Practices Of Risk Evaluation In The Construction Industry Within Conflict Zones

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Abstract: This paper identifies risk factors and how these risks are perceived in the construction industry within conflict zones, where risks are inherently greater and different. This involves identifying risk variables and aspects that affect how stakeholders shape their perceptions and make informed decisions. The research began by examining stakeholders in the construction industry within conflict zones, using the case study of Palestine. A qualitative research was adopted to gain a better understanding of the situation, using two sets of semi-structured stakeholders interviews and a review of policy documentation. The interview findings were transcribed, translated and analysed. A range of risk variables was uncovered, including movement restrictions, limitations in the locations of construction and problems related to particular policies. The findings also confirmed the applicability of different theories and revealed other aspects that affect risk perception, particularly: cultural, social and psychometric, as well as the process of policy implementation and validation. The interviewees considered that inappropriate implementation of policies is the main cause of poor construction development, followed by restrictions in movement and poor land management. This implies that there are problems and a lack of understanding in dealing with risk perception in the construction industry within conflict zones.

Index Terms: Conflict zones, Construction industry, Restrictions, Risk management, Risk perception, Thinking process, Policies

1. INTRODUCTION

Construction projects design and management provides stakeholders with the optimism and assurance that the project will be completed according to plan. However, with the increased requirements for new and rapid development in the construction industry, numerous uncertainties and risks are bound to occur and affect development strategies. Pender (2001) claimed that the construction project is related to incomplete and limited future knowledge and information processing. Several studies of the construction industry have focused on identifying, assessing, evaluating and managing risks (for example Perry and Hayes, 1985; Thomas and Bone, 2002; Gohar et al., 2011; Hirsch et al. 2018), rather than examining the factors and variables that affect stakeholders` perceptions of and engagements with risk events. Therefore, it is vital to acknowledge this gap and identify how stakeholders perceive and engage with risks in the construction industry. Conflict zones, where risks are inherently higher and different, and where stakeholders perceive and cope with them in different ways, are significantly under-researched even though construction development is still needed to serve the needs of society in such areas. The meaning of risk has been examined in a range of studies. It is defined by Dake (1992) as the possibility of a certain event happening, also taking into account the potential positive or negative consequences. Both positive and negative aspects of risks should be considered when dealing with or measuring risk. As Douglas (1990) claimed, the definition of risk should be considered as the probability of an event which is linked to the magnitude of possible gains and losses. In contrast, others have claimed that risks are always related to adverse effects, rather than the relationship with both possible losses and gains. Hales (2018) defined risk as an uncertain or unplanned event that has an impact on projects. Graubard (1990) emphasised that risks should be conceived as an events which are associated with danger, loss or any possible negative effects. Other studies have focused on relating the risk to the way that people identify it in terms of probability and severity. For example, Adam (1995) pointed out that dealing with risks is related to identifying and comparing the potential gains of a particular event against its possible losses.

The current literature on risk management in the construction industry incorporates various techniques to deal with risks, particularly identification, analysis, response and monitoring (Raftery, 1999; Thomas and Bone, 2002; Goji et al., 2017). These techniques are often applied in situations facing risks and uncertainties in order to manage risks and avoid their adverse consequences. These techniques also consider risks as an objective rather than subjective aspect. However, there is a shortfall in understanding how these risks or uncertainties are perceived by different stakeholders especially in the construction industry in conflict zones. This shortfall has led to further research to identify different risks and variables as well as to identify the factors and aspects that affect stakeholders` perception in the construction industry in conflict zones. The conflict belongs to the situation in which individuals or groups utilise conflict behaviour between them in order to achieve incompatible goals or present their hostility (Otomar et al., 2002). According to Galtung (2000), three main components are involved in conflicts; actor behaviours, contradictions and attitudes. Niklas et al. (2005) defined conflict as being the differences in perceiving things associating with certain issues at the same time between people. Moreover, conflict has great impacts on organisations, groups, individuals and even countries. It has adverse effects on the development and economy in addition to indirectly affecting other countries or regions (World Bank, 2016). Many areas worldwide suffer from ongoing conflicts that have lasted for decades at different levels of violence; including war in Afghanistan, Somali civil war, Colombian conflict and the Israeli-Palestinian conflict. This paper focuses on the ongoing long-term conflict between Palestine and Israel, since there is a lack in achieving potential development in the construction industry, understanding the situation and coping with problems and obstacles.

2 RISK PERCEPTION

2.1 The background

In general, there are three different approaches to the study of risk. These are; identifying how risk is perceived, how it can be assessed and the possible methods to mitigate or avoid it. However, studies focused on identifying how risk is perceived and dealt with in the construction industry, especially in conflict

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zones, are extremely rare. Risk perception is defined as the subjective assessment of the possibility of a particular event occurring, and how people perceive the potential consequences (Sjoberg et al., 2004). Rohrmann and Renn (2000) defined risk assessment as the scientific methods of identifying the implications and components of potential hazard or damage. However, risk mitigation processes are usually implemented after identifying the risks, in order to decrease either their severity level or the possibility of occurrence (Tuncel and Alpan, 2010). Furthermore, Wachinger et al. (2013) claimed that risk perception is considered as a key component that assists people to take appropriate action in order to deal with and/or avoid hazards. Therefore, this research focused on studying risk perception and exploring its related concepts. Risk perception has been widely studied and its cognitive features were established based on the early revealed preferences method developed by Starr (1969), in order to understand how people perceive and deal with risk consequences (Fischhoff et al., 1978; Douglas and Wildavsky, 1983; Slovic, 1987; Burns and Slovic, 2012). Starr`s approach explored the process of consideration that people take to decide whether something is risky or safe, in addition to seeking to understand how people measure risks or hazards against benefits. In order to achieve this, Starr studied various services and conditions to identify the potential fatalities or other harm that may be caused. Starr (1969) claimed that acceptance of risk is related to the voluntariness of a situation or activity and the benefits attached to it. For instance, people are generally less tolerant of the value of involuntary activities such as consuming food preservatives, and more tolerant of voluntary ones such as skiing. However, Starr`s approach was criticised by Otway and Cohen (1975), Fischhoff et al. (1978) and Eyles and Baxter (2017), who claimed that it had a number of limitations. These include difficulties in assessing new or rare hazards; people do not always have the choice or the ability to choose reasonable substitution; past information is not always valid to indicate and identify present preference as it may lead to different consequences; and fatalities are not the only element by which measure harm. Based on Starr`s (1969) approach, Slovic et al. (2000) proposed a quantified model that can be used to measure/examine how individuals perceive risks. This model focuses on measuring attributes of risks based on uncertainty about the degree and likelihood of harm, voluntariness, distribution of harm, level of control, familiarity, number of individuals exposed to harm, catastrophic potential and the timeliness of harm manifestation (Fischhoff et al., 1987; Slovic, 2000; Brasier et al., 2013).

2.2 Psychometric approaches

There have been many studies of the various psychological dimensions that affect risk perception (including Starr, 1969; Fischhoff, 1978; Slovic, 1992; 2000; Paek et al. 2016). Starr (1969) established an approach based on weighting risks or hazards against their possible benefits. In order to answer the question ‘how safe is safe enough’? This approach focused on comparing the risk to which people are exposed in everyday events with the risks which are associated with industrial conditions. Starr classified the risks into two categories; voluntary and involuntary. Voluntary risks are related to events or activities in which people participate based on their own choices, such as flying, driving a car or diving. In contrast, involuntary risks are associated with events or activities to which people are exposed without their consent, such as natural disaster or exposure to hazardous material or practices in the workplace. The psychometric approach has been criticised for not proposing sufficient and robust theoretical substance (Rayner, 1992). It has also been criticised for not considering some dimensions that have significant impact on risk perception, such as familiarity and dread (Krass and Slovic, 1999; Bishop and Syme 1992; Slovic, 2000). First, the familiarity dimension is related to the overconfidence effects when people face risks (Joffe, 1999). Unfamiliar things are perceived with high hazard compared with familiar things (Bronstein, 1987). Overconfidence may lead to decreasing the risk perception levels because people with high certainty of their judgements may not have sufficient knowledge about the potential consequences of particular risk. Secondly, the dread dimension is related to the way in which people perceive risks, depending particularly on their feelings and emotions such as loss of control or fear (Slovic and Ropier, 2003). People usually show more concern about ‘dread risk’ that may cause instant fatalities or harm than continuous or prolonged risk that may cause harm over long time (Bodemer et al., 2013).

2.3 Culture and social components

Risk perception aspects and the level of acceptance of risk are generally formed through cultural, social and psychological approaches (Kasperson et al., 1988). Therefore, in order to understand how people perceive risks, the cultural approach should be considered alongside social and psychological approaches, rather than focusing on just one dimension (Dake, 1992). Many researchers are agreed that numerous cultural factors affect shaping people`s perception of risk (for example Douglas and Wildavsky, 1983; Thompson et al., 1990; Ripple, 2002). In culture theory, risk perception is considered as the consequences of diverse and complex socio-cultural methods which cannot be accepted as a simple process (Douglas, 1970; Taylor-Gooby, 2008). Moreover, Ripple (2002) claimed that culture theory in risk perception emerged when both anthropologists and sociologists began to explore social and cultural aspects closely, in order to examine the significant impact of these aspects on risk perception. Cultural theory has been extended to propose that risks can be either minimised or amplified based on people's cultural, social and acceptance levels of risk about a particular event (Covello, 1989). Similarly, Thompson et al. (1990) emphasised that risk acceptance levels can be shaped depending on a combination of both an individual’s social knowledge and their cultural adherence. Although the cultural approach has some limitations, similar to the psychometric approach, these approaches can provide complimentary and useful information by identifying the factors that have a significant impact on shaping risk perception among people (Marris and Langford, 1996). There have been subsequent criticisms of culture theory. It is argued that culture theory divides into two types: mobility and stability (Boholm, 1996; Sjoberg, 1996; Marris et al., 1998). People who belong to the mobility type are likely to be attached to their organisations through various group and grid features over different periods of time (Marris et al., 1998). Grid relates to constraints that are imposed by an individual’s choices in the society. On the other hand, group associates with the extent to which people are restricted or bounded by their solidarity or feelings in the society. People who relate to the stability type are usually attached to their organisations through the same group and grid features within different events of their lives such as at work or at home (Marris et al., 1998). In addition,

adopting culture theory alone is insufficient to explore how people perceive risk (Sjoberg, 2000). Therefore, it is helpful to use both culture theory and psychometric paradigm approaches in order to achieve high explanatory and understanding levels in risk perception.

2.4 Risk perception in construction projects

Risks in construction projects can be considered as either subjective or objective. Therefore, the analysis and management process of these risks are mainly based on the type of risk. Objective project risks are described as the risks that are analysed and assessed using actual calculations and observations. These analyses are often related to probabilities and are quantitative in nature including complex calculations, experiences, experimental evidence or previous knowledge (Adams, 2008). However, subjective risks are analysed and assessed depending on people`s beliefs and views. The analysis of this type of risk often uses qualitative methods based on personal experience and available knowledge. Applications and empirical studies of objective risks have been widely demonstrated in the construction industry (Pouliquen, 1970; Bjornsson, 1977; Zoe et al., 2007; Oyewobi et al., 2012; Vidivelli et al., 2017). On the other hand, there is a lack of research about dealing with subjective risks in the construction industry especially in conflict zones. Therefore, this research focuses on dealing with subjective risks in construction projects within conflict zones. Furthermore, the absence of objective information about particular risks leads to an exploration of people`s perception and their estimations regarding that risk. Tversky and Kahneman (1974) argued that analysis, estimations and predictions of subjective risks are frequently associated with people`s potential initial judgments. These judgments are significantly affected by people`s perceptions, although these are often not included in the analysis. Adams (2006) claimed that the appropriate consideration of expert opinion tends to reduce the potential impacts of people`s opinion and biases on the evaluation process. Numerous studies have evaluated/assessed risk perception in the construction industry in a range of ways including comparing different attitudes and groups of risk (Findley et al., 2007), asking stakeholders to rate a list of risk factors according to their severity, importance and frequency (Holmes et al., 1997; Enshassi et al., 2009; Mahamid et al., 2012), quantifying the way in which people perceive risks using an objective algorithm approach (Jannadi and Almishari, 2003; Hallowell, 2010), requesting stakeholders to participate in ranking qualities of risks such as risk control, risk exposure and risk prevalence (Leiter et al., 2009), and identifying the factors that affect health and safety aspects in construction projects in terms of people`s perceptions and prevention strategies (Gambatese et al., 2008; Schultz and Jorgensen, 2014). Construction risk perceptions are related to people who are dealing with similar risk events or factors regarding certain responses. Hence, in reality people experience potential risks by themselves and choose how to assess and respond to them in diverse ways. Consequently, people who deal with risk perception in the context of the construction industry are expected to recognise, understand and assess possible risks based on experience, knowledge and other factors. Ouedraogo et al. (2011) concluded that individuals usually respond in different ways to the same risk situations and consequences, and their perception of risk mainly depends on their knowledge, education, culture and social factors. In contrast, few studies have focused on studying the potential discordance of perceptions among construction stakeholders. Therefore, it is vital to critically understand how risk is perceived in construction projects in order to be able to deal with it properly. As was established in the discussion of risk perception approaches, risk perception is mainly related to psychometric, cultural and social factors. Understanding these factors helps in recognising scientific deliberation and logical reasons about risk perception (Slovic and Peters, 2006). According to Saunders et al. (2012), in order to understand all construction stakeholders' perceptions and interests about any situation, an industry-wide discussion about risk should be developed from a range of people in the construction industry.

3 RESEARCH METHODS

This study focuses on long term conflict between Israel and Palestine, as it has an adverse effects on the construction industry and leads to poor development (ie the wrong type, quality and location of development, and at the wrong time). In order to evaluate the stakeholders` perception of risk in the construction industry in conflict zones, construction stakeholders from different disciplines including contractors, consultants and workers were involved in this study. An interpretivist approach was adopted in order to develop an understanding of how stakeholders perceive and respond to risks (Walliman, 2006; Linda and John, 21011; Saunders et al., 2012, Razia et al., 2019).The interpretive tradition is related to naturalistic approaches including observation, interviewing and analysis of existing transcripts. This approach ensures appropriate interactions between the researcher and the participants in order to collaboratively develop a better understanding of the subject. It also adopts qualitative rather than quantitative methods (Angen, 2000). This research began by interviewing stakeholders in order to identify diverse risks and variables that affect construction projects in conflict zone. Therefore, at the early stage, this research did not rely on knowledge of existing literature (although the main researcher had some relevant industry experience), but rather focused on identifying aspect-related to risks and risk perceptions, seeking to investigate how risk is perceived and dealt with in the construction industry within this conflict zone. This allowed the study to identify several discourses, which refer to main themes, and narratives which refer to sub-themes. All generated data were then linked to the current practices in order to identify the differences and similarities as well as confirm the research gap and the new knowledge. The following research questions were addressed in order to achieve the research aim: what are the risks that face the construction industry in conflict zone? How these risks perceived? What are the factors that affect stakeholders' perception? What are the factors that affect stakeholders' decisions whether or not to engage/participate in particular risks?

4 DATA COLLECTION AND ANALYSIS

The researcher interacted with seven different stakeholders who are directly and indirectly involved in the construction industry in order to obtain different information at a range of levels. The selection criteria for participants considered stakeholders who work in different disciplines and hold different levels and amount of experience together with different qualification in order to gather a complete view of the situation. The selected stakeholders include two consultants,

two contractors, one owner, one academic and one policy maker. Data collection with the stakeholders was then undertaken using semi-structured interviews to identify the potential risks and uncertainties that affect the construction industry, to obtain better understanding of how these risks and uncertainties are perceived as well as to determine the variables and aspects that affect stakeholders in forming their perceptions in conflict zones. The interviews began by asking questions about identifying the various risks and obstacles that affect the construction industry especially in conflict zones. This aimed to identify the differences of risks between conflict zones and other non-conflict zones. The interviews then moved to ask about how stakeholders perceive these identified risks and what are the dimensions or aspects that affect shaping their perception. This interviews allowed the researcher to gain information and thoughts on current practice in the construction industry especially in conflict zones. Due to the nature of the stakeholders, all interviews were carried out in Arabic, recorded and transcribed. The Arabic transcripts were then translated into English by the researcher. Some difficulties were experienced throughout the translation and interpretation process: such as finding appropriate words or phrases to represent different meanings in the two languages/cultures, and clearly and unambiguously explaining the research purpose. Thematic coding was used in order to explain and understand stakeholders` perceptions and relate these perceptions to main cultural, social and psychometric aspects of the existing literature. Different variables or sub-themes for each aspect were then identified and categorised in order to obtain better insights regarding risk perception. This research has used codes to represent the anonymised participants: in the following discussion and using their own words, the contractors are identified as CT1, and CT2; the consultants are identified as CS1, and CS2; the owner is identified as OW, the academic is identified as AC and the policy maker is identified as PM.

5 FINDINGS

The empirical research aimed to identify the factors that affect the construction industry in conflict zones together with addressing how stakeholders perceive and deal with these risks. The findings indicated that there are risk factors that significantly affect the construction industry in conflict zones which are not found in the existing literature. These include restrictions in movements and limited availability of construction locations. Restrictions in movements include route closures, checkpoints, barriers and restrictions on traffic at external borders. Construction locations are limited owing to unsafe areas, isolated areas and land confiscations. Participants claimed that the unexpected existence of barriers and checkpoints adversely influences the construction industry and leads to delays and potential losses. ‘‘From my perspective, I think it is challenging to run a construction project and deliver it according to its planned time because of the ongoing conflict which often cause obstacles in movements between different places.’’ CT2 ‘‘The main problem refers to find a land that has a good location and reasonable price, since there are limited access to area C and overpopulated people in the cities. Therefore, all the prices keep going up and the amount of land decreases’’ CS1The participants were then asked to provide their perceptions regarding particular risks and to explain the factors or aspects that are relevant and affect how their perceptions are formed. The interviews established that there are different factors and dimensions that affect stakeholders in shaping their perceptions regarding particular risk events. These factors are related to cultural, social, psychological and policy aspects. In terms of cultural and social factors, participants claimed that the way in which they perceive risks is significantly related to their individual knowledge, social relationships and community context.

‘‘It is always challenging to deal with risks without any social support including appraisal and concerning support through sharing information and resources.’’ CS2

‘‘I think people more are likely to see and respond to risks effectively when there are effective ways to support them socially through providing sufficient information and details regarding particular risks or problems.’’ AC

‘‘It is considered as a sign of weakness when someone tries and then fails to deal with risks that have unexpected consequences.’’ PM

‘‘The society here does not usually accept any potential change in the construction industry that may have possible negative outcomes. Guaranteed positive outcomes of taking risks are the only ones to be accepted and welcomed.’’ CT1

‘‘From my perspective, some problems are related to changing and collaborating process due to the working in one-cultural environment where stakeholders coming from same backgrounds and cultures.’’ PM Other participant described the factors related to psychometric aspects that affect perceiving and dealing with risks in the construction industry. These factors include job control, expectancy levels of risks and unstable performance. ‘‘Sometimes it is hard to find an opportunity to make an own decision or create a proper schedule and plans. Stakeholders also suffer from providing a constant levels of performance or work due to the ongoing conflict situation, together with poor ability of stakeholders to identify and respond to risks.’’ CT2 ‘‘Due to the ongoing conflict and unexpected uncertainties, it becomes difficult to deliver a stable work performance and progress. This is associated with the changing in people`s mind to work under certain circumstances.’’ CT1The major factor that affects the construction industry is related to the implementation of polices. This issue significantly affected shaping stakeholders’ perceptions regarding particular risk events. Participants claimed that poor implementation of policies, and outdated policies, should be considered as vital aspects that affect the development of the construction industry in conflict zones.

‘‘Despite the various risks and obstacles here, poor processes of implementation rules play an important role weather to deliver successful construction project or lead to possible failure completion.’’ AC

‘‘It is important to look at the validity of current policies especially the ones related to construction, as many policies need to be recreated and improved in order to meet the market requirements and achieve development.’’ OW

6 DISCUSSION

The current literature of risk perception focuses on applying its theories and approaches in non-conflict zones and fails to address the aspects related to risk engagement especially in the construction industry (Slovic, 1987; Burns and Slovic, 2012, Razia et al., 2019). Participants showed that it is important to consider risk engagement in line with risk perception in the process of dealing with risks in the construction industry. This consideration plays a vital role in

identifying how stakeholders perceive risks and in how they decide whether or not to engage with particular risk events. This shortcoming adversely influences the potential development of the construction industry and provides poor understanding of how stakeholders respond to risks and make informed decisions. Findings also confirms the application of risk perception theories including cultural, social and psychological aspects (Sjoberg, 200; Paek et al., 2016; Razia et al., 2017), and uncovers new significant aspects which are related to policies that affect stakeholders to shape their perceptions. The implementation of policies – and not just those specifically relating to construction – needs to be considered as a vital aspect in the construction industry especially in conflict zones, due to the instability of the situation and the poor creation and application or enforcement of policies. That is why it is important to pay more attention to the different factors and dimensions that affect policies and risk perception within conflict zones, compared with other non-conflict or normal zones that do not face similar uncertainties and problems. Several risk factors were identified from the existing studies of construction risk management and its related aspects (Adam, 2008; Vidivelli et al., 2017). However, due to the nature of conflict zones and the small number of studies that have focused on this particular situation (Mahamid et al., 2012; Razia et al., 2017), various risk factors affecting the construction industry and its development have now been identified including construction locations, restriction in movements and policy implementations. The previous discussion of risk perception uncovers three insights. First, consideration both the aspects of risk perception and risk engagement in evaluating risk in the construction industry is found to be a robust approach to deal with risks effectively and to achieve development. Secondly, the process that stakeholders take to shape their perception is strongly affected by how policies are implemented. Thirdly, several risk variables are identified to influence the development of the construction industry especially in conflict zones. Therefore, it is important to pay more attention to these various aspects of risk perception, as they lead to avoiding the possible loss of some useful knowledge and achieving potential development in the construction industry especially within conflict zones. Problems related to translation and interpretation processes. This study was conducted in Arabic and it proved difficult translate into English while retaining the exact meaning of the original. This research will assist both stakeholders and policy makers to recognise risks more effectively and make more appropriate decisions. In particular, the aspects developed in this research can be used to provide policymakers with better knowledge of stakeholders' views about effectively identifying, perceiving and responding to risks in order to enhance construction development in these inherently risky locations. Current construction risk approaches have very limited coverage of issues related to risk perception and other relevant aspects. This research can have significant influence for improving the evaluation process of perceiving and dealing with risks based on various stakeholder perceptions. It contributes to the existing literature by first, providing a comprehensive literature review. Second, this study identifies adverse aspects and factors of risk perceptions that need to be considered as a baseline for further research. The approach can be considered as beneficial for practical and theoretical advances when dealing with risks in the construction industry especially in conflict zones.

6 Conclusion

This study presents risk perception approaches and their relevant aspects that integrates the construction industry with conflict zones to identify risk factors and evaluate how these risks are perceived and dealt with. The application of risk perception should be considered as significant for assessing the theme of risk and other concepts within the construction industry based on stakeholders' views. Although the current practises of risk perception methods have the potential to provide a holistic understanding of how stakeholders identify and react to risks, the lack of adoption of risk perception theories and strategies has made such approaches unclear; and ineffective to deal with risk factors and the risk perception context in the construction industry within conflict zones. The evaluation process of the most prevalent risk factors and how stakeholders perceived them in the construction industry in conflict zones demonstrated better understanding of how stakeholders deal with risks as compared to the results emerging from the existing literature. This is because the approach of dealing with risks does not need special criteria of ranking or weighting quantitative information, as it deals with gathering stakeholders' opinions to identify the factors that affect them in shaping their perceptions, and therefore simplifies the identification and perception processes to make better-informed decisions.

7 Contributions to the Body of Knowledge

This research contributes to the literature and practices in several ways. This work developed new knowledge about identifying and evaluating risk perception approaches within the construction industry especially in conflict zones. The approach is considered useful for both policy makers and stakeholders and can be applied to any construction industry and other relevant industries. The application of the approach potentially provides a significant assistance for identifying how risk is perceived and the factors that affect stakeholders` perception, together with helping stakeholders in making better informed decision regarding particular risk events. This leads to increasing the development success for the construction industry and enhancing its resilience in the inherently more risky situations of conflict zones.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, [Bahaa Razia], upon reasonable request.

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