Does government policy matter? Factors influencing contractors' risk attitudes in the Malaysian construction industry: A structural equation modelling analysis

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ABSTRACT

One of the critical factors responsible for the successful management of construction projects is individual factors. These factors play a significant role in the decision-makers' attitudes towards risks management. Many previous studies regarding the management of construction projects have focused on the factors contributing to the success of risk management. However, little attention has been given to factors severely affecting the decision-makers' risk attitudes with particular reference to an individual's risk factors in the construction industry. Therefore, this study aims to identify the factors affecting contractors' risk attitudes and then determine its relationship with government policy. Theories of planned behaviour and organisational control were used to develop the theoretical framework that investigated G-7 contractors in the Kuantan Pahang, Malaysian construction industry. A review of relevant literature and questionnaire was employed to identify the factors affecting contractors' risk attitudes (personal factors). 112 copies of a structured questionnaire were analysed with a response rate of 80%. Structural Equation Modelling SEM was utilised to test the hypotheses developed for the study. The results of this study, through SEM, proved that personal factors (working experience, professional competence and physical health) have a significant influence on contractor risk attitudes in the Malaysian construction industry. The findings of this research also confirm that government policy (rules and regulations) plays a moderating role in enhancing the relationship of personal factors affecting contractors' risk attitudes in construction companies in Malaysia. The findings of the study provide more understanding of the personal factors that affect contractors' risk attitudes to facilitate contractors' decision-making process and serve as a useful reference for further studies in the field of construction project management.

KEYWORDS: Contractor's risk attitude, Government policies, Individual factors, PLS-SEM.

INTRODUCTION

Risk is one of the most commonly used terms to describe uncertain features of construction projects. It is well-defined as an event that negatively affects project aims: time and schedule, cost and performance of work. Contractors deal with uncertainties inherent in construction projects that frequently result in unfavourable effects e.g. cost overruns and time delays (Ibrahim *et al.*, 2010; Wang *et al.*, 2011). Risk is a multifaceted singularity that has a physical, cultural, social dimension and monetary effect on a construction project. The importance of risk actions go well beyond physical harm to financial or physical properties, people or

environments to affect the way society operates and people think. The experience of risk is not only shaped by the extent of probable harm but also by the way in which contractors interpret or the way contractors filter information about it. Human error and unsafe behaviours are both the cause of risk attitudes which lead to mishaps in the construction sector (KLIUC News, 2007).

Risk attitude can be defined as 'chosen state of mind concerning those uncertainties that could have a positive or negative effect on objectives' (Zakir, 2012). Consequently, people's risk attitudes reflect their characteristics and experience, as well as the economic, policy and management of their immediate environment. This risk attitude explains the reason for the divergence in decision-making and judgement, even in the same situations in different locations. The subjective judgement highly related to the human factors in the decision-making process is customarily depicted as risk attitude, which plays an important role in decision-making. Therefore, decisions made without considering the decision-makers' risk attitude might not be credible or reliable. For this reason, the need to identify the factors that are influencing decision-makers' risk attitudes in construction projects requires urgent attention (Wang, Zhang & Chen, 2016).

Besides attitude and subjective norm, the behaviour of people is strongly influenced by the confidence in their ability to perform (Wang & Yuan, 2011). This is attributed to how people perceive the control over the intended behaviour (ability to perform), which relies on the availability of resources, competency, support from other people and experience. Confidence may arise once the perceived control over the behaviour is in place. In this study, perceived behaviour control is defined as employees' knowledge, skill and ability to execute the behaviour that will have better control on the ability to perform (Lyons & Skitmore, 2004; Moshood *et al.,* 2020). All these are gained from the training and education process, which is an independent variable in this study. It is believed that employees who have adequate training/knowledge (competent) are more motivated and willing to demonstrate a strong commitment to handle their tasks and are in a position to behave according to organisational safety norms. A competent employee reflects the right attitude and high values on job efficiency, productivity and more importantly on safety.

Though there is a development of safety performance and increase in safety awareness in the construction industry, its risk level is still one of the highest across all sectors because contractors' attitudes towards risks play an important part in project management. Earlier researchers in risk management in the construction project have concentrated on the factors contributing to the success of contractors in the industry (Shirolkar, 2015; Wang & Yuan, 2011; Wang, Zhang & Chen, 2016). Still, little attention was given to the relationship between factors affecting risk attitudes (individual factor) and contractor risk attitudes in the construction industry with the moderating role of government policy. To accomplish this objective, several decision-making activities towards individual factor and contractors' risk attitudes in construction industries were examined in this research.

LITERATURE REVIEW

Contractors' Risk Attitudes

As human attitude is always reflected in behaviour, similarly, there is a high possibility that a contractor's behaviour will be by their attitude. Shirolkar (2015) explained the relationship among contractors' risk perceptions, attitudes and behaviours by setting out the possible change in design from perception to attitude to behaviour. They also investigated the factors (termed

'situational variables') driving contractors' behaviours away from their attitudes. The major factors identified were the employer's reputation for honouring payment on time, contractor's need for more works and the number of liquidated damages.

Moreover, the construction industry has changed, and it has been improved by applying new materials, new construction methods and advanced project delivery methods. But one thing that has not changed is that contractors have to deal with risks characteristics on their jobs to always face competition in the market. Contractors' compensations for delivering a complete facility are based on their winning bids, especially in competitive bidding environments (Jaafari, 2001).

Therefore, individuals implement effective project risk management systems and then, the risk attitude of these individuals can have an important impact on the successful implementation of risk systems. International research in psychology indicates that individuals' attitude towards risk can contain some biases that result in inappropriate responses to risks. In line with the above, the PMBOK guide (2013) emphasised that risk attitude can include many aspects such as risk appetite, risk threshold and risk tolerance. All of these aspects might influence the way individuals and organisations respond to risks. Although there is no agreement on a single definition of risk attitude, they all relate to the mind-set selected as a response to uncertainties driven by the perception of individuals (Hillson & Murry, 2007).

Many researchers have conducted studies about different risk attitudes among organisations, and also among individuals (Hillson & Murray-Webster, 2005; Pennings & Smidts 2003). They classified contractors' risk attitudes into three common types in construction industries: risk-averse, risk-neutral, and risk-seeking.

The risk-averse contractor is a contractor who prefers lower returns with known risks rather than higher returns with unknown risk (Cha *et al.*, 2012). For example, contractors with risk-averse preferences are willing to take an amount of money smaller than the expected value of a huge amount in a contract (Chun & Bing Bing, 2016; Kim & Reinschmidt, 2011).

The risk-neutral contractor is a contractor who places himself in the middle of the risk spectrum, represented by the risk-seeking contractor at one end and risk-averse contractor at the other (Cha *et al.*, 2012). The party's decisions are not affected by the degree of uncertainty in a set of outcomes, so a risk-neutral party is indifferent between choices with equal expected payoffs even if one option is riskier than the other choice (Chun & Bing Bing, 2016; Kim & Reinschmidt, 2011).

The risk-taker contractor is a contractor who risks everything to achieve or accept the more significant potential for loss in decisions. In other words, a risk-taker contractor willingly tolerates uncertainty to achieve a goal (Shirolkar *et al.*, 2015). Furthermore, it is an individual who tends to behave in a way that can potentially cause physical harm or financial loss but might also present an opportunity for a rewarding outcome (Chun & Bing Bing, 2016; Kim & Reinschmidt, 2011).

Some studies relating to risk management showed that professional managers are relatively risk-averse, while others question the assumption of global risk-aversion (Fiegenbaum & Thomas, 1988). Many studies in organisation and economics found the presence of heterogeneity in risk attitudes among organisations, even in homogeneous industries (Chatman & Jehn, 1994). Pennings and Smidts (2003) found out that some contractors in the construction industries were risk-takers because the jobs they do are much riskier than other occupations.

Nevertheless, this assumption is not compelling enough. For the fact that the jobs they do are hazardous does not mean that contractors are risk-takers. Many contractors consider themselves risk-averters, not risk-takers (Jaafari *et al*., 2001).

FACTORS AFFECTING RISK ATTITUDES (INDIVIDUAL FACTOR)

Many critical factors influence the effectiveness of risk management. There is unanimity among project and risk practitioners about the most significant factors for risk management: 'human factors'. Human factors can be defined as an individual, group and organisational factors that influence the achievement of project goals by indirectly shaping the behaviours of the project team members (Taofeeq *et al.*, 2020). Individual factors can be referred to as educational background, professional competence, motivation level, emotional intelligence and work experience. Group factors can be referred to as leadership styles, communication methods, coordination and empowerment while organisational factors can be referred to as corporate policies, procedures and senior management styles (Pennings & Smidts, 2000).

Work Experience

Work experience in construction companies always affects both practical and organisation abilities of contractor's. It is also accepted as the main standard for prequalification in any organisations. Mohammed *et al.* (2011) mention that the proprietors and consultants graded unskilled engineers amongst the top three causes of constructions delay in China. Correspondingly, Sambas, Ivan and Soon (2007) conclude that insufficient work experience of contractors is the third most prevalent cause of delay in Malaysian construction projects.

Labour is a major component of construction work in Malaysia. Unlike in industrialised economies nations such as the USA, UK and Germany where operations on construction sites are highly mechanised, construction work in developing countries and particular Malaysia, are still labour intensive. This agrees with a study carried out by Alinaitwe *et al*. (2007) which ranked incompetent workers and lack of experience of the workers as the two most significant causes of low productivity of construction workers in developing countries.

Therefore, work experience is a pressure that is partly affecting contractors' risk attitudes in construction companies. Experience comprises the ability to demonstrate effective observation, which has been gained through contribution and exposure to different issues in the process of working on various construction sites. A contractor with considerable experience in the construction field can gain a reputation as an expert. This indicates that contractors with rich experience in engineering practice in society would increase their potentials for better handling of risk in the construction of projects (Wang & Jiayuan, 2010).

Professional Competence

Professional competence comprises ability (to do a task economically), adequacy (to provide good service to the client) and capability (ability to undertake the commission) (Mhetre, Konnur & Landage, 2016). There are many definitions of human competence. Worker-oriented approaches describe competence as attributes controlled by humans and classically represented as knowledge, skills and abilities (KSAs). Additionally, a job competency can be defined as the individual's fundamental characteristics, showing itself in the form of traits, skills, and knowledge (Hillson *et al.*, 2007).

Personal competence may be a better predictor of a person's potential to perform in future positions than functional competence, which attests primarily to competence within a candidate's current position. However, there is no guarantee that a person who has the right mix of personal competencies will be able to 'put it all together' and deliver the desired outcomes. Hence, the main weakness of the personal competence approach is that it does not define effective performance within the played a role in terms of what has to be achieved. It may also ignore other potentially important components, such as knowledge and ethics. However, personal competence is an important complement to functional competence, and it is considered to have a place within the model (Adeleke *et al.*, 2018).

Project team members' attitude towards risk can be affected by their level of competence, where limited competence can lead to a risk-averse attitude and vice versa. Besides, individuals' risk perception is also affected by their level of competence since their estimation of their skill and competence can influence their risk attitude (Hillson *et al.*, 2007). Moreover, individuals who feel uncertain and incompetent tend to overestimate risk while those who perceive themselves as knowledgeable, experienced and competent tend to underestimate it. Therefore, individuals confronting unpredictable situations of which they have no prior knowledge or experience tend to perceive the situation as risky, which leads to a more risk-averse response. In contrast, individuals adopt more risk-seeking attitudes when faced with a situation where they have proven skills such as extraversion, agreeableness and conscientiousness (Hofstede *et al.*, 2001).

Physical Health and Safety

The World Health Organisation (WHO) defines health as a state of complete physical, mental and social well-being whereas health of the workers need to be free from any physical health disease, a mental and social activity that is related to the working conditions, working practices and the working environment (Manu *et al.*, 2018; Wilkins, 2011). Also, the safety of a worker is defined by the Occupational Safety and Health Administration (OSHA) as to protect the workers from accident, injuries and threat from the occupational workplace, unsafe environment, etc. In the context of civil engineering, safety is defined as the discipline of preserving the health of those who build, operate, maintain, and demolish engineering works and of others affected by those works, as well as freedom from danger of risks (Lee *et al.*, 2010; Wilkins, 2011).

Safety guidelines were issued by the Department of Occupational Safety and Health (DOSH). The purpose of these guidelines is to guide employers on how work practice can be carried out on every activity in construction to prevent an accident to workers and the public. These guidelines can be used as a standard reference for developers, contractors, engineers, architects, designers, and safety and health officers to control contractors risk attitudes in the construction industry. Health and safety legislation, which are frequently imposed by the Health and Safety Executive (HSE) or the Local Authorities (LAs). The Health and Safety Commission's (HSC) responsibility is to monitor health and safety during construction projects. This responsibility has a significant impact on a company's internal and external factors. For example, they are known for standard-setting, policy enforcement and policy development (Gilbertson *et al.*, 2012). The Management of Health and Safety at Work Regulations (MHSWR, 1999) perceived risk as to the hazard of possible harm caused by something. Therefore, contractors with a strong health condition will be able to complete projects successfully, and it will also help contractors to behave more actively to identify and address the potential risk problems. Furthermore, good health condition of contractors will increase the possibility of contractors to better evaluate the project situation being encountered. Therefore, strong health condition will help the contractor

in decision making and better judgement ability are helpful for a contractor to deal with risk issues in the construction industry. The level of the risk is based on the probability of its occurrence, the possible severity of the risk, such as the population that may be affected and the health effects. Besides, good health condition of the contractor will increase the possibility of contractors to evaluate better the project situation. In addition, Policy statements should indicate how the company is organised concerning the health and safety responsibilities of the workers, and should further state the managers' commitment to providing safety information, training and advice to employees. It is very important to enhance the ability of the workers and the managers to anticipate possible hazards in the workplace. (Lee *et al.*, 2010; Wilkins, 2011).

Government Policy as A Moderator

The policy is the guiding principle that is used to establish organisational regulations. Policy refers to a course of action that leads or influence decisions (Adeleke *et al.*, 2019; Bamgbade *et al.*, 2019). Also, it is used as a guide for making judgement following an assigned event within the structure of goals, objectives and the management philosophies as defined by the senior management. Government policy is described as the programme of action which aims to change a definite state of affairs. Therefore, government uses policies as the starting point for them to get a course of action to execute and to contribute a real-life change. Hence, policies are used to tackle a wide range of issues. Policies can even change the amount of taxes and individual or organisation pay, parking fines, immigration laws and pension, as well as the landfill taxes. Similarly, the government can change the law, when a policy is created and made to affect the people or particular issues or everyone in the society at large.

Therefore, Government policy (rules and regulations) are used as moderators in this study because they have been used as independent variables in the study by Ismail (2001) in Malaysia context, Iroegbu (2005) in Nigeria, while Aniekwu (1995), Gibb (2011) and Niu (2008) in Nigeria, Scotland and China have considered them as dependent variables respectively. Ismail (2001) revealed that in Malaysia context, rules and regulations on housing has a positive relationship with construction risk management. This finding suggests that there must be a replacement for the traditional building practices by an Industrialised Building System (IBS), which on the long run might save labour, cost, confer quality and durability, and time of construction in Malaysian construction companies as cited by Alaghbari *et al.*, (2007). Iroegbu's (2005) study also revealed that government rules and regulations positively influenced construction projects in Nigeria, such as the importation of construction materials and taxes.

Elinwa and Joshua (2001) stated that there is an insufficiency in government regulations, rules and specifications on the qualifications that contractors should possess regarding the technical aspect and work experience. This situation has paved way and encouragement for small contracting firms that are not qualified to acquire projects in Malaysia, thereby adding to the risk and low quality in construction projects. In particular, it is paramount to maintain a safe working environment in the construction business. Human mistake plays a vital role in the causes of the accident. It constitutes up to 90%, while the remaining 10% represents technical mistakes due to uncontrollable conditions. Most time in the construction business, health and safety regulations are enforced to reduce accidents, and large contractors need the proof of minimum safety training for workers and managers (Bamgbade *et al.*, 2016; Hamid *et al.*, 2003).

THEORY AND HYPOTHESES DEVELOPMENT

Almost all research studies in social and behavioural sciences regardless of discipline/ programs require a rational or base for conducting research. This rational base is often called a theoretical framework. A host of researchers have provided a varying definition of the theoretical framework. A theoretical framework is a conceptual model of how one theorises or makes logical sense of the relationships among several factors that have been identified as important to the problem (Chen *et al.*, 2016). Therefore, the theoretical framework of this study was grounded and underpinned by two theories: organisational control theory and theory of planned behaviour. However, the theory of planned behaviour is the main theory in this study, while organisational control theory complements it. The basic concept of the theory of planned behaviour is based on the fundamental construct of intention to perform a behaviour which is influenced by the attitude towards the behaviour and subjective norm. The basic concept of the theory of planned behaviour is based on the fundamental construct of intention to perform a behaviour which is influenced by the attitude towards the behaviour and subjective norm (Ang *et al.*, 2015; Ajzen & Fishbein, 2000; Chen *et al*., 2016).

Attitude is the evaluation step of behaviour, and it could be favourable or unfavourable depending on the salient information or beliefs linking the behaviour to the outcomes such as cost and injuries incurred as a result of performing the behaviour (Ang *et al.*, 2015). The intention is also influenced by a subjective norm which is a belief of perceiving social pressure coming from colleagues, bosses and parents etc., expecting the behaviour to be performed by the person. Also, this theory suggests that a person's perceived behaviour control, influenced by the availability of resources (e.g. skill, knowledge physical abilities) and opportunities, can predict the behaviour directly independent of the intention.

While organisational control theory demonstrates some theoretical underpinnings to support the relationship between government policies and factors affecting contractors risk attitudes, the organisational control theory (Adeleke *et al*., 2018; Flamholtz *et al.*, 1985; Snell, 1992) proposes that proper control established and applied by a government must theoretically be able to regulate risk occurrence on construction projects within the organisation with the aids of proper monitoring, control and compensation among the stakeholders, contractors, project managers, team members and the organisations themselves. Similarly, organisational control theory presumes that risk occurrence can be minimised through control introduced by an organisation with the influence of government policies which would certainly encourage compliance and must be flexible in every organisation. Organisational control concerns everyone. Whether you are a manager attempting to run a department, a politician trying to frame legislation to control multinational corporations or just an individual affected by the activities of the many organisations that have an impact on you, organisational control is a fundamental issue of modern life.

Regarding risk management, its importance has been emphasised in construction as well as other industries. The relevant risk management tools and techniques have been developed and used by researchers in academia and by practitioners in the industry. An important fact should be emphasised, that in general, different individuals may use the same tool differently. Similarly, depending on their risk attitudes, individual firms may have different perceptions of an identical risky event, which lead to different evaluations of the risk and correspondingly different actions.

Hence, the following hypotheses were developed based on the strong evidence provided by literature considering the influence of personal factors affecting risk attitudes on contractor risk attitudes. In the context of the Malaysian construction industry, the following are hypothesised:

H1. Working experience significantly influences a contractor's risk attitude.

H2. Professional competence significantly influences a contractor's risk attitudes.

H3. Physical health significantly influences the contractor's risk attitudes.

H4. Government policy moderates the relationship between working experience and the contractor's risk attitudes.

H5. Government policy moderates the relationship between professional competence and the contractor's risk attitudes.

H6. Government policy moderates the relationship between physical health and the contractor's risk attitudes.

H7. Government policy significantly influences the contractor's risk attitudes.

Conceptual Framework

The concept behind this study is that some factors affect an individual's risk attitudes in the construction industry. As a result, the researchers intend to identify those individual factors affecting risk attitude and then identify the relationship of those factors with contractor risk attitudes among construction industry, as shown in Figure 1.

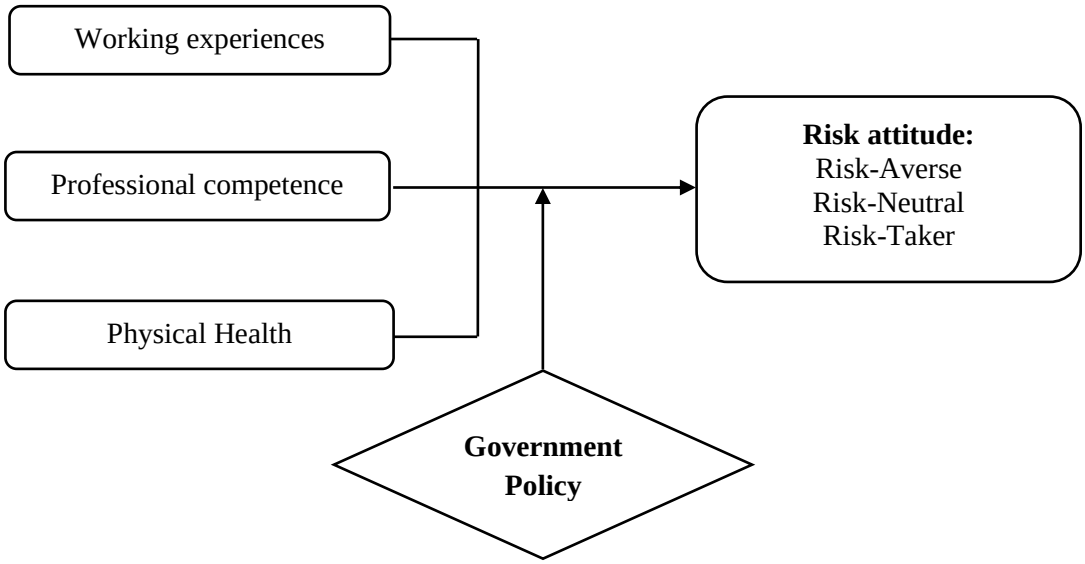

Figure 1: Conceptual Framework

METHODOLOGY

In line with the above-mentioned issues and arguments from existing literature, the main objective of this article is to examine the relationship between the individual factors affecting contractor's risk attitudes among construction practitioners in Malaysia with the moderating role of government policy.

This research method is based on structural equation modelling (SEM), and the research model was ascertained through the SmartPLS 3.0 software (Ringle, Wende & Becker, 2015). PLS-SEM seems an appropriate method to assess the relationship in the current research because its algorithm permits the unrestricted computation of cause-effect relationship models that employ both reflective and formative measurement models (Diamantopoulos & Siguaw, 2006). Therefore, a reflective approach was employed in this research. This study also focused on the G7 contractors operating in Kuantan Malaysia construction industry that specialise in building, bridge and road construction project. Kuantan district comprises six (6) sub-districts, which are Sungai Karang, Ulu Kuantan, Ulu Lepar, Kuala Kuantan, Beserah and Penor in Malaysia.

The Scale of the Questionnaire

Kulatunga and Udayangani (2006) stated that Likert scales are proper and widely used in attitudinal measurement. The Likert scale is commonly used to measure activities, with a scale ranging from very low to very high. In this paper, we map the scale point from 1 to 5 scale in order to quantify the risk attitudes of contractors in construction projects, in which the scale correspondingly represents respondents' attitudes from (1) very low that this factor has the dramatic influence to (5) very high that this factor has dramatic influence. In this study, the selection of an odd scale, particularly the 5-point scale is appropriate because it will increase the reliability of the data as well as lessen social desirability bias (Krosnick, 1991). Respondents were asked to respond to the items by indicating their level of agreement using a five-point Likert scale. Also, a five-point scale is used because the scale can make a compromise between the conflicting goals of offering enough choice since only two or three options means measuring the only direction rather than also the strength of opinion and making things manageable for respondents. Lastly, Likert scale is mostly recommended from previous studies (Dikman *et al.*, 2007). It was supported by previous literature such as Krosnick and Fabrigar (1991) that a scale between 1 and 5 is enough to point out reliably and validly, the measure of an item, than a longer or shorter scale point. Table 1 shows the summary of indicators and the sources of the items used in the questionnaire survey.

Table 1: Summary of Variables and Measurement of Indicators

Constructs	Dimensions	Adapted from	No. of indicators
Factors Affecting Risk Attitudes	Working Experience	Wang *et al.* (2011) & Muthike (2014)	7
	Physical Health	Wang *et al.* (2011) & Muthike (2014)	7
	Professional Competence	Wang *et al.* (2011) & Muthike (2014)	6
Contractors Risk Attitudes	Risk-averse	Ibrahim et al. (2011) & Wang *et al.* (2011)	3
	Risk-neutral		3
	Risk-taker		3
Government policy	Rules and Regulations	Adeleke *et al* (2016)	7

Note: all measurement scales are interval with five-point.

The original questionnaire adapted from Adeleke *et al.* (2016), Ibrahim (2011), Muthike, (2014) and Wang *et al.* (2011) was in English. Therefore, in order to ensure that every respondent understands the items stated in the questionnaire. The survey questionnaires were prepared in both Malay and English version to give flexibility for the respondents to respond in either language they were comfortable with. Preceding to distributing the surveys, the selected contractor committee's was provided with the details of the survey procedures. The

time limit for the return was given as two to three weeks, however late responses were accepted. The key contact person was asked to contact the researcher once they had collected some of the questionnaires (Lam & Adeleke, 2020).

RESULTS

Response Rate

In survey research, response rate represents the number of people invited to participate in the study and the number of persons who complete the survey instrument, and there are no standard expectations for response rates as they could vary across survey (Adeleke *et al.*, 2016; Shittu & Ahmad, 2020). To achieve the proper response rate for this study, 140 questionnaires were randomly distributed within the construction industry in Malaysia. Of the 140 questionnaires distributed, 124 questionnaires were received representing 89%. 12 questionnaires were found to be unusable due to missing data or provided the same responses to all the questions. Thus, overall, 112 (80%) of the total questionnaires were usable. A response rate of 80% is considered adequate for the analysis in this study because Hair *et al*. (2014) and Sekaran (2010) suggested that a response rate of 30% is sufficient for surveys. Moreover, the response rate for this study is alike with studies on technology use. This response rate was measured sufficient as a rule of thumb for the minimum number of data cases required to validate a study's research model using PLS-SEM is calculated as ten times the number of predictors (Nawanir *et al.*, 2020).

Table 2: Profile of Respondents

Categories	Demographic	Count	Percentage
Position	Contract managers	20	17.8%
	Architects	17	15.2%
	Project managers	14	12.5%
	G-7 Contractors	48	42.9%
	Engineers	13	11.6%
Years of Experiences	Below 3 years	39	34.8%
	4-6 years	48	42.8%
	7-9 years	21	18.8%
	Above 10years	4	3.6%
Academic Qualification	PhD	20	17.8%
	Masters	62	55.4%
	Bachelor	30	26.8%
Job specialisation	Buildings	79	70.5%
	Roads	21	18.8%
	Bridges	12	10.7%

Demographic Distribution of the Respondents

The demographic profile of respondents is a component of a sample that considers similarities and differences within the unit, such as position, gender, age, years of experience, qualification, specialty of the company and the location of the company. A sample of architects, project managers, contractors, engineers operating within the construction industry in Kuantan

Malaysia was asked to complete this question. It comprises a five-point interval scale including a demographic and descriptive question on their views towards individual factors affecting contractors risk attitudes among construction industries. As previously stated, there were 112 positive responses with 80% response rate used in the current analysis. The description of the respondent profile is exhibited in Table 2. The particular demographic features of the companies' representatives who participated in the main survey include the position in the company, work experience and gender. Those related to their companies include firm specialisation. This study requires input from the management team to confirm the potential of contractors risk attitudes in Malaysia as a developing country. The highest number of the respondent is G-7 contractors whereas in total 48 respondent participated followed by contract managers (20 respondent) and project managers (17 respondent).

Assessment of Measurement Model (Outer Model)

The PLS-SEM method and statistical software SmartPLS 3 (Ringle, Wende & Becker, 2015) were used to estimate the hypothesised model. PLS-SEM is a non-parametric, multivariate approach used to estimate path models with latent variables (Hair *et al.*, 2017; Memon, Salleh & Baharom, 2017; Richter *et al.*, 2016; Rigdon, 2016). In this study, PLS-SEM was used for several reasons; firstly is the exploratory nature of the research as the study was to investigate the individual factors affecting contractors risk attitudes. Secondly, the PLS-SEM can handle complex research models (Hair *et al.*, 2016), and is recommended for the moderating models (Hair *et al.* 2011; Hair *et al*. 2017; Henseler *et al.*, 2009). To organise the measurement model, the study is reflected to affect the standard, which is anticipated by many researchers (Hair *et al.*, 2017; Memon *et al.*, 2013; Rigdon *et al.*, 2014).

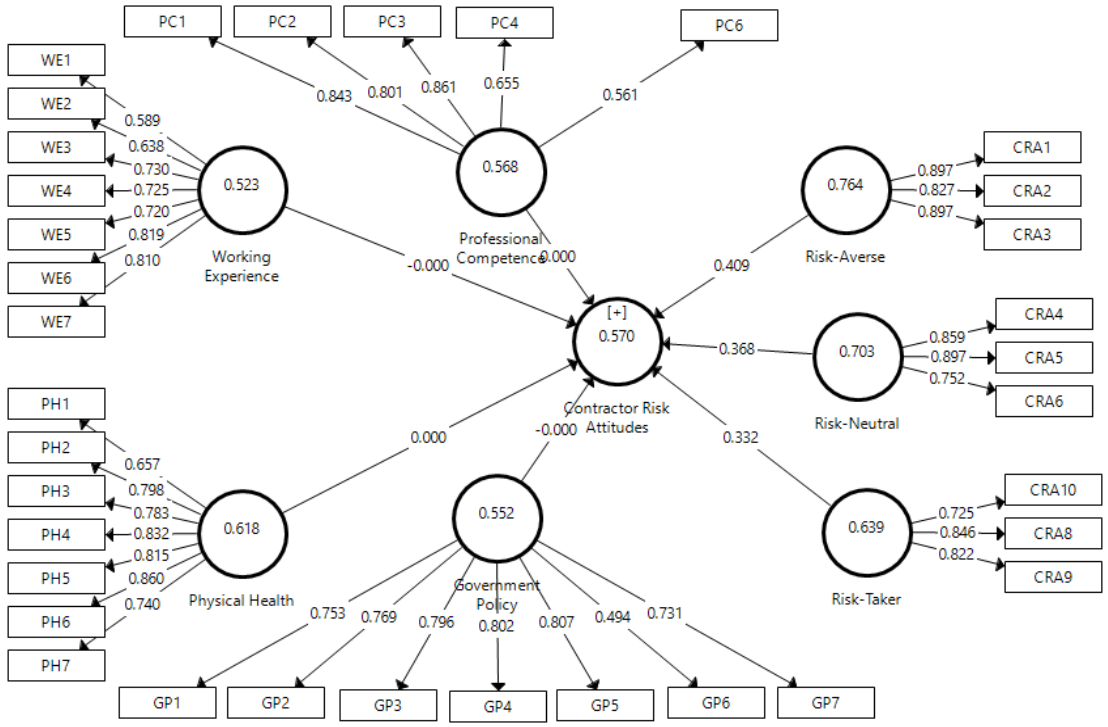

Figure 2: Initial Evaluation of Measurement Model through PLS Algorithm (Initial PLS Path model)

Composite reliability, outer loadings, Cronbach's alpha, average variance extracted (AVE) for convergent validity) and discriminant validity were assessed to examine the measurement model. Based on the initial assessment, 1 item (i.e., PC5) was discarded from the model the

outer loading is below the threshold of 0.4 (Hair *et al.*, 2017). However, for the whole model, only 35 items were retained with the loading between 0.494 and 0.897, as shown in Figure 2.

Subsequently, Cronbach alpha was assessed to indicate internal consistency of the measurement. The alpha coefficients of 0.60 are considered average reliability, while a coefficient of 0.70 or higher indicates that the instrument has a high-reliability standard (Hair *et al.*, 2014; Sekaran, 2010). Hair *et al.* (2011) equally suggest that the composite reliability CR coefficient should be at least 0.70 or more. Table 3 shows that the Cronbach's alpha of the variables used in this study ranged from 0.800 to 0.895 and the CR scores of all constructs exceeded the recommended criterion of 0.7 demonstrating high internal consistency or the appropriateness of the scales used in this study (Bagozzi & Yi, 1988; Hair *et al.*, 2011; Taofeeq *et al.*, 2020).

Table 3: Construct Reliability and Validity

Constructs	Items	Outer Weight/Loading	Types of Constructs	AVE	CR	Cronbach's Alpha
Contractor's Risk attitude	Risk-Averse	0.541	Formative	N/A*	N/A*	N/A*
	Risk-Neutral	0.216				
	Risk-Taker	0.343				
Government policy	GP1	0.753	Reflective	0.552	0.894	0.861
	GP2	0.768				
	GP3	0.795				
	GP4	0.801				
	GP5	0.807				
	GP6	0.496				
	GP7	0.753				
Physical health	PH1	0.652	Reflective	0.618	0.918	0.895
	PH2	0.796				
	PH3	0.782				
	PH4	0.835				
	PH5	0.817				
	PH6	0.860				
	PH7	0.742				
Working experience	WE1	0.586	Reflective	0.568	0.865	0.800
	WE2	0.641				
	WE3	0.734				
	WE4	0.728				
	WE5	0.717				
	WE6	0.818				
	WE7	0.808				
Professional competence	PC1	0.842	Reflective	0.523	0.883	0.844
	PC2	0.801				
	PC3	0.861				
	PC4	0.655				
	PC6	0.562				

Note: ***N/A** (Not Applicable for Formative Construct)

Next, factor loadings and average variance extracted (AVE) were assessed to determine the convergent validity of the constructs. Based on Table 3, all outer loadings are above 0.4 and AVEs are higher than 0.5. Therefore, convergent validity indicating the extent to which a measure correlates positively with alternative measures of the same construct are satisfactory (Hair *et al*., 2017; Nawanir *et al*., 2019).

Table 4: Cross Loading

Items	CRA	GP	PH	WE	PC
Risk-Averse	**0.948**	0.675	0.809	0.690	0.587
Risk-Neutral	**0.847**	0.656	0.700	0.587	0.445
Risk-Taker	**0.890**	0.698	0.731	0.612	0.490
GP1	0.584	**0.753**	0.447	0.456	0.454
GP2	0.560	**0.768**	0.469	0.39	0.420
GP3	0.575	**0.795**	0.544	0.383	0.380
GP4	0.656	**0.801**	0.584	0.464	0.478
GP5	0.593	**0.807**	0.546	0.400	0.386
GP6	0.344	**0.496**	0.331	0.288	0.248
GP7	0.505	**0.731**	0.462	0.329	0.260
PH1	0.591	0.527	**0.652**	0.439	0.427
PH2	0.647	0.535	**0.796**	0.652	0.476
PH3	0.638	0.451	**0.782**	0.656	0.501
PH4	0.709	0.488	**0.835**	0.562	0.572
PH5	0.659	0.549	**0.817**	0.498	0.454
PH6	0.704	0.530	**0.860**	0.598	0.537
PH7	0.657	0.549	**0.742**	0.494	0.419
WE1	0.473	0.384	0.427	**0.586**	0.410
WE2	0.477	0.407	0.485	**0.641**	0.441
WE3	0.522	0.372	0.511	**0.734**	0.403
WE4	0.472	0.334	0.498	**0.728**	0.456
WE5	0.518	0.356	0.486	**0.717**	0.424
WE6	0.595	0.419	0.641	**0.818**	0.458
WE7	0.515	0.387	0.518	**0.808**	0.375
PC1	0.517	0.383	0.569	0.451	**0.842**
PC2	0.386	0.327	0.435	0.436	**0.801**
PC3	0.461	0.417	0.501	0.462	**0.861**
PC4	0.362	0.375	0.396	0.439	**0.655**
PC6	0.425	0.425	0.383	0.412	**0.562**

Note: (CRA) Contractor Risk Attitudes, (PC) Professional Competence, (PH) Physical Health, (GP) Government Policy, (WE) Working Experience.

For reflective scales, the standardised loading is provided; for formative scales, the weight of the linear combination is given. CR = Composite Reliability, AVE = Average Variance Extracted, and Cronbach's Alpha, all NA (Not applicable) for formative scale (Gholami *et al*., 2013). Besides convergent validity, discriminant validity indicating to the extent to which a construct is truly distinct from other constructs was assessed (Hair *et al.*, 2017; Nawanir *et al.*, 2019). In this study, discriminant validity was evaluated using three criteria, including cross-loadings, Forner-Lacker and HTMT criterion as suggested by Hair *et al.* (2017). In assessing

the cross-loadings, the outer loading of an item should be greater on its respective latent variable than its cross-loadings on other latent variables. Table 4 shows that outer loading of each indicator was greater on its respective.

The second approach of discriminant validity was evaluated using the criteria suggested by Fornell-Larcker (1981). The author suggested that discriminant validity is achieved when the square root of each construct's AVE is higher than the correlation of the construct to other latent variables. Table 5 shows the correlations between the variables and the values of the square root of the average variances extracted. Which clearly indicate that all the diagonal values are greater than the correlation among the variables, suggesting adequate discriminant validity (Fornell & Larcker, 1981).

Table 5: Discriminant validity results based on Fornell-Larker Criterion

Items	GP	PH	WE	PC
GP	**0.743**			
PH	0.659	**0.786**		
WE	0.527	0.710	**0.723**	
PC	0.515	0.618	0.586	**0.753**

Note: (PC) Professional Competence, (PH) Physical Health, (GP) Government Policy, (WE) Working Experience. **Note:** Diagonals (boldface) represent the square root of the average variance extracted while the other entries represent the correlations.

Additionally, a new approach in examining the discriminant validity of variance-based SEM is the heterotrait-monotrait ratio of correlations (HTMT) (Henseler & Fassett, 2010; Nawanir *et al*., 2019). According to Henseler and Fasset, the Heterotrait-Monotrait ratio of correlations (HTMT) approach to determine the Discriminant Validity (DV) of the constructs. To achieve DV, the HTMT value should not be greater than the HTMT 0.85 value of 0.85, or the HTMT 0.90 value of 0.90 (Hair, *et al.*, 2016; Sekaran & Bougie, 2010). As shown in Table 6, all values have not passed both HTMT 0.85 and HTMT 0.90 measures, indicating that the discriminant validity has been established.

Table 6: Discriminant validity results based on the heterotrait-monotrait ratio of correlations (HTMT)

Items	Government Policy	Physical Health	Professional Competence	Working Experience
Government Policy				
Physical Health	0.750			
Professional Competence	0.617	0.815		
Working Experience	0.615	0.724	0.722	

Based on Figure 2, a formative second-order construct (i.e. contractor risk attitude) was assigned as an endogenous variable. It resulted in the zero standardised beta values for the exogenous constructs (i.e. professional competence, working experience, physical health, and government policy). In order to overcome this issue, by using the latent variable scores calculated in SmartPLS, the first-order constructs risk-averse, risk-neutral, and risk-taker were converted to be manifest variables (Hair *et al*., 2017). Therefore, the contractor risk attitude

will become the endogenous first order formative construct with risk-averse, risk-neutral, and risk-taker as the indicators. The second modified model is presented in Figure 3.

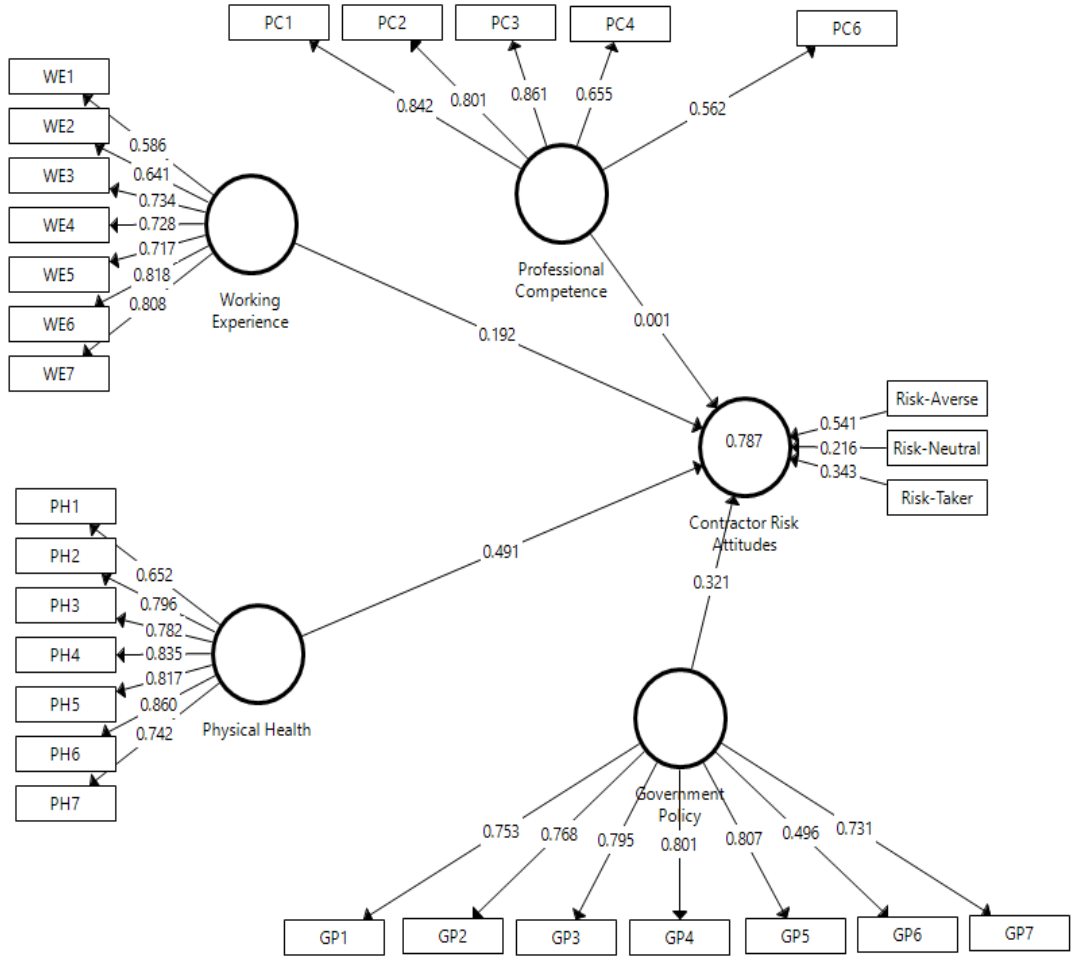

Figure 3: Evaluation of Measurement Model Through PLS Algorithm (Modified PLS Path model)

Collinearity Statistics (VIF)

Multi-collinearity is the extent to which the other variables can explain a variable in the analysis (Tabachnick & Fidell, 2007). Because of collinearity, it is difficult to ascertain the effect of any single variable. This study included using variance inflation factors (VIF) to examine multi-collinearity.

Table 7: Collinearity Diagnostics

Items	Inner VIF	Outer VIF
Risk-Averse	2.663	
Risk-Neutral	2.420	
Risk-Taker	2.482	
Government Policy		1.836
Physical Health		2.783
Professional Competence		2.180
Working Experience		1.786

A VIF value greater than 3 indicates multi-collinearity. In this study, the VIF values were below the 5 standard criteria, indicating no multi-collinearity issue (Tabachnick & Fidell, 2007). Therefore, since we had both reflective and formative measures, we considered multi-collinearity of inner VIF for exogenous variables and outer VIF for formative constructs to be an important issue in assessing both formative and reflective measures.

Assessment of Structural Model (Inner Model)

The structural model was assessed to test the causal relationships between Individual factors affecting contractor risk attitudes (Working experience, Professional competence and Physical health), Government policy (Rules and Regulations) and Contractor risk attitudes (Risk-Averse, Risk-Neutral and Risk-Taker). The coefficient of determination (R^2 values) and path coefficients (beta values, ß) were parameters to determine how well the data supported the hypothesised relationships (Hair *et al.*, 2014; Taofeeq *et al.*, 2020). A bootstrapping process with 5,000 interactions was performed to generate t-values and standard errors to confirm the statistical significance (Hair *et al.*, 2011). R^2 measures the predictive accuracy of the model and represents the percentage of variance in the dependent variables as explained by the independent variables in the model (Hair *et al.*, 2011). Whereas, path coefficients (ß) indicate the degree of change in the dependent variable for each independent variable.

Table 8: Results of Bootstrapping for Structural Model Evaluation

Hypotheses	Variables	Beta (ß)	Std. Error	T-Value	P-Value	Findings
H1	Working Experience -> CRA	0.207	0.057	3.617	0.000	Supported***
H2	Professional Competence -> CRA	0.024	0.048	0.425	0.336	**Not Supported**
H3	Physical Health -> CRA	0.454	0.066	6.984	0.000	**Supported*** **
H4	Government Policy*** WE -> CRA	0.089	0.047	1.806	0.036	**Supported*** **
H5	Government Policy*** PC -> CRA	0.120	0.056	0.749	0.227	**Not Supported**
H6	Government Policy*** PH -> CRA	0.040	0.062	1.919	0.028	**Supported***
H7	Government Policy -> CRA	0.333	0.067	4.885	0.000	**Supported***

Note: ***Significant at 0.01 (1 -tailed), **Significant at 0.05 (p-value), **significant at 1.65 (t-value), **Note;** (CRA) Contractor Risk Attitudes, (PC) Professional Competence, (PH) Physical Health, (GP) Government Policy, (WE) Working Experience.

For concluding whether the path coefficients are statistically significant or not, bootstrapping techniques embedded in this study with SmartPLS 3. As reported in Table 8, the T-values with each path coefficient were determined using the bootstrapping technique and P-values subsequently were generated. The results showed that professional competence element has no significant effect on contractor risk attitudes ($\beta = 0.048$, $t = 0.425$, $p>0.336$) and also H5 which stated that government policy moderate the relationship between professional competence and contractor risk attitudes was not significant as well. Therefore, the hypothesis H2 and H5 of this study were not supported. Result in Table 8 indicated that working experience, and physical health possess a positive relationship with contractor risk attitudes respectively ($\beta = 0.057$, $t = 3.617$, $p < 0.000$), ($\beta = 0.066$, $t = 6.984$, $p < 0.000$). H1and H3 of this study was supported, and government policy moderate H4 and H6 of this study and H7 of this study were supported as well. As it is normal that the self-assessment showed high performance, this study revealed that the respondents criticised the current performance in construction companies,

which is a reflection of the problem of the study. Also, the small values of standard deviation professional competence indicated the fact that this perception is virtually agreed upon among most contractors and engineer in the construction industry. Also, according to the bootstrapping result, the government policy as a moderating variable did not have a significant effect on the relationship that existed between professional competence and contractor risk attitudes (Table 8). The reason is that there existed statistical significance for organisations that were highly obedient to the policy of the government than those organisations whose compliance was low. In other words, the government's high policy operations facilitate the reduction of contractor's risk attitudes and regulate the behaviour of the contractors in the construction companies. So, there exists a positively strengthened relationship between professional competence and contractor risk attitudes as caused by the product term method (Figure 5).

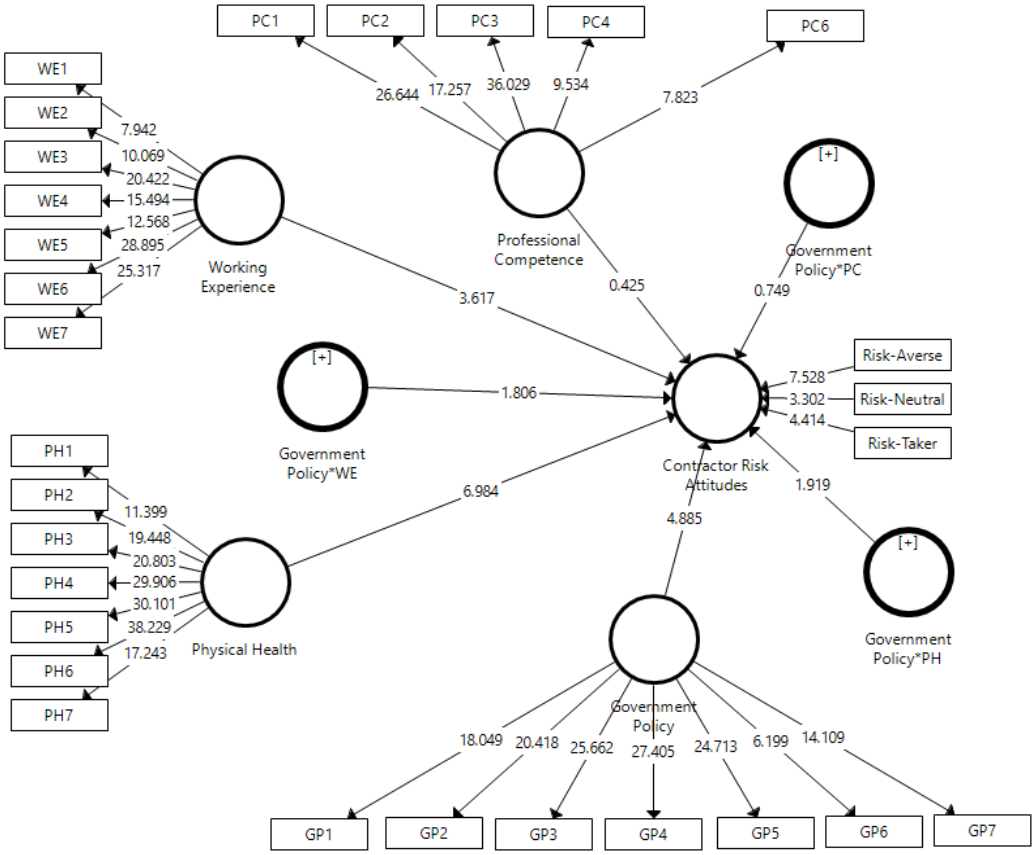

Figure 4: Evaluation of Structural Model through PLS Bootstrapping

Effect size and predictive relevance

Having examined the significance and relevance of the path coefficients, the explanatory power of the structural model was determined. The explanatory power was examined by the coefficient of determination; R^2 values (Hair *et al.*, 2014). Another essential criterion for measuring structural model in the PLS-SEM is the use of R-squared values or the coefficient of determination (Hair *et al.*, 2011; Hair *et al.*, 2012; Henseler *et al.*, 2009). However, many criteria can be employed as guidelines for assessing the level of R-square. For example, Cohen (1988) criterion opine that R^2 value equals 0.26 or more is considered to be substantial, 0.13

moderate, and 0.02 weak. Meanwhile, Chin (1998) criterion state that R^2 value equal or more than 0.67 is substantial, 0.33 moderate, and 0.19 weak. Figure 3 depicts the R^2 values of the endogenous (contractor risk attitudes) latent variable (Hair *et al.*, 2012; Henseler *et al.*, 2009; Ishak, Adeleke & Bamgbade, 2020). As depicted in Figure 3, the research model explicates 0.787 (78.7%) of the total variance in contractor risk attitudes.

Therefore, following Falk and Miller's (1992) and Chin's (1998) standard, the endogenous latent variable presented acceptable levels of R^2 values, which were regarded as substantial.

Testing of Moderating Effect

The current study employed a product indicator approach with the use of PLS-SEM to discover the strength of the moderating effect of government policy (rules and regulations) on the relationship between professional competence and contractor risk attitudes in Kuantan Malaysian construction industry (Chin *et al.*, 2003; Helm, Eggert & Garnefeld, 2010; Henseler & Chin, 2010). The product term method is regarded as appropriate in the present study because the moderating variables are continuous (Rigdon, Schumacker & Wothke, 1998). Henseler and Fassett, (2010) stated that the results of the product term method are normally superior or equal to the group comparison method, the authors always recommend the use of a product term method. To employ the product indicator method in trying out the moderating effects of government policy (rules and regulations) on the relationship between professional competence and contractor risk attitudes, the product terms between the indicators of the latent predictor variable and the indicators of the latent moderator variable need to be established. Thus, the product terms would serve as the indicators of the interaction term for the structural model (Adeleke *et al*., 2018).

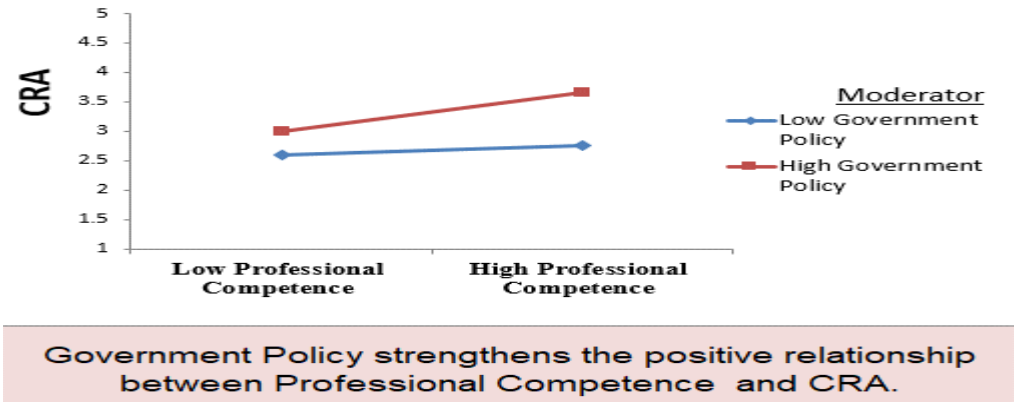

Figure 5: Interaction Effect of Government Policy on Professional Competence & contractor's risk attitudes (CRA)

Government Policy strengthens the positive relationship between professional competence and contractor's risk attitudes among Malaysian construction industries. The result of professional competence, however statically significant for contractors that have high obedience to rules and regulations than for contractors with low compliance with rules and regulations in the construction industry.

According to (Cohen, 1988; Henseler & Fassett, 2010), moderating effect sizes (f^2) values of 0.35, 0.15 and 0.02 can be considered as Large, Medium and weak respectively. Nevertheless, according to Chin *et al*. (2003), effect sizes with low values does not essentially mean that the moderating effect is insignificant. Even a small interaction effect can be significant under

utmost moderating conditions, and if the resulting beta changes are significant, then it is paramount to take these conditions into consideration (Adeleke *et al*., 2016; Henseler & Fassett, 2010; Taofeeq *et al*., 2020). The output of the strength for the moderating effects of government policy is 0.248, which were regarded as Medium.

DISCUSSION

Previous literature has conflicting results on the role of a contractor's attitudes on construction projects. Literature also showed relevant factors affecting contractors risk attitudes, and there are many studies conducted to examine the relationship between risk attitudes and contractor risk attitudes (Kim 2011; Szymanski, 2017; Wang *et al*. 2011). Notwithstanding this extensive research work, many empirical studies reported inconclusive results (Wang *et al*., 2011). Many of these studies argued that contractor's attitudes could increase organisational performance by providing many benefits, enhancing client services, minimizing risk record, improving sales growth, and help organisations to gain competitive advantages over competitors (Kim 2011; Szymanski, 2017; Wang *et al*. 2011). In contrast, other researchers found negative results that some factors affecting contractor attitudes may affect the contractor's performance adversely (Abdul-Aziz, 2014; Alfredo, 2014; Taofeeq *et al*., 2019; Wang, 2011).

Also, previous literature has revealed that contractors are facing a lot of problems in the construction industry, which lead to diverse risk attitudes in the construction industry (Abdul-Aziz, 2014; Taofeeq *et al*., 2019). The problems are lack of knowledge and skills related to construction projects, lack of understanding of construction process and requirement, lack of skills on necessary aspects of project success, improper application of construction equipment, changes of specifications during the construction process and lack of apprenticeship.

Moreover, there is a significant number of literature on factors influencing contractors' risk attitudes in many developing countries (Kim 2011; Szymanski, 2017; Wang *et al*. 2011; Taofeeq *et al*., 2019). Although this significant body of knowledge exists in the context of an emerging economy, many previous studies regarding management of construction projects have been focusing on the factors contributing to the success of risk management. However, little attention has been given to factors severely affecting the decision-makers' risk attitudes with particular reference to the individual's risk factors in the construction industry. Therefore, it is the aim of this study to identify the factors affecting contractors' risk attitudes and then determine its relationship with the government policy, with a view to identifying individual's perception from different contexts or locations.

Therefore, tests conducted to confirm Hypothesis 1 on the significant influence of working experience on contractor's risk attitudes, found that a significant positive relationship exists with working experience and contractor risk attitudes. This is not surprising because it is the utmost expectations of every company to have experienced workers. Contractors that have extensive experience in the construction field can increase their standing as professionals on construction projects. This signpost that contractors with high experience in both industrial practice and civilisation would upsurge their potentials for better risk management in the construction industry, unlike those contractors with little experience because, those contractors with little work experience would be less skillful to addressing the potential risks that might block the successful implementation of projects while contractors who have high experience in the construction industry will have a high reputation and credibility in the marketplace. The contribution of contractors' industry experience in facilitating a high-quality project risk management has been widely investigated by previous studies (e.g. Taofeeq *et al*., 2019; Wang *et al*., 2011).

Hypothesis 2 of this study suggests that professional competence has a significant effect on contractor's risk attitudes among Kuantan Malaysia construction industry. Literature shows that when the contractor becomes senior by age and more job experience, they have more score on rules and regulation. But the result of this hypothesis was not significant because the respondents criticized the current performance of professional competence in construction companies which is a reflection and the reason why professional competence to be a relatively less significant factor for influencing contractors risk attitudes in Kuantan Malaysia, construction industry. Also, the result is in line with the findings provided by Ward *et al.*, (1991) who recommended that a prerequisite for high-quality project risk management is the ability to have access to required information relating to the handling of risk concerning a specific project. If contractors have adequate and accurate information when making decisions against risks, they are probably willing to be risk-neutral, as they are confident and competent in making good trade-offs between risks and benefits. Otherwise, they cannot have the right perception of project risks or a clear understanding of the consequential risks to them. Therefore, taking a risk without adequate understandings and competence about that risk may lead the willingness to bear and manage the risk to unwillingness.

Moreover, individuals who feel uncertain and incompetent tend to overestimate risk while those who perceive themselves as knowledgeable, experienced and competent tend to underestimate it. Therefore, individuals confronting uncertain situations of which they have no prior knowledge or experience tend to perceive the situation as risky which leads to a more risk-averse response. This echoes with Thevendram and Mawdesley (2004) and Wang *et al.*, (2011) who both emphasised the importance of human factors to the project success in their studies. In this study, we further their findings by investigating the details about the role of individual factors and government policies in affecting contractors' risk attitudes in construction projects. Therefore, with the help of a moderator, the result of professional competence statically significant for contractors that have high obedience to rules and regulations than for contractors with low compliance with rules and regulations in the construction industry in Kuantan.

Also, Hypothesis 3 and 7 of this study proposed that Physical Health has a significant effect on contractor's risk attitudes among Kuantan Malaysia construction industry and Government Policy has a relationship with contractor's risk attitudes among Kuantan Malaysia construction industry. The result of this hypothesis was significant because rule and regulations are very necessitate in construction companies to meet specific performance standards for some products or health with safe surroundings for the workers and to forcing them to improve the quality of their product and rate at which technology is used in the construction process and also rules and regulation we make contractors be aware of the current health and safety legislation which govern their activities in the construction industry. In addition to this, physical health is one of the prequalification criteria for new workers in many industries. Therefore, Government policy (rules and regulations) are positively related to proper control in the construction industry. For instance, rules and regulations are connected with all aspects of construction activities, such as all protocols or measures that are involved before the initiation and closure of a project. Moreover, organisations that duly follow the prescribed rules and regulations by the government while procuring materials, drawing plans, or performing other activities involved in construction will record less occurrence of risk in the project.

To improve the performance of contractors in the construction industry, the government established acts and regulations and has taken many actions to guard employees against occupational tragedies such as death, disease and disability. The existing rules and regulations have guarded workers/employees against occupational accident and have assisted in having a

good performance at the workplace. Therefore, management of the construction site is enjoined to follow few steps in managing individual factor of the workers in their organisation. The hierarchy of the control measures in controlling the individual factor started from motivation, training and finally with enforcement in developing safety climate in the construction site.

RESEARCH IMPLICATIONS

The present study permits us to provide some useful and interesting information on individual factors that always affect contractors risk attitude in the construction industry. Contractors should take into account that individual Factors play an important role in the decision-makers' attitudes towards risks management. As a result, Contractors should as well hire team members with high team competency, working experience, educational background and physical health of their workers as this will help to increase the quality of the work and allow workers to know more about risk in the construction industry. Furthermore, team members should be persuaded in attending training and courses on risk attitude.

In addition, human capital is an important asset to the organisation. Therefore, it is imperative that the management have a clear understanding of the best way and strategy to encourage workers to engage and to be committed to safety. This is vital for the improvement of safety behaviour. The management of construction should be a focus on the hiring process, which involves selecting the right candidates for the jobs in terms of educational background, work experience, physical health condition, and professional competence with the help of rules and regulation right from the recruitment process. Although the individual factor affecting risk attitudes dimensions investigated in this study is easy to control during the recruitment of new worker, project managers should try to adopt the result of this study in dealing with the risk attitudes in the construction industry. Our research also provides contractors, project managers, team members and clients with some strategies as to know how to deal with risk attitudes in the construction industry.

In the same vein, the result of this study echoes that, this research provides contractors; subcontractors; project managers and policymakers with a tool to assess how individual factors affect contractor risk attitude in the construction industry with government policy (Rules and regulations) to control the activities of contractors and to improve risk management within the construction industry. Besides, there is also a need for the development of policies that encourage and support projects issuance. Policymakers should, therefore, develop initiatives that can motivate contractors and project managers to adherence of effective performance of contractors in order to attract client's patronage. Policymakers might as well consider organisational control theory to mitigate the occurrence of less risk during the project.

The results of this study also show the importance of government policy (rules and regulations) as a practice to follow to increase and enhance the contractor’s performance. Also, the results increase the awareness in the construction industry to follow the rules and regulations, which involves life safety and innovation when implementing construction risk management. Government policy as a practice in construction companies can lead to higher performance of contractors, but also at the same time can be a desire and a result of practicing other initiatives. Moreover, the construction industry should excel when dealing with other strategies and practices to have the successfulness and obtain the planned goals. Besides, this study can also give some insights to public, manufacturing and service organisations in the Malaysian and Asian region. For example, other industries in Malaysia or other Asian countries can take this study as a guideline when striving for excellence. In other words, the construction industry, whether in Malaysia or outside, can have many practical benefits from this study. The extensive

literature and arguments and the results should be taken into consideration from other industries to enhance their performance.

The methodological implication of this study is classified into three dimensions factors influencing contractors risk attitudes in the context of the construction industry, a research model for this study, and extending the resource base theory to suit the construction industry. Most previous researchers did not address individual factors and government policy on contractor risk attitudes; therefore, the present study makes an effort to fill that research gap. The framework for examining the moderating effect on the relationship between individual factors and government policy on contractor risk attitudes will provide a direction for future studies. Furthermore, the study of the construction industry will represent a benchmark for providing a means of assessing the contractor risk attitudes in the construction industry.

Finally, this research has explored a relatively new tool of analysis (PLS-SEM) to explicate the structural relationship among the constructs of this study. The PLS tool is a general model that constitutes canonical correlation, multiple regression, principal components techniques, multivariate analysis of variance between others. Therefore, the current study makes use of this comparatively new tool of analysis which has some significant methodological implications.

Limitation and Paths for Future Research

This research is not without limitations, thus giving room for improvements through future studies. The study was directed solely to contractor's and so future studies may consider investigating other practitioners and policy makers in the construction industry. Also, data was collected through a questionnaire survey conducted in one of the states in Malaysia, Pahang, so the generalisation of this study results should be made with caution. Future studies may be undertaken in other countries for comparison with this Malaysia findings.

In addition, our study focused on 'individual factors' affecting contractor's risk attitudes in the construction industry in Kuantan, Pahang Malaysia. Other researchers may include more control factor variables such as organisation, environment, technical and managerial factors (private and public sectors) into their studies. As different company sizes may have different organisational structures and may respond differently to certain determinants. Furthermore, future research may investigate other Grades of contractors in Malaysia to know if there is a similarity to these results.

Finally, respondents were requested to translate their perceptions based on statements in the questionnaire survey into numbers through a Likert scale. These answers may be influenced by biased perceptions of the situation (Macinati, 2008). Therefore, future research design could consider a mixed research design, quantitative and qualitative research to complement each other.

CONCLUSION

This study's theoretical research framework has extended knowledge to the risk management field, with the theory of planned behaviour and organisational control, by examining the impact of personal factors (working experience, professional competence and physical health) on contractor's risk attitudes, with the moderating influence of government policy. The study results provide support for the conclusion that personal factors play a dominant role in factors affecting contractors' risk attitudes in construction projects. Therefore, in line with the empirical evidence and theoretical opinion presented in this study, it is ascertained in this research that government policy theoretically moderates the relationships between the

endogenous and exogenous variables. Thus organisational rules and regulations buffer the relationships among individual factors, political factor, economic factor, and technological factor (factors affecting risk attitude) in construction project management. In other words, risk management will be more effective (more positive) for organisations that have well-established rules and regulations concerning these identified factors, than those organisations without rules and regulations to guide their workers.

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