THE ROLE OF CONSTRUCTION CORRUPTION IN WORSENING THE HUMAN IMPACT OF NATURAL DISASTERS: A SYSTEMATIC LITERATURE REVIEW

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This paper presents a review of international peer-reviewed academic research into the question of how corruption in the construction industry can exacerbate the human impact of naturally-triggered disasters. A systematic review of peer-reviewed academic papers from the fields of corruption, construction and disaster management over the past thirty years reveals a dearth of empirical research in this area. Results indicate that existing research tends to focus on the quality of governance and the drivers of corruption and is fragmented, limited and narrow in scope. Despite these limitations, evidence is found to support the proposition that corruption in the construction industry can significantly worsen the economic, social and environmental impacts of naturally-triggered disasters. This appears to be especially the case where corruption, disaster, and poverty intersect. Acknowledging the methodological challenges of undertaking research in this area, it is concluded that more research is needed to test this proposition which intersects the related fields of corruption, natural disasters and the construction industry.

Keywords: corruption; disasters; social impact; community

INTRODUCTION

The Centre for Research on the Epidemiology of Disasters (CRED) (2019) Emergency Events Database (EM-DAT) defines a disaster as "a situation or event that overwhelms local capacity, necessitating a request at the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering". In 2019 alone, CRED recorded 396 disasters, impacting 95 million people, causing 11,755 deaths and costing US$103 billion in economic losses globally.

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Disasters such as these are triggered by natural hazards such as earthquakes, tsunamis and windstorms (cyclones, hurricanes and typhoons). The natural hazard however is only half the story. A hazard needs to strike a vulnerable location to become a disaster. A tsunami striking a deserted coastline may have very little immediate impact on a population; a tsunami striking a dense, low-lying coastal city is a different matter. Poorly designed, constructed and managed buildings built in high-risk areas and urban densification in many parts of the world is increasing community vulnerability to natural disasters (Sanderson and Sharma 2018). For example, Smith (2006) shows that in every phase of a disaster (Mitigation, Preparedness, Response, and Recovery), human decisions play a critical role in determining the impacts of disasters for communities. Using Hurricane Katrina as an example, Smith (2006) shows how these impacts follow social stratifications, with wealthier people typically living in less vulnerable areas, being more informed, more able to escape and having better insurance policies for rebuilding. Smith (2006) provides anecdotal evidence that corruption in the construction industry exacerbates the negative impacts of natural disasters. More recently, the COVID-19 pandemic has increased the risk of corruption occurring. As the OECD head of bribery and corruption recently warned, governmental relaxing of procurement regulations and speeding up of processes and building and infrastructure projects in the wake of the COVID-19 disaster was creating, across the globe, a 'paradise for corruption' which could reduce future resilience to future disasters and potentially make them worse (OECD 2020).

And it is for these reasons that in this paper we do not refer to 'natural disasters', but rather, naturally-triggered disasters. Many natural disasters are not as natural as they may first seem.

The United Nations Development Programme defines corruption as the misuse of entrusted power, office or authority for private benefit and estimates that USD$1,000 billion are paid in bribes every year, costing countries up to 17 percent of its GDP (United Nations Development Program 2020). The construction and infrastructure industry has been repeatedly labelled the most corruption-prone industry in the world by Transparency International and World Bank (WEF, 2016). The Global Infrastructure Anti-Corruption Centre (2020) provides many examples of corruption in infrastructure projects around the world including bribery, rigged tendering, extortion, fraud, cartels, abuse of power, embezzlement, and money laundering. There is significant evidence that large amounts of public funding injected into infrastructure and construction projects are syphoned off into private hands (up to 40% in some countries) acting to further increase the vulnerability of communities to future disasters (Kenny 2006, Hostetler 2011). Indeed, Transparency International (2006) describes a world built on bribes and reports that the human impact of corruption is especially threatening for fast-growing cities in low and middle-income countries.

There has been a considerable amount of research into corruption in the construction industry (Bowen *et al.,* 2012, Le *et al.,* 2014, Brown and Loosemore 2015, Chan and Owusu 2017). However, the question of how corruption in the construction industry exacerbates the impact of naturally-triggered disasters has received surprisingly little research attention. The aim of this paper is to investigate this gap in knowledge through a systematic literature review (SLM) of extant research in the fields of corruption, built environment and hazard related disasters was undertaken. This is important in building a conceptual foundation for both research and practice in advancing this important but neglected field of knowledge.

METHOD

The study employed a SLM methodology informed by Tranfield *et al. (*2003) and Thorpe *et al.,* (2005) given its demonstrated value in understanding the state of knowledge in a field. The authors adopted an SLM approach because as Tranfield *et al. (*2003) notes, in comparison to traditional narrative reviews it is based on a replicable, scientific and transparent process/method which minimises potential bias through exhaustive literature searches of empirical research in respected peer-reviewed sources.

A systematic search of databases (PubMed, JSTOR, and ProQuest) of extant research in the fields of corruption, built environment (design, construction, planning) and hazard related disasters was undertaken. The reputable databases of PubMed, JSTOR, and ProQuest were used, as these databases constantly index scientific journals with the vast majority of peer reviewed literature at the convergence of these three topics. To adequately represent the current state of the literature and of this field, the literature search was limited to publications from the years 1990 to 2020, encompassing the last 30 years of scholarship.

Inclusion criteria were: Written in English; Original peer-reviewed research; Implicit discussion of corruption, built environment (design, construction, planning) and/or disaster. Additionally, the references of the selected studies and requested references were searched from various experts in the field to find any other papers that may have been missed by the search strategy. After duplicate publications were removed, a final count of 59 papers qualified for full content extraction and analysis. The majority of papers published in the years 2005 (6), 2017 (6), 2015 (7) and 2019 (7). All papers were published post 1990. These papers were then analysed by extracting and summarizing from each paper: descriptive metrics of each study; key findings; recommendations; and authors' narrative perspective, if given. All of the authors independently performed a critical review of the extracted summary findings generated by this data extraction process using methods described by Grant and Booth (2009). A process of cross-checking allowed high inter-rate agreement and provided confidence in the validity of the results reported below.

RESULTS AND DISCUSSION

Evidence of correlation between disasters, construction and corruption

The review highlighted evidence of correlation between disasters, construction, and corruption. For example, Linthicum (2018) reported that building collapses killed 228 people during an earthquake in Mexico City due to poorly constructed buildings signed-off by private building inspectors hired and paid by developers. Ambraseys and Bilham (2011) drew a direct correlation between corruption and disaster, when they calculated 83% of all deaths from building collapse in earthquakes over the past 30 years occurred in countries that are anomalously corrupt. As the authors note, earthquake-resistant construction depends on responsible governance, its implementation undermined by corruption through the use of substandard materials and assembly methods, or through the inappropriate siting of buildings.

A focus on earthquakes

Among the various disaster types, earthquakes were discussed the most in relation to corruption (34% of papers). Corruption was exposed in the compromises to earthquake preparedness in buildings due to lax, deficient, or absent building codes and laws in low- and middle-income countries which amplified poor standard of

building construction (Crowley and Elliott, 2012). In Turkey, several papers discuss how constructed buildings were unsafe prior to the earthquakes (Green, 2005; Gunduz and Önder, 2013; Kenny, 2012; Özerdem and Barakat, 2000). For example, Özerdem and Barakat (2000) found that bribes and political favours were common practice in Turkey to obtain building permissions. These papers about earthquakes in Turkey converge on the idea on how fraud and lack of regulation were institutional failures within the government system.

In earthquake-related studies, papers were found to suggest that public and private sector corruption was connected to additional lives lost to disaster impact which could have been avoidable (Ambraseys and Bilham, 2011; Anbarci, Escaleras, and Register, 2005; Escaleras, Anbarci, and Register, 2007). For example, Ambraseys and Bilham (2011) found that poor construction was exposed during earthquakes, citing examples from Haiti, China, India, Japan, Indonesia, Iran, and New Zealand, which led to a catastrophic scale of lives lost and costs. Escaleras *et al.,* (2007) analysed 344 earthquakes occurring between 1975 and 2003 and found that public sector corruption was found to be positively related to earthquake deaths. Highlighting the nuances that level of governance is embedded into the institutional failures and built environments within local communities.

Types and causes of corruption

Most papers were not specific about the type of corruption, although bribery and mismanagement of public funds were the most frequently discussed when relating to disasters. Unsurprisingly, almost every publication discussed the quality of governance in relation to corruption and disasters. Issues included limited government oversight, incompetence, weak controls, low capacity, limited budgets and weak, if any, preparedness planning, or after disaster, competency in recovery efforts (Ambraseys and Bilham, 2011; Rumi, 2010; Schultz and Søreide, 2008). Where governance is stronger, disasters are fewer. Persson and Povitkina (2017) carried out a study using time-series and cross-sectional data from CRED. The authors found that in countries where democratic institutions are strongly developed, there was a higher quality of government associated with substantively lower numbers of people affected by naturally-triggered disasters (Persson and Povitkina, 2017). In an examination of risk financing and disaster mitigation of tsunamis affecting Southeast Asian countries, Loh (2005) found that good governance is the key element for reducing corruption in post-reconstruction countries for the long term.

Focus on developing countries

China and Indonesia were the two countries which were discussed most frequently (88% of the papers). Apart from Smith (2006) there were few papers that considered the interaction between disasters, corruption and construction in developed countries. The papers in developing countries discussed the failures within political context, local institutions and established built environment in communities (Bamidele, Olaniyan, and Ayodele, 2015; Calgaro and Lloyd, 2008; Kharas *et al.,* 2009; Konadu-Agyemang and Shabaya, 2005; Porteria, 2015; Rodolfo and Siringan, 2006; Smith, 2007). Poverty related to corruption in relation to high unemployment levels, human rights violations, and opportunities for local officials to supplement low-paying salaries (Alamgir *et al.,* 2017; Brown and Brown-Murray, 2010; Gros, 2011; Özerdem, 2006; Özerdem and Barakat, 2000; Schultz and Søreide, 2008; Smith, 2007; Weinstein, Fletcher, and Stover, 2007). Lewis (2012) examined the long-term vulnerability and risk of disasters in several countries including Indonesia, and India and found that impoverishment was as active threat to communities, especially with

the changing culture, denial of access of resources, and siphoning of public money. In a follow up paper, Lewis (2017) found that almost half of all deaths due to disasters that occurred in low-income countries from 1996 to 2015 were tied to a country's apparent poverty. The authors suggested that this apparent poverty was closely connected to commercial mismanagement and corrupt politicians.

Examining data from 1990 to 2010 on the occurrence of disasters and its effects on corruption in the public sector, Yamamura (2014) found in high-income countries ongoing incentives to live with disaster risk exist due to future compensation payments. These payments connect economic motivations to the determinants of corruption. Shabbir and Anwar (2007) and Seyf (2001) suggest that corruption negatively impacts the economy of countries, especially low-income countries. These economic ramifications were also explored by Ambraseys and Bilham (2011) who found a correlation between poverty and corruption by examining the relationship between countries perceived to be those most corrupt (using Transparency International's Corruption Perception Index) and Gross National Income per capita.

The publications reviewed suggested that three key drivers that lead to opportunities for corruption are economic development, inequality and poverty. Mochizuki, Mechler, Hochrainer-Stigler, Keating, and Williges (2014) looked at past methodologies, modelling, understandings of economic risk, vulnerability, resilience, adaptive capacity and development as it relates to disasters. The authors found causal relationship between levels of economic development, quality of institutions (including corruption levels), and disaster impacts.

Examining the power structures, injustices, corruption and inequalities which remained from Hurricane Katrina in the United States, Belkhir and Charlemaine (2007) found that Hurricane Katrina heightened the existing social crisis within communities. This social crisis was seen in the race, gender and class inequalities which manifested in disaster management decisions to initially protect property and wealthier regions over lower income areas where the hurricane's impact was most severely felt. Voigt and Thornton (2015) reviewed 10 years of media, court cases and public documents related to post-Katrina and disaster-related human rights violations and corruption. The authors found that corrupt practices by government officials in public services in the recovery efforts from Hurricane Katrina included bribery, dishonest services, wire fraud, money laundering and tax violations.

CONCLUSION

Within the context of the increasing risks of naturally-triggered disasters and increasing urbanisation in many countries, the aim of this paper was to review the existing scholarship found in leading databases to address a gap in knowledge about the relationship between corruption in the construction industry and the impact of disasters. This review found that this critically important area of research is largely unexplored. This review found a lack of empirical research on disasters and corruption to provide the basis for informed evidence-based policy and practice development and raises many new questions and key avenues for further research. The limited research that does draw the link between disasters, construction and corruption focusses mainly on earthquakes and do not reflect the increasing risks of extreme weather events facing many countries. The literature is also limited to developing countries and fails to draw definitive links between causes and consequences.

These findings indicate a clear need for cross-disciplinary research to explore the potential impact of corruption in construction with disaster outcomes over the life cycle of construction projects, in every phase of a disaster (causes, vulnerability, preparedness, results and response, and reconstruction) and, given references to the importance of governance, in a wider sample of countries. In particular, there is a need to broaden out the types of disaster types researched, and the range of countries impacted - beyond earthquakes, China, and Indonesia - to a variety of high-, medium-, and low-income countries, all of which are prone to corruption.

Our findings indicate that linking the currently disconnected fields of corruption, construction and disaster management could contribute significant new insights into reducing the human impacts of future naturally-triggered disasters. Standard global indexes of corruption appear to be of limited value in indicating what this relationship may be and where it may be most strong.

There is also an important social justice dimension to future research in this area. For example, it would be useful to explore how different types of construction corruption actions impact the vulnerability, preparedness, response, and reconstruction of different elements of communities in terms of their socio-economic status, education and geographic location.

Acknowledging the complex and sensitive issues and challenges and even risks in undertaking such research, it is likely that construction researchers will need to explore new innovative methodologies and methods of data collection and analysis to move this new area of research forward. The current dependence on anecdotal examples and case studies points to the need for more empirical research. There is a rich untapped body of information, that is publicly available, rigorous, and evidence-based from which the links to a disaster occurring can be found. While interesting ethical challenges in gathering primary data from respondents in the field, sources of secondary data such as published criminal court case findings can also be explored using newly available and powerful textual analysis software and can release researchers from the burden of ethical challenges to undertake the research, since the findings are already public domain information. This approach is already underway in criminal studies but has not yet sufficiently found its way into the construction literature.

The authors recognise the limitations to the methods used in this study. Our study strictly covers scientific non-invited peer-reviewed journal articles that make explicit mention of the above search terms and that we do not cover other related concepts. We recognise the limitations of using only peer-reviewed literature for this paper, which does not cover works published in books, magazines, reports, working papers, grey literature, and other non-refereed sources. Finally, the focus of this paper is on the level of pre-disaster corruption that plays a large role in determining how damaging a disaster may be. The significance and scale of post-disaster corruption in relief and recovery activities should be the subject of future research.

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