(5), 1223-1235.
- Lawrence, L. D. and Low, S. M. (1990) 'The Built Environment and Spatial Form', *Annual Review of Anthropology*, Vol. 19, pp. 453-505.
- Lewis, A. (1954) Economic Development with Unlimited Supplies of Labor. *The Manchester School*, 22, pp. 139-191.
- Lewis, J. (2005). Earthquake destruction: Corruption on the fault line. *Transparency International, Global corruption report*, 2005, 23-30
- Lipton, M. (1977). *Why Poor People Stay Poor: A study of urban bias in world development*. London: Maurice Temple Smith.

- Lizarralde, G., Tomiyoshi, S., Bourgault, M., Malo, J., & Cardosi, G. (2013). Understanding differences in construction project governance between developed and developing countries. *Construction Management and Economics*, 31(7), 711-730.
- Low, S. M. (1996). 'The Anthropology of Cities: Imagining and Theorizing the City', *Annual Review of Anthropology*, Vol. 25, pp. 383-409.
- Marmot M. (2005). Social determinants of health inequalities. *The Lancet*, doi:10.1016/S0140-6736(05)71146-6 pmid:15781105.
- Marshall, A. (1920). *Principles of Economics: An Introductory Volume*. London: Macmillan.
- Masurkar, Y. S., & Attar, A. C. (2014). Investigating the causes for failures in construction by taking a case study. *Current Trends in Technology and Science*. Vol. 3(5). Pp. 376 – 380
- Matthews P, Ryan-Collins L, Wells J, Sillem H and Wright H (2012) Briefing: Engineers for Africa: identifying engineering capacity needs in sub-Saharan Africa. *Proceedings of the Institution of Civil Engineers – Municipal Engineer* 165(4): 187–188, <https://doi.org/10.1680/muen.12.00052>.
- Maylam, P. (1990). The Rise and Decline of Urban Apartheid in South Africa. *African Affairs*, vol. 89, no. 354, pp. 57–84.
- McDermott, V., Zhang, R. P., Hopkins, A., & Hayes, J. 2018. 'Constructing safety: investigating senior executive long-term incentive plans and safety objectives in the construction sector'. *Construction Management and Economics*, 36(5), 276-290.
- McKee, M. (2017). Grenfell Tower fire: why we cannot ignore the political determinants of health. A public health response must confront the underlying causes. *BMJ*. Pp.1–2. <https://doi.org/10.1136/bmj.j2966>
- Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Miekle, J. (2011). *Note on informal construction*. Washington, DC: ICP
- Mitullah, W. and Wachira, I.N. (2003). *Informal labour in the construction industry in Kenya: a case study of Nairobi*. Working Paper 204, Sectoral Activities Programme. Geneva: International Labour Office.
- Moffat, S., and Kohler, N. (2008). 'Conceptualizing the built environment as a social-ecological system', *Building Research & Information*, Vol. 36, No. 3, pp. 248 –268.
- Molotch, H. (1970). Oil in Santa Barbara and power in America. *Sociological Inquiry*, 40(1), 131_144.
- Moullier, T. (2015). *Building regulation for resilience: Managing risks for safer cities*. Washington: World Bank
- National Disaster Management Organization Research Unit (NADMO (2014). *Investigative Report into the Achimota Melcom Building Collapse*: Accra: NADMO
- Ndua G, Ng'ethe N (1985). 'Education, training, and welfare in the informal sector: A study of carpentry and metalwork in the Eastlands of Nairobi'. In *Workshop on Technology, Employment, Education and Development (TEED)*, International Development Research Centre, Nairobi, Kenya 21(24).
- Njoh, A. (2003). "Urbanization and Development in Sub-Saharan Africa," *Cities* 20(3): 167–174.
- Njoh, A. J. (2016). *Urban planning and public health in Africa: Historical, theoretical and practical dimensions of a continent's water and sanitation problematic*. NY: Routledge.
- Obeng-Odoom (2018). 'Petroleum Accidents in the Global South'. In Cooney, P., & Freslon, W. S. (2018). *Introduction', Environmental Impacts of Transnational Corporations in the Global South*. Emerald Publishing Limited
- Obeng-Odoom F. (2014b). *Oiling the Urban Economy: Land, Labour, Capital, and the State in Sekondi-Takoradi*. London: Routledge

- Obeng-Odoom, F. (2009). The Political Economy of Urban Policies. *ICFAI Journal of Urban Policy* 4(1): 7–20.
- Obeng-Odoom, F. (2010). Drive left, look right: the political economy of urban transport in Ghana. *International Journal of Urban Sustainable Development*, 1(1-2), 33-48.
- Obeng-Odoom, F. (2010a). An urban twist to politics in Ghana. *Habitat International*, 34(4), 392-399.
- Obeng-Odoom, F. (2010b). 'Abnormal' Urbanization in Africa: A Dissenting View. *African Geographical Review*, 29(2)
- Obeng-Odoom, F. (2011). Developing Accra for All? The story behind Africa's largest millennium city. *Development*, 54(3), 384-392.
- Obeng-Odoom, F. (2012). Health, wealth and poverty in developing countries: Beyond the State, market, and civil society. *Health Sociology Review*, 21(2), 156-164.
- Obeng-Odoom, F. (2013). *Governance for Pro-Poor Urban Development: Lessons from Ghana*. London: Routledge.
- Obeng-Odoom, F. (2014). Urban planning and public health in Africa: Historical, theoretical and practical dimensions of a continent's water and sanitation problematic [Book Review]. *Journal of Australian Political Economy*, The, (73), 268.
- Obeng-Odoom, F. (2015). The social, spatial, and economic roots of urban inequality in Africa: Contextualizing Jane Jacobs and Henry George. *American Journal of Economics and Sociology*, 74(3), 550-586.
- Obeng-Odoom, F. (2016). *Reconstructing urban economics: towards a political economy of the built environment*. London: Zed Books Ltd.
- Obeng-Odoom, F. (2017). Urban governance in Africa today: Reframing, experiences, and lessons. *Growth and Change*, 48(1), 4-21.
- Obeng-Odoom, F., & Bockarie, M. M. B. (2018). The political economy of the Ebola Virus Disease. *Social Change*, 48(1), 18-35.
- Offei-Nyako K, Osei-Tutu E, Fugar FD, Adinyira E (2014). Skilled Artisanal Availability in the Ghanaian Construction Industry. *Covenant J. Res. Built Environ.* 1(1):1-9.
- Ofori, G. (2007). Construction in developing countries. *Construction Management and Economics*, 25(1), 1-6.
- Okyere, S. A., Tasantab, J.C., Abunyewah, M. (2018). Accra's informal settlements are easing the city's urban housing crisis. *The Conversation*: <https://theconversation.com/accras-informal-settlements-are-easing-the-citys-urban-housing-crisis-104266> (Accessed: 21.08.19)
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Oloyede, S. A., Omoogun, C. B., & Akinjare, O. A. (2010). Tackling causes of frequent building collapses in Nigeria. *Journal of Sustainable Development*, 3, 127-132.
- Oosterbaan, C., Arku, G., & Asiedu, A. B. (2012) Conversion of residential units to commercial spaces in Accra, Ghana: a policy dilemma. *International Planning Studies*, 17(1), pp. 45-66
- Owusu-Ansah, A., Ohemeng-Mensah, D., Abdulai, R. T., & Obeng-Odoom, F. (2018). Public choice theory and rental housing: an examination of rental housing contracts in Ghana. *Housing Studies*, 33(6), 938-959
- Özderdem, A. (1999). Tiles, taps and earthquake-proofing: lessons for disaster management in Turkey. *Environment and urbanization*, 11(2), 177-180.
- Özderdem, A., & Barakat, S. (2000). After the Marmara earthquake: Lessons for avoiding short cuts to disasters. *Third World Quarterly*, 21(3), 425-439
- Potts, D. (2009). The Slowing of Sub-Saharan Africa's Urbanization: Evidence and Implications for Urban Livelihoods. *Environment and Urbanization* 21(1): 253– 259.

- Pye, L. W. (1969). The Political Implications of Urbanization and the Development Process. In Breese, G. (ed.). *The City in Newly Developing Countries: Readings on Urbanism and Urbanization*. Englewood Cliffs, N.J.: Prentice Hall, pp. 401-406.
- Rapoport, A. (1969). *'House form and culture'*. London: Prentice-Hall International Press.
- Rapoport, A. (1973). 'An Approach to the Construction of Man-Environment Theory' *The Environmental Design Research Association EDRA 4: Fourth International EDRA Conference*, Vol. 2, pp. 124 – 135
- Rapoport, A. (1980). 'Vernacular architecture and the cultural determinants of form', pp. 283 - 305 in King, A. [ed] (1980) *Buildings and Society: Essays on the Social Development of the Built Environment*, London: Routledge & Kegan Paul.
- Rapoport, A. (1982). *The Meaning of the Built Environment*, London: SAGE Publications
- Ricketts, J.T. (2001). 'System Fundamental'. In Merritt, F. S. & Ricketts, J.T. (2001). *Building design and construction handbook*. (Vol. 13). New York: McGraw-Hill
- Robinson, J. (2006). *Ordinary Cities: Between Modernity and Development*. London: Routledge
- Rojas, E. (2015). 'Housing Policies, Quality of Housing and Urban Development. Lessons from the Latin American Experience 1960-2010'. In presentation at the 2015 World Bank Conference on Land and Poverty. Washington DC.
- Rostow, W.W. (1960). *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge: Cambridge University Press.
- Rowlinson, S. (Ed.). (2004). *Construction safety management systems*. London: Spon Press.
- Sengupta, U. (2010). The hindered self-help: Housing policies, politics and poverty in Kolkata, India. *Habitat International*, 34(3), 323-331
- Smets, P. (1997). Private housing finance in India: reaching down-market? *Habitat International*, 21(1), 1e15
- Smiley, J-P., Fernie, S. and Dainty, A.R.J., (2014) 'Understanding construction reform discourses', *Construction Management and Economics*, Vol. 32, No. 7-8, pp. 804 – 815
- Smith, A. (1991). *An Inquiry into the Cause of the Wealth of Nations*. New York: Knopf Doubleday Publishing Group.
- Soane, A. (2016). Learning from experience to avoid collapse. *Proceedings of the Institution of Civil Engineers-Forensic Engineering*, 169(4): pp. 127-132.
- Soonsuk, B., Hyunsook, C., Joon, P., Soyoung, L., Yirang, L., Kyohee K. & Haneul, L. (2014) Development of an Incremental and Affordable Housing Policy Toolkit and Pilot City Case Studies. Washington DC: KRIHS / World Bank.
- Sovani, N.V. (1964) The Analysis of "Over-Urbanization". *Economic Development and Cultural Change*, 12 (2), pp. 113-122.
- Sowatey, E.A., and R. Atuguba. (2015). 'Community policing in Accra: The complexities of local notions of (in)security and (in)justice'. In . Albrecht, P. & Kyed, H.M (eds) (2015). *Policing and the politics of order making*. London: Routledge.
- Stretton AW (1981). The building industry and urbanization in third world countries: a Philippine case study. *Econ. Dev. Cultural Change* pp. 325-339.
- Subbarao, H. (2016). Editorial. *Forensic Engineering*. Vol. 169 (4), 121 – 122
- Tam, C. M., Deng, Z. M., Zeng, S. X., & Ho, C. S. (2000). Quest for continuous quality improvement for public housing construction in Hong Kong. *Construction Management & Economics*, 18(4), 437-446.
- Tchamba, J. C., & Bikoko, T. G. L. (2016). Failure and Collapse of Building Structures in the Cities of Yaoundé and Douala, Cameroon from 2010 to 2014. *Modern Applied Science*, 10(1), 23.
- Thiruppugazh, V. (2008). Urban vulnerability reduction: regulations and beyond. In *The Indian Economy Sixty Years After Independence* (pp. 200-212). London: Palgrave Macmillan.

- Tierney, K. (2010). Growth Machine Politics and the Social Production of Risk. *Contemporary Sociology*, Vol. 39, No. 6. pp. 660-663
- Tierney, K. J. (2007). From the margins to the mainstream? Disaster research at the crossroads. *Annu. Rev. Sociol.*, 33, 503-525.
- Tipple, A. G., Korboe, D., Willis, K., & Garrod, G. (1998). Who is building what in urban Ghana? Housing supply in three towns. *Cities*, 15(6), 399-416. [https://doi.org/10.1016/S0264-2751\(98\)00036-5](https://doi.org/10.1016/S0264-2751(98)00036-5).
- Tsang, H. H., & Wenzel, F. (2016). Setting structural safety requirement for controlling earthquake mortality risk. *Safety science*, 86, 174-183.
- Tutu, K. A., & Bempong, K. G. (2018). Our Concrete Quality: The Tip of an Iceberg? In the *50th Ghana Institution of Engineers (GhIE) Annual Conference*. Accra, Ghana, pp. 1 – 3
- Ubink, J. M. (2008). 'Struggles for land in peri-urban Kumasi and their effect on popular perceptions of chiefs and chieftaincy' In Ubink, J. & Amanor, K. (200). *Contesting Land and Custom in Ghana State, Chief and the Citizen*. Leiden: Leiden University Press
- UN-Habitat (2011). *Ghana Housing Profile*. Nairobi: United Nations Human Settlements Programme (UN-HABITAT)
- United Nations (2008) *World Population Policies 2007*. New York: United Nations, Department of Economic and Social Affairs/Population Division
- United Nations, Department of Economic and Social Affairs (1968) Urbanization: development policies and planning. *International Social Development Review*, No. 1, New York: United Nations.
- United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision, Highlights*. NY: United Nations.
- Wachira, M. (2015). Another city building collapses *Daily Nation*. <https://www.nation.co.ke/counties/nairobi/Zimmerman-Building-Collapse/1954174-2789530-kfdf3t/index.html> (Accessed: 21.08.19)
- Wales, J. (2017). The political economy of road safety: a policy-oriented literature review. *ODI Report*, 61, 877-881.
- Watt, D. S. (2007). *Building Pathology: Principles and Practice*. Oxford: Blackwell Publishing Limited
- Wells, J. (1998). The informal sector and the construction industry. Paper in Proceedings, First Meeting of TG29, Managing Construction Industry Development in Developing Countries, Arusha, Tanzania, 21-23 September.
- Wells, J. (2001) Construction and capital formation in less developed economies: unravelling the informal sector in an African city. *Construction Management and Economics*, 19, 267-74.
- Wells, J. (2007). Informality in the construction sector in developing countries. *Construction Management and Economics*, 25(1), 87-93.
- Wells, J. and Wall, D. (2003) The expansion of employment opportunities in the building construction sector in the context of structural adjustment: some evidence from Kenya and Tanzania. *Habitat International*, 27, 325-37.
- Windapo, A. O., & Rotimi, J. O. (2012). Contemporary issues in building collapse and its implication for sustainable development. *Buildings*, 2, 283-299.
- Wisner, B. Blaikie, P. Cannon, T. & Davis, I. (2003) *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge
- World Bank. (2000). Dynamic Cities as Engines of Growth. *World Development Report*, World Bank, 125-138. Oxford: Oxford University Press
- World Bank. (2014). *Rising through cities in Ghana: Ghana urbanization review overview report*. Washington: World Bank
- Yap, K. S., & De Wandeler, K. (2010). Self-help housing in Bangkok. *Habitat International*, 34(3), 332-341.

- Yates, A. (2002). The nexus between regulation enforcement and catastrophic engineering failures. In *Current Issues in Regulation: Enforcement and Compliance*. Melbourne.
- Yeboah, E., & Obeng-Odoom, F. (2010). 'We are Not the Only Ones to Blame': District Assemblies' Perspectives on the State of Planning in Ghana. *Commonwealth Journal of Local Governance*. Pp 78 – 98

Chapter: 9

- Adjei Mensah, C., Kweku Eshun, J., Asamoah, Y., & Ofori, E. (2019). Changing land use/cover of Ghana's oil city (Sekondi-Takoradi Metropolis): implications for sustainable urban development. *International Journal of Urban Sustainable Development*, 11(2), 223-233.
- Asante, L. A., & Sasu, A. (2018). The Challenge of Reducing the Incidence of Building Collapse in Ghana: Analyzing the Perspectives of Building Inspectors in Kumasi. *SAGE Open*, 8(2).<https://doi.org/10.1177/2158244018778109>
- Fu, F. (2009). Progressive collapse analysis of high-rise building with 3-D finite element modeling method. *Journal of Constructional Steel Research*, 65, 1269-1278.
- Fu, F. (2010). 3-D nonlinear dynamic progressive collapse analysis of multi-storey steel composite frame buildings — Parametric study. *Engineering Structures*, 32, 3974-3980.
- He, Q., Dong, S., Rose, T., Li, H., Yin, Q., & Cao, D. 2016. 'Systematic impact of institutional pressures on safety climate in the construction industry'. *Accident Analysis & Prevention*, 93, 230-239. <https://doi.org/10.1016/j.aap.2015.11.034>
- Jia, A. Y., Rowlinson, S., Loosmore, M., Xu, M., Li, B. and Gibb, A. (2017). 'Institutions and institutional logics in construction safety management: the case of climatic heat stress'. *Construction Management and Economics*, 35(6), 338-367. <https://doi.org/10.1080/01446193.2017.1296171>
- Jia, Y. A., Rowlinson, S., & Ciccarelli, M. (2016). 'Climatic and psychosocial risks of heat illness incidents on construction site'. *Applied ergonomics*, 53, 25-35. <https://doi.org/10.1016/j.apergo.2015.08.008>
- Kwasniewski, L. (2010). Nonlinear dynamic simulations of progressive collapse for a multistory building. *Engineering Structures*, 32(5), 1223-1235.
- Molotch, H. (1976). The city as a growth machine. *American Journal of Sociology*, 82(2), 309–332
- Obeng-Odoom, F. (2010a). An urban twist to politics in Ghana. *Habitat International*, 34(4), 392-399.
- Obeng-Odoom, F. (2010b). 'Abnormal' Urbanization in Africa: A Dissenting View. *African Geographical Review*, 29(2).
- Obeng-Odoom, F. (2014). *Oiling the Urban Economy: land, labour, capital, and the state in Sekondi-Takoradi, Ghana*. NY: Routledge.
- Obeng-Odoom, F. (2016). *Reconstructing urban economics: towards a political economy of the built environment*. London: Zed Books Ltd.
- Olajumoke, A. M., Oke, I. A., Fajobi, A. B., & Ogedengbe, M. O. (2009). Engineering failure analysis of a failed building in Osun State, Nigeria. *Journal of failure analysis and prevention*, 9(1), 8-15.
- Peckitt, S. J., Glendon, A. I., & Booth, R. T. (2004). 'Societal influences on safety culture in the construction industry'. *Construction safety management systems* pp.14 – 46
- Tutt, D., Pink, S., Dainty, A. R. J. and Gibb, A. 2013. "In the air' and below the horizon: migrant workers in UK construction and the practice-based nature of learning and communicating OHS'. *Construction Management and Economics*. <https://doi.org/10.1080/01446193.2012.756145>

APPENDIX 1:

Interview guide

Researcher: Festival Godwin Boateng, RMIT University, Australia.

Topic:

Building collapse: Pathologies in cities in Ghana

Introduction & Consent

Answer questions participant may have; let her/him sign Informed consent form

Areas to cover in the course of conversation

- Participant's professional profile

Qualification; years spent in the Ghanaian construction sector thus far, institutional affiliation and any other relevant information

Ps: Ask this question to only researchers:

In your years of researching on Ghana, what has/have been the main issue(s) that keep emerging and/or has/have emerged as critical to planning, development control and building safety challenges in the cities' context?

- Some of the causes of building collapse established in literature

1. *Non-involvement of professionals in building construction and supervision*
 - To what extent is this claim true of the Ghanaian (city) context?
 - What are the underlying issues? The Ghanaian construction industrial complex is informal-sector driven. And if most of them do not engage professionals, what kind of projects do you execute?
2. *Use of Substandard materials*
 - *Is it the case that the materials used for construction in Ghana are of decidedly inferior quality and/or there are other reasons for that?*
3. *Compromised compliance and implementation/enforcement of safe building and construction regulations*
 - *How do these problems play out in the Ghanaian city context? What has been your experience in respect of that in your engagement with clients and the authorities?*
4. *Other factors that are central to the problem and (may be specific to Ghana?)*

- **The predominance of the incidents in the cities – especially Accra and Kumasi**
- 5. Explore participant's professional/personal observation on this – general
- 6. Throw in specific urban building-needs induced suboptimal construction and building use practices emphasized in the literature along the way: *hasty constructions; appendages and construction of extra floors atop old buildings; conversion of buildings to (especially commercial) uses unintended in original designs*
- 7. ***Explore Arku et al (2016) claim that construction professionals are declining to take up some projects in some parts of Accra in particular due to the activities of land guards***
 - *What is your experience in respect of this? How do the activities of land guards in Ghana affect professional practice in the construction sector? Have you or a colleague you know declined some job offers based on this?*

APPENDIX 2:

Human Research Ethics Committee (HREC)
 Research and Innovation office
 NH&MRC Code: EC00237

Notice of Approval

Date: **12 December 2016**

Project number: **20442**

Project title: ***Searching Beneath - A Sociological Inquiry into Building Failures in Ghana***

Risk classification: **More than low risk**

Chief investigator: **Dr Binoy Kampmark**

Approval period: From: **12 December 2016** To: **15 November 2019**

The following documents have been reviewed and approved:

Title	Version	Date
20442 Kampmark appn	Final	9 December 2016
Interview guides		9 December 2016
Participant Information Statement/Consent Form		9 December 2016

The following documents have been noted:

Title	Date
Response to HREC	9 December 2016
Email from Construction watch regarding permission to conduct research	25 October 2016

The above application has been approved by the RMIT University HREC as it meets the requirements of the *National statement on ethical conduct in human research* (NH&MRC, 2007).

Terms of approval:

1. Responsibilities of chief investigator

It is the responsibility of the above chief investigator to ensure that all other investigators and staff on a project are aware of the terms of approval and to ensure that the project is conducted as approved by HREC. Approval is valid only whilst the chief investigator holds a position at RMIT University.

2. Amendments

Approval must be sought from HREC to amend any aspect of a project. To apply for an amendment use the request for amendment form, which is available on the HREC website and submitted to the HREC secretary. Amendments must not be implemented without first gaining approval from HREC.

3. Adverse events

You should notify the HREC immediately (within 24 hours) of any serious or unanticipated adverse effects of the research on participants, and unforeseen events that might affect the ethical acceptability of the project.

4. Annual reports

Continued approval of this project is dependent on the submission of an annual report.

Annual reports must be submitted by the anniversary of approval (12 December 2016) of the project for each full year of the project. If the project is of less than 12 months duration then a final report only is required.

5. Final report

A final report must be provided within six months of the end of the project. HREC must be notified if the project is discontinued before the expected date of completion. **6.**

Monitoring

Projects may be subject to an audit or any other form of monitoring by the HREC at any time.

7. Retention and storage of data

The investigator is responsible for the storage and retention of original data according to the requirements of the *Australian code for the responsible conduct of research* (section 2) and relevant RMIT policies.

8. Special conditions of approval

Nil.

Human Research Ethics Committee (HREC)
Research and Innovation
office NH&MRC Code:
EC00237

In any future correspondence please quote the project number and project title above.

Prof Stephen
Bird Chairperson

RMIT HREC

cc: Mr Godwin Festival Boateng, Principal
research student Dr Robin Cameron, Co-
investigator/Associate supervisor

Dr Russell Solomon, Co-investigator/Associate supervisor

Dr Peter Burke, HREC secretary