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RISK PERCEPTION DIFFERENTIALS OF CONSTRUCTION PROFESSIONALS

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Risk perception is an essential and integral part of most strategic and executive decision-making. This is because such decisions typically reflect the medium to long-term future success of the organisations to which they apply. Risk perception reflects the subjective awareness and judgement of risk by individual executives. The effectiveness of any risk decision exercised by these professionals is affected by how they perceive that risk. Within the construction sector, such decisions involve large capital expenditures that can result in adverse financial outcomes if the risk component is not perceived and judged right. Earlier work done in the field of psychology indicates that individual perception of any risk situation differs based on their circumstance. The circumstances of construction professionals could be accounted for by their discipline, career, educational attainment, as well as their personal attributes. Establishing how the circumstances of professionals create a difference in their perception can be valuable for enhancing risk management practice. The important question posed here relates to the degree of explanation in risk perception that can be associated with such differential factors. The paper presents a review of extant literature to establish the key concepts and essential theories on developments in risk perception. The review conducted culminated in a conceptual model for investigating the nature and degree of differentials in risk perception of construction professionals. The conceptual model shows the relationship between the risk perception and its determinants. A quantitative approach would be adopted, using a survey to capture information that can be used to measure the variables from three different groups of professionals in the road section working in public sector consultancy. The consideration of the influence of individual risk perception presents a radical departure from the conventional approach to risk management. It forms part of a broader study that explores the potential for applying the radical approach of perception differentials that embraces the practitioner as key to achieving improvement in risk management efforts.

Keywords: decision making, management, perception, risk

INTRODUCTION

Risk perception is considered an integral part of decision-making process, because the way people eventually react to issues is significant in solving a problem (Slovic *et al.* 2005). The ability to solve problems is therefore dependent upon how well risk is perceived and eventually determines the success of an organisation (Carriço *et al.* 2015). How risk is perceived should be of concern to employers as well as researchers to make the best out of employees.

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The risk perception of construction professionals is consequently critical in project delivery considering the capital-intensive nature and contribution of the construction industry to national development. Over the years, concerns of performance level which is the outcome of risk perception in the construction industry, have been raised at various levels of stakeholder consultations, conferences and seminars at organisational and international levels (Kikwasi and Escalante 2018; Ofori 2007). These call for a concerted effort to provide a sustainable and a robust platform for risk management especially in construction.

Current practices are focused on provisions made and subjective judgements of practitioners (Baloi 2002; Zhi 1995; HM Treasury 2004). These are deemed inadequate as per the concerns being raised. Efforts being made to overcome the limitations in the current practices in risk decisions making include the use of planning tools, information systems, software development and building data base to support confidence and define the likelihood of risk (ACORN 2015; Airmic *et al.* 2010; Philipp *et al.* 2016).

But notwithstanding all that, the result is that of people's decision and that is where their judgement becomes important, and their judgement is held in their perception of risk. It has possibly been argued by others such as psychologists outside construction, that perception is what needs to be developed to enhance the decision that people make in finance and in other sectors with the use of simulation software. What is aimed at is to enhance the perception, the cognition and the awareness of risk of people who think risk. This is to get them to respond appropriately in conditioning their perception, which becomes part of their development and construction does not have anything of this sort. This opportunity presents a new and innovative way of enhancing how risk can be addressed and this forms the foundation of this study. This study thus takes a different approach considering the practitioner's perception as key in achieving improvement in risk management efforts.

To do this, there is the need to understand what the concept of perception is, what variables play out to support any investigative effort and development that could come out of this study. This paper essentially is for a concept development and outlines the variables that support any development resulting from the study. It starts with the literature followed by the analysis of the dominant theories that culminates in a conceptual model. This can be used to support the investigation and development of perception dimension of making risk decision to be applied by construction professionals.

Construction Professionals and Risk Perception

The significance of the rightful judgement of risk of the construction professional, cannot be over emphasised (Olanrewaju and Abdul-Aziz 2015). Wrong decisions within the construction industry can result in serious financial consequences in the delivery of projects due to the high capital-intensive nature of its activities. Consequently, a nation can be adversely affected in the long run due to the industry's contribution to national development.

The output from the construction industry forms an integral part of national output and represents a sizable part of its Gross Domestic Product (GDP) (Ofori 2012). As it relies on the products of several industries as inputs and its products provide the necessary infrastructure and physical structures for all other industries. It in turn serves as a major employer to many people directly and indirectly. The industry on the other hand provides ready market to several industries.

Due to its importance, performance with regards to managing risk to ensure that project targets are met should be of concern to every nation. An effective risk management system in project delivery impacts positively in any nation's development (Ofori 2015).

The knowledge of risk and the steps involved in managing it by the players in the construction industry is critical, in minimising the likelihood of problems occurring. Thus, lead to the improvement of the perception of risk among practitioners in the construction industry.

Risk perception is often related to deviations from the formal procedures where there is no clarity or out of context situations. When laid down rules fail to present desired information or do not relate to provisions made, professionals tend to make their own decisions. Decision making has to do with solving problems which involves risk management. In the construction industry, problems are solved with the use of rule of thumbs or some laid down rules. The basis of risk management in the construction is on figures.

However, the use of the rule of thumb does not mean professionals do not perceive. Most often than not, decisions are made based on individuals' subjective judgements (Akintoye and MacLeod 1997; Baloi 2002; Lyons and Skitmore 2004; Zhi 1995; Rastrelli 2014). If perception is subjective, then decisions made from perception would be peculiar to an individual. Therefore, the attributes of an individual define that person's perception of risk.

Like any other industry, the construction industry is not without challenges. Associated challenges are not peculiar to developing countries but developed countries alike. As the factors that impact the industry are the same, such as the nature of products, resources needed, the sequential nature of processes and the multidiscipline of professionals involve (Fernández-Solís 2008; Ehsan *et al.* 2010).

Due to its importance, performance in terms of it meeting its objectives, should be of concern to every government. Any hindrance to performance means objectives would not be met. Furthermore, as construction becomes complex coupled with increasing demand for its products, the industry is presented with increased risk situations. The need for an effective risk management in this industry can therefore not be overemphasised.

Risk Concept, and Practices

The construction industry like in any human institution is faced with risk (Robinson 2006). Risk is inevitable in any human endeavour and to improve an individual's or a corporate institution's situation and overcome a natural hazard, there is the need to take risk. However, decisions exercised in relation to such risks have often than not resulted in negative consequences. Therefore, managing risk is of importance in the successful delivery of construction projects.

Risk can affect an action positively or negatively. For example, a decrease in prices of construction inputs, where fluctuation is applicable, means a gain for the client, signifying a positive risk to the client. This gain can only be realised if a provision is made. Risk therefore is a problem and mitigating these negative consequences is of prime importance to the successful delivery of projects in construction.

Risk Management in Construction

Risk management in the construction industry is usually based on subjective judgement and rule of thumb where a provision is available (Akintoye and MacLeod 1997). This includes the use of contingency plans and contractual provisions in contracts such as the use of insurance securities and in the case of rule of thumb such as using tolerances in design, which is dependent on the individual's judgement.

Identified risks in the industry are handled on a case by case bases with a choice of how risk is managed. Moreover, because construction projects are unique, it seems to make it difficult for solutions from other projects to be easily applied. However, knowledge could be built on to form a basis in preventing same issues as well as improving on risk management. The way risk is managed has raised much concern to optimise inputs and maximise outputs to give value for money to clients (Green 2016). Thus, managing risk in construction is heavily dependent on the individual's judgement.

The increasing demand for the products of the industry, and the desire for complex structures, there is the need to take advantage to apply measures that has worked in other sectors in context, incorporate and keep up with technology. In addition, there is the need to keep up with the changing trends in other sectors that provide inputs for the industry and determine the rate of its outputs. Such as available construction materials and type of skills needed for the smooth running of the industry as well as changes in the demand of its products. This calls for an effective management skill to ensure value for money (Gerbert 2016).

There are different definitions of risk which can be classified as objective and subjective. Where the objective approach is definite and subjective approach as in sectors other than construction such as the health sector carries a notion of outrage. Technically, risk is considered as the product of probability of occurrence of an event and the severity of the occurrence. The relative magnitude of these product determines how it is managed and this forms basis of how risk is measured and managed in construction. Though, this approach of measuring risk in construction is objective compared to other sectors, to some extent is subjective. Because the decision made on the choice of risk management depends on the appreciation of estimates for risk measurement and judgement of the individual involved in managing the risk.

Much of the decisions made in managing risk is determined by perception, which reflects how issues faced with in construction are addressed. There are numerous uncertainties in the construction industry and risk management is technical, based on absolute figures for probabilities and severity of risks. This peculiarity makes risk management in the construction industry different from that in other sectors. In other sectors, much of the decisions is linked to their cognitive ability. This could account for the inability to reap similar effect in the use of models, tools and techniques that work for other sectors in construction (Rastrelli 2014).

What is Risk Perception?

Risk perception determines how people react to risk. Why and how people eventually react to issues is of importance to individuals, industries and government. The outcome of the works we do, and the benefits derived from technologies serves as a drive to policies. Irrespective of whatever individuals, industry or government do, it is the result of a problem solved. How well the problem is solved depends on the

individuals' risk perception ability and the extent to which the problem is understood (Carriço *et al.* 2015). Risk perception therefore appears to hold a core position of the political agenda and a concern to policymakers and researchers.

Risk perception represents the subjective awareness and judgement of risk made by people. Therefore, the effectiveness of any risk decision made by professionals is determined by how the risk is perceived. This supports the fact that different people make different estimates of the degree of danger of a risk (Lerner *et al.* 2003). What makes people different, stance from what affects us as a person. This is confirmed by proposed theories and studies that risk perception is influenced by external and internal factors and the personality as shown in figure 1.

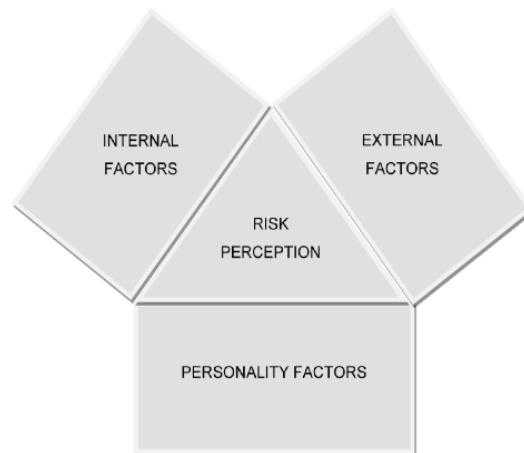


Figure 1: Factors determining perception

Moreover, Dobbie and Brown (2014) indicate that perception is affected by emotional and cognitive factors which involve consequential and ethnic evaluation of risk. Their argument underlines the significance of how risk is prioritised which leads to diverse risk perceptions. Risk perception, therefore, seems to cross every human endeavour, thus, to draw a concise consensus, there is the need to understand the underlining factors that inform the risk decisions of construction professionals.

Decision making is key in the role of managers, such as construction professionals, as this determines achievement of objectives. Managers, however, do not make decisions based only on knowledge about the domain under consideration, but the extent of knowledge about the outcome of our actions (Damghani *et al.* 2009). This forms the risk factors of whoever is engaged to carry out work.

These risk factors constitute the factors that determine a person's risk perception demonstrated in the way work is done, this in effect reflects in the outcome of the decisions made. These factors include knowledge about available systems developed overtime coupled with the situation in which one finds oneself, one's upbringing and personality.

However, actions are not just perceived, they are influenced. They are found to be influenced by some factors (Sjöberg *et al.* 2004) as illustrated in figure 2 below. People react differently under the same condition as well as do people with similar personality. The subjective factors that affect risk perception such as those indicated in figure 2 can be categorised into the three main factors in figure 1. The factors outlined in figure 2 form the summary of what cause subjectivity in risk outrage.



Figure 2: Factors of risk outrage

Risk Perception Concept in Construction

Although it has been established that there are differences in the risk perception of different people as well as professionals, there are some similarities, and this ensures they achieve the same target. For example, different professionals with different interests as far as project delivery is concern, work together to achieve the same goal, which is the completion of the project. This suggests that risk perception is not discrete but overlaps.

Figure 3 shown below illustrates the relationship of risk perception of these professionals. It depicts the fact that there is a level of commonality and this shows the level of agreement of people. If risk perception is identified as influenced by some factors, then these factors account for the differences in the risk decisions make. How then can these factors be enhanced to improve the risk decisions that construction professionals make and eventually develop a nation as a whole?



Figure 3: Risk perception of construction professionals

METHODOLOGY

The works of seasoned researchers who have contributed immensely in the area of perception and its determinants forms the basis of this study (Sjöberg *et al.* 2003). If the risk perception is found to be affected by factors that can be categorised as internal, external and personality factors, then measurable factors underlining these main factors can be assessed for measurement.

Measurable factors identified within the three main factors are; education, experience, personality, profession, age group, gender, mood and value systems. The risk perception of people is demonstrated in these traits as being pessimistic, normative or optimistic in their approach to the roles they play. A conceptual model developed as illustrated in figure 4, shows the relationship between risk perception and its determinants as established from existing literature.

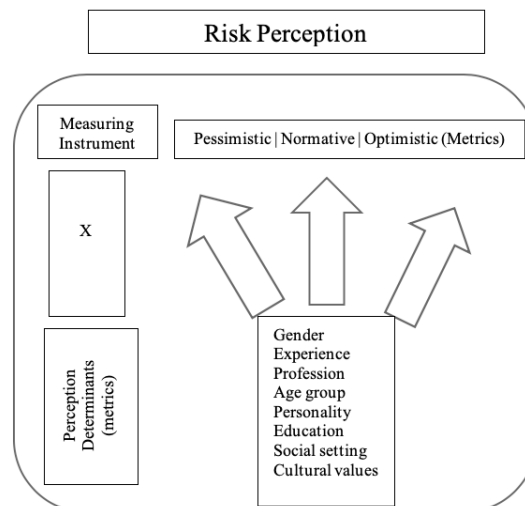


Figure 4: Conceptual framework - Perception determinants' effect on risk perception

On the left-hand side of the model shows the risk perception of an individual with a set of determinants using an appropriate measuring instrument. The measurable factors like age group and gender fall under internal factors, which is part of an individual that cannot be changed naturally. While profession, experience, mood and value systems form external factors which describes people's reaction to issues. The external factors are influenced by the environment in which a person finds himself, the circumstances around, upbringing and formal training, shape the way the individual feels as well as the value placed on issues. These are acquired and dependent on the person's experience which comes with time and exposure within this time. Whereas with personality, though it is inborn, it is not acquired with time but can be managed or controlled with time depending on life experiences. Further the social setting in the context of this study refers to the long term feeling towards work where one needs to manage risk as a result of the effect of the environment in which the person is, and not the short-term emotion which can change frequently. Such as the effect of organisational culture, provisions in the project environment. The cultural value on the other hand, refers to the value systems of an individual in the context of the construction industry characteristics. The model is mathematically expressed as:

$$RP = \beta_0 + \beta_1 Ed + \beta_2 Ex + \beta_3 Ep + \beta_4 Pr + \beta_5 Ea + \beta_6 Eg + \beta_7 \delta \text{ -----Equation 1}$$

Where;

RP is risk perception,

Ed is level of education,

Ex is experience,

Pr is profession,

Ea is age,

Ep is personality,

Eg is gender and

δ is social setting and cultural values

And β_1 to β_7 represent the weightings of the various factors. β_0 is a constant which signifies that everyone has a level of risk perception in the absence of the

determinants. For example, an insane person would give way to a moving vehicle, a child would not put his hand in fire, especially after an experience usually.

Having established the relationship of risk perception and measurable elements of the determinants of risk perception, a quantitative approach would be adopted to find out if there are systematic differences in the way different professionals perceive risk. If there are, how do the determinants account for these differences. A survey methodology would capture the measurement of the measurable elements of risk perception and its determinants and a multiple regression method use to find out the sensitivity of each factor on risk perception in a further investigation.

Data would be collected from three groups of professionals such as engineers, quantity surveyors and planners working with the Ministry of Roads and Highways in Ghana. These would comprise of public sector workers. A confirmatory test would be done with data collected in the United Kingdom (UK) to find out if findings in Ghana can be generalised and is not peculiar to Ghana.

DISCUSSION

The awareness of risk perception as key in the decisions made in risk situations, presupposes that it is vital in the output of the role individuals play. Since the output of the decisions people make reflects how problems are solved and this informs management decisions. However, risk perception of people has been established to be influenced by some identified essential attributes. These attributes therefore are the determinants of risk perception and forms the foundation of how people perceive in risk situations.

Having reviewed the concept of risk perception and the factors that influence it, a foundation is set to understand how these affect risk perceptions. This would lead to exploring how these differences can be enhanced to improve the risk decisions of construction professionals. This would be done by modelling the risk perception against the various determinants in the conceptual model developed based on existing literature.

Since the determinants of risk perception are identified and can be measured, their individual sensitivity to risk perception if identified can lead to giving management direction. Such that the determinants if applied to a small extent can make a significant change in an individual's risk perception. Enhancing the perception of the construction professional is expected to eventually lead to development in a nation at large considering the contribution of the construction industry in national development.

CONCLUSIONS

This study is aimed at establishing the awareness of risk perception among different construction professional and the effect of factors that influence their risk decision in the role they play. It considers the practitioner as key to achieve improvement in risk management efforts. Whereas other studies consider provisions in the area of logistic, funding, policies in the same regard, employment of management tools and information systems in improving risk management in project delivery. Ultimately, the use of these provisions depends on the decisions of people.

Meanwhile construction makes significant contribution to national development, and any effort directed at improving the risk decision of construction professionals can result in national development. Risk decisions in construction are mainly dependent

on the subjective judgement of professionals. Therefore, an awareness of their perception and how determinant factors affect the risk decisions they make is important for the delivery of construction projects.

These factors have been identified and applied in psychology and used as basis in this study. Since our situations are different our perception is likely to be different, and this forms the foundation of this study. A conceptual model has been developed based on the findings in literature and expressed mathematically showing the relationship between risk perception and measurable items that can be used to depict these factors. These can be explored further to understand how people perceive risk. The findings can be used to inform management and policy makers on how the risk perception of practitioners are affected by the determinant factors.

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