Construction Contractor Selection Criteria: The effects of relational norms, price and prequalification

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By

Francis Kok Siong Lee

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Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Name: Francis K S Lee

Date: .....

Signature:.....

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Dedication

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Abstract

This study investigates contractor selection by Malaysian housing developers. In order to maintain competitive advantage, businesses such as housing developers need to strive to give their customers better value for money. Selecting the right contractor enhances project delivery outcomes and could help this cause. With this in mind, this study is concerned with the contractor (supplier) evaluation and selection by housing developers in procuring contractor services (Watt et al., 2010a) and the effects of relational norms -1) trust norms (Dwyer et al., 1987; Morgan and Hunt, 1994; Doney and Cannon, 1997) and 2) cooperative norms (Zhong et al., 2014; Cai and Yang, 2008; Eriksson, 2007b) and 3) prequalification (Aje, 2012; Hatush and Skitmore, 1997; Jennings and Holt, 1998) on contractor selection in industrial exchange relationship.

Three research questions were considered:

Research question 1	how do the relationships between developers and contractors affect the selection procedure?
Research question 2	how do the contractor's tender price, financial standing and expertise affect the selection procedure?
Research question 3	do housing developers in Malaysia carry out contractor prequalification as part of their contractor selection procedure?

With support from literature, seven hypotheses are advanced to deal with these issues;

H1: Norms are the second order construct with two sub-dimensions trust norms (H1a) and cooperative norms (H1b)

H2: Norms have a positive impact on contractor selection

H3: Price has a positive impact on contractor selection

H4: Past experience has a positive impact on expertise

H5: Finance has a positive impact on expertise

H6: Contractor expertise has a positive impact on prequalification

H7: Prequalification has a positive impact on contractor selection

Data was collected from the Malaysia Real Estate and Housing Development Association (REHDA). A postal survey of 545 housing development companies' entries in the REHDA

registry 2009 / 2010 produced 155 completed questionnaires comprising responses from 64 small size firms; 38 medium size firms and 53 large size firms. The overall response rate was 28.4%. Biases were examined for but none were found.

The empirical investigation involved the use of Partial Least Square - Structural Equation Modelling (PLS-SEM); the advanced quantitative data analysis techniques. All results were cross validated by the expert group discussion method.

In term of contributions to theory, the aggregate model shows that price and relationship have small effects on contractor selection whereas prequalification has medium effect on contractor selection. Selection criteria such as contractors' qualification on financial standing, past experience and company expertise have significant effect on selection. Therefore, the higher the contractor qualification in those criteria, the more likely they are to be selected for the job.

In terms of contribution to construction management practice, this study offers an understanding of how housing developers in Malaysia select their main contractors. According to the findings of this research, developers especially the larger firms rely less on relationship criterion but prefer to use prequalification in their contractor selection. This study demonstrate that the contractor selection is based on multi-criteria - beyond those traditionally used such as time, quality and cost - also known as "iron triangle". Using multi criteria prequalification methods helps developers to source for contractors with the necessary capabilities and expertise to match the complexity of projects. This study also highlights the role of developer and contractor relationships as the non–financial criteria (such as cooperative norms and trust norms in contractor selection) especially among small size developers firms.

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List of abbreviations

CB-SEM	Covariance-Based Structural Equation Modelling
DBB	Design Bid and Build
DB	Design and Build
DBFO	Design Build Finance and Operate
GDP	Gross Domestic Products
LIKERT	Likert-type Attitude Scale (Earl, 1998)
PLS-SEM	Partial Least Square – Structural Equation Modelling
REHDA	Real Estate and Housing Developers Association of Malaysia
SET	Social Embeddedness Theory
SCM	Supply Chain Management
TCE	Transaction Cost Economics

Chapter 1 Introduction

1.1 Rationale for study

In order for housing developers to maintain competitive advantage, increased efficiency in the construction deliveries is very important. In the past decades, there has been growing interest in construction management literature to address the issues of contractor selection and identify important selection criteria. This has focused on improving construction projects deliveries beyond the traditionally used criteria such as price, quality and cost and showing how these criteria affect selection process and outcomes. Further, there has been change in the contractor selection criteria of late. Firstly, there is a shift from the price centric tender award to multi criteria selection system. Secondly, to improve project delivery outcomes through better client and contractor relationship, there is a call for more trust and cooperative procurement procedures to be utilised. Both trends have produced new insights into contractor selection practices and an advanced understanding of how construction clients, such as residential housing developers can achieve better end result in the outsourcing exercise.

The purpose of this chapter is to explain the rationale for this study and provide an overview of the research, the research focus and question, the conceptual framework, the theoretical frameworks, selection criteria, this study's contributions, the empirical work examined an explanation of the state of the construction industry in Malaysia, the structure of this thesis and finally, the summary.

The rationales of this study are;

- To explore the contribution that can be made to the understanding of contractor selection and contractor selection criteria for construction management. This is important because this knowledge can increase housing developers' competitive advantage by promoting greater efficiency and business capability (Michell, 2011) in construction deliveries in Malaysia's housing development sector.
- To explore the contribution that can be made to the understanding of non-financial contractor selection criteria through a more cooperative and trusting environment between parties.
- To fulfil a doctoral study completed with the purpose of complying with the DBA requirements at Henley Business School

Whether in developing or developed countries, the construction industry is one of the main contributors to the economy in terms of country gross domestic products (GDP) and also has a positive impact on socio-economic factors and employment. From the macro-economic point of view, the construction sector typically accounts for 7% to 10% of a country's GDP. Further, residential property (a sub-sector of the construction industry) investment accounts for a substantial proportion of total private investment in many countries. For example, residential property investment in Malaysia accounts for 17% of total private investment and in countries such as UK it is 39%; whilst in the US and Australia is 20%;(REHDA Bulletin, 2015). Therefore, successful project deliveries and outcomes are important to government, businesses and communities as there are such high levels of investment tied up in them.

1.2 Contractor selection

In construction projects, unless the developer has an in-house construction department, developers will need to select main contractors that can perform in accordance with their project requirements and needs. Traditionally, selecting contractors on a purely "lowest price" basis has been very common in developing countries such as Malaysia as well as construction industry elsewhere (Doloi, 2009; Holt, 1998a; Holt, 2010; Singh and Tiong, 2006; Waara and Brochner, 2005; Walraven and de Vries, 2009). According to these authors, choosing the cheapest tender price may lead to a practice of false economy and grounds for poor performance, low quality as well as disputes and unnecessary claims (Eriksson and Westerberg, 2010; Eriksson and Pesämaa, 2011; Eriksson and Pesämaa, 2007; Cheung et al., 2011; Wong, 2001; Elyamany and Abdelrahman, 2010) as such project performance suffers. Therefore, a multiple criteria selection method ((Wong et al., 2001) is needed in order to improve contractor selection. Through the well-defined selection criteria, project clients can 'filter' out the 'good' from the 'bad' contractors because not all the contractors that declared their interest to tender will be qualified according to the selection criteria. Assessing the contractors' capabilities and the organisation's resources such as expertise in financial management, contractor past project experience as well as other qualities like technical ability, management experience, performance and project resources would help clients to judge the suitability of the contractors to achieve their project: Whether in terms of time, cost and quality expectations (Holt et al., 1994; Wong et al., 2000; Topcu, 2004), or to predict the performance of the tenderer from their past experience (El-Sawalhi et al., 2007; Elyamany and Abdelrahman, 2010), all of which are important components of contractors' project delivery capabilities and therefore, contractor selection criteria.

1.3 Research focus

This study focuses on contractor selection criteria and impact of prequalification, price and relational norms on contractor selection process one side of buyers and suppliers exchange dyads; the housing developers that procure (buyer) construction work are mostly referred to as client or construction owner (Eriksson, 2007b). The supplier is referred to as main contractor providing construction services and other non-construction suppliers synonymously referred as suppliers or sellers in the literature.

As explained in Section 1.2 selecting competent contractors is important for project deliveries. Poor contractor performance has plagued the Malaysian construction industry for decades (Abdul-Rahman et al., 2006; Chan, 2009; Sambasivan and Soon, 2007; Shehu et al., 2014a; Shehu et al., 2014b; Yong and Mustaffa, 2013). There is a need to find better contractor selection criteria to address the contractors' project delivery problems. However, in the Malaysian context, there have been many studies conducted on project performance (Al-Tmeemy et al., 2011; Chan, 2009), on causes and effects of project delays (Sambasivan and Soon, 2007; Abdul Rahman et al., 2013), on the selection of main contractor (Idrus et al., 2011),on factors affecting construction labour productivity (Kadir et al., 2005) and of supplier selection in the Malaysian telecommunications industry examining the selection criteria, and the effects of government policies and business ethics (Abdul Rahim, 2013). However, there has been very little research specifically focused on the effects of price and prequalification criteria on contractor selection and the effects of developer and contractor relationships on contractor selection (Eriksson and Westerberg, 2010; Eriksson, 2006; Eriksson and Laan, 2007; Liu et al., 2009; Arranz and Arroyabe, 2012) in the Malaysian context. Therefore, there is a gap in research in these areas.

It is therefore the aim of this study to investigate contractor selection practices by housing developers in Malaysia to enhance knowledge on contractor selection criteria and promote better selection practices. This research is expected to contribute towards the extension of the theoretical works in contractor selection and prequalification and this knowledge could give the housing developers opportunities to improve project delivery outcomes. Further, this study is designed to identify;

- Whether the presence of relational norms such as cooperative and trust norms change the way developers select their contractors.
- What are the preferred selection criteria practiced by small, medium and large size developers?

- Whether prequalification is important in the contractor selection exercise.

1.4 The housing development context in Malaysia

Private housing developers in Malaysia (a country with population of 32 million), play an important role in fulfilling the housing needs of the country. In Malaysia's southern neighbour, Singapore, a government agency, the Housing and Development Board (HDB) is primarily responsible for implementing public housing programmes in Singapore, where more than 80% of the population live in purpose-built HDB public housing (HDB, 2015), In comparison, in Malaysia, the majority of housing developments are developed and sold by private developers. According to Salleh's (2008) study, private housing developers accounted for 97% of all housing supplied in Malaysia. In Malaysia, private housing developers are represented by the Malaysia Real Estate and Housing Developers' Association (REHDA) and the registered members of REHDA was targeted for study sample population. It consists of companies involved in the development of high, medium and low cost housing development projects in the 12 states of Peninsular Malaysia. The respondents' locations are shown in the map of Malaysia in Figure 3-3 in Chapter 3.

Similar to a model found in Ball (2003), property developers in Malaysia are characterized by the existence of a large number of relatively small and medium size firms and a small number of large firms. This is a common trend in the property development market (Ball, 2003) as the capital required to accumulate land banks for future business expansion represents high capital investment for new firms due to their low working capital. Their growth is further restricted by the limited financing options available for small firms as property development is associated with high risk business ventures (Ball, 2013). This category of small developers are usually involved in building the landed single-family houses on small parcels of land and complete up to two or three projects in a year. Substantial numbers of these small developers participated in this study questionnaire survey. They were mostly owner managed and operated businesses with very few supporting staff.

On the other hand, the large firms have strong capital-bases, highly skilled employees and land banks at diverse locations that enable them to spread their risk, and lower their financing costs as large firms are generally more secure enterprises and enjoy better negotiating positions (Ball, 2003). Further, a unique feature of these large property development companies in Malaysia is that many of these firms have a ready stock of large land banks for property development from their plantation based business activities established decades ago. This land became available for development after they diversified from less profitable and more volatile plantation based industries such as rubber and oil palm

to property developments as a result of rising labour and operating costs and low commodities prices in plantation related industries (Izad, 2012; Barlow, 2012). According to Sharin and Rahim (2005), the contribution of agriculture to the gross domestic product (GDP or the sum of goods and services produced in a year) declined from 28.8% in 1970 to just 7.3% in 2010 (Jala, 2013). Due to high demand for development land as Malaysia's population increases at the annual rate of 2.5% together with the demand for better housing standards, sales of land or property development businesses could give the firms a better return of investment. Unlike the small firms which concentrate on low-rise single family developments, these large firms generally build highly customised multi-family high rise apartments as well as other mixed developments with more complex construction methods and a higher need for contractors' expertise and competences.

1.5 The construction industry in Malaysia and it's challenges

From the literature, the current challenges experienced by the Malaysian construction industry are; 1) a shortage of skilled construction workers; 2) delays of payment from the project owners and 3) the traditional lowest price procurement method that often leads to cost and time overruns and disputes.

1.5.1 Shortage of skilled contractor and workers and quality problems

Unfortunately, despite the demand growth in the construction sector, as in most developing countries, Malaysia still lacks competent contractors and skilled construction workers (Abdul-Rahman et al., 2006) as there are no formally structured apprenticeships for the new workforce to learn and improve their skills for construction trades. Further, the rapid growth of the construction industry in the country has attracted unskilled migrant workers from neighbouring countries such as Indonesia, Myanmar, Vietnam, India, China and Bangladesh, whereas the local workforce stays away from the less desirable working conditions and lowly paid work offered in construction (Marhani et al., 2012). Many of these migrant workers are not vocationally trained for the trades; they usually learn-on-the-job. This has resulted in the poor workmanship and low quality of the construction works (Foo, 2015) which is one of the biggest problems facing housing developers as quality issues represent the key dissatisfaction of homebuyers in Malaysia: - Developers are unable to deliver quality completed properties as promised (Foo, 2015). Further, since most of these properties are sold off-plan; buyers have no opportunity to assess the quality of work before the purchase agreements are signed. To counter this problem the Malaysia Housing Control Authority in 2007, has increased the defect liability period from 18 months to 24 months to give homebuyers longer protection against defective works upon the handover of properties.

1.5.2 Security of Payment Act 2012

Poor payment practices by project owners is also another major cause for concern in the construction industry in Malaysia and elsewhere (Sambasivan and Soon, 2007; Toor and Ogunlana, 2008; Ye and Rahman, 2010), often projects were slowed down or abandoned during the construction stage due to delays or lack of payment received for work completed by contractors. As a result, in order to protect the interest of contractors, the government enacted the Security of Payment Act 2012 (Malaysia, 2012) similar to those in Singapore, Australia and the United Kingdom, to provide contractors an avenue to claim against project owners for late payments and an option to stop work. However, as this Act is still relatively new in Malaysia, its effectiveness has yet to be seen.

1.5.3 Procurement preference in Malaysia

According to Shehu (2014), the construction industry in Malaysia still favours the use of the traditional procurement method using the fixed price contract as shown in Table 1.1. As shown in the table below, the traditional procurement method (291 projects) is the most preferred procurement route for all the categories as compared with the design and builds (58 projects) and project management (9 projects).

Table 1-1 Preferred Procurement Method in the Malaysian Construction Industry (Shehu et al., 2014b)

Class Range %	Traditional Freq.	%	Design & Build Freq.	%	Project Management Freq.	%
<0	124	42.6	26	44.8	1	11.1
0	6	2.1	3	5.2	0	0.0
0.1- 5	51	17.5	18	31.0	4	44.4
5.1 – 10	37	12.7	3	5.2	3	33.3
10.1 – 20	51	17.5	2	3.4	0	0.0
20.1 – 30	10	3.4	2	3.4	1	11.1
>30	12	4.1	4	6.9	0	0.0
Totals	**291**	**100**	**58**	**100**	**9**	**100**

According to the literature, these traditional fixed price contracts where often the contractor' with the lowest price tender is awarded the project, have caused a high number of project delivery problems such as time overrun, cost overrun (Abdul Rahman et al., 2013; Al-Tmeemy et al., 2011), poor quality of works, disputes, arbitration, litigation and total abandonment according to Sambasivan and Soon (2007).

Alongside the project delivery problems caused by procurement choices a significant number of problems in project deliveries were caused by inadequate care in the contractor selection exercise. As shown in the Table 1.2, the top causes of delays in the Malaysian construction industry apart from the clients' late payment for the completed works, are; 1) the contractor's improper planning, 2) the contractor's site management, 3) inadequate contractor experience, 4) labour supply problems highlighted in bold in Table 1-2. Therefore, careful selection of qualified contractors is important to ensure positive outcome from the outsourcing exercise.

Table 1-2 Ranking of Causes of Delays in Malaysia Construction Industry (Sambasivan & Soon, 2007)

Causes of delays	Percentage of respondents scoring					RII	Rank
	1	2	3	4	5		
Client related							
Finance and payments of completed work	3.6	4.0	23.3	38.0	31.3	0.780	4
Owner Interference	3.3	8.7	40.0	37.3	10.7	0.687	20
Slow decision making	2.0	7.3	31.3	41.3	18.0	0.732	13
Unrealistic contract duration and requirements imposed	5.3	10.7	42.0	32.0	10.0	0.661	24
Contractor related causes							
Subcontractors	0.0	7.3	25.3	42.0	25.3	0.771	5
Site management	**0.7**	**2.0**	**20.0**	**44.7**	**32.7**	**0.813**	**2**
Construction methods	2.0	9.3	32.0	44.0	12.7	0.712	15
Improper planning	**1.3**	**4.0**	**15.3**	**44.7**	**34.7**	**0.815**	**1**
Mistakes during construction stage	0.0	8.0	31.3	36.7	24.0	0.753	10
Inadequate contractor experience	**0.0**	**7.3**	**25.3**	**36.0**	**31.3**	**0.783**	**3**
Consultant related causes							
Contract management	0.7	17.3	34.7	31.3	16.0	0.689	19
Preparation and approval of drawings	0.0	6.7	48.0	31.3	14.0	0.705	16
Quality assurance/control	0.0	14.7	44.7	31.3	9.3	0.671	22
Waiting time for approval of tests and inspection	1.3	14.0	44.0	30.0	10.7	0.669	23
Material related causes							
Quality of material	0.0	9.3	29.3	46.7	14.7	0.733	12
Shortage in material	0.0	7.3	28.0	36.7	28.0	0.771	6
Labour and equipment category causes							
Labour supply	**2.7**	**7.3**	**18.0**	**52.7**	**19.3**	**0.757**	**7**
Labour productivity	1.3	10.7	24.7	40.7	22.7	0.745	11
Equipment availability and failure	0.7	9.3	27.3	37.3	25.3	0.755	8
Contract related causes							
Change order	0.7	14.0	38.7	38.0	8.7	0.680	21
Mistakes and discrepancies in contract document	0.0	16.0	29.3	41.3	13.3	0.704	17
Contract relationships related causes							
Major disputes and negotiations	0.7	10.0	36.7	36.7	16.0	0.715	14

Inappropriate overall organizational structure linking to the project	0.0	14.7	48.0	39.3	8.0	0.661	25
Lack of communication between the parties	0.0	7.3	28.7	43.3	20.7	0.755	9
External causes							
Weather condition	2.7	20.0	34.0	38.0	5.3	0.647	27
Regulatory changes	3.3	20.0	34.0	30.0	12.7	0.675	26
Problem with neighbours	4.0	20.7	44.7	26.7	4.0	0.612	28
Unforeseen site condition	1.3	13.3	33.3	42.7	9.3	0.720	18

1.6 Research question

As shown above, the careful selection of contractor is essential in order to produce better delivery outcomes. The question is how do housing developers in Malaysia select their contractors? As explained (Section 1.5), Malaysia is a developing country; the construction industry still suffers from a lack of competent construction personnel and management expertise. Incompetent contractors often cause delays and cost overrun in the projects due to a lack of cash flow, past similar project experience, and shortfalls in the organisation's expertise such as technically competent, work planning, and qualified site personnel. Further, the practice of submitting extremely low bids one of the most cited causes of delays and project abandonment (Frimpong et al., 2003; Le-Hoai et al., 2008; Shehu et al., 2014a) Therefore, it is important that the developer as the project owner assesses the contractor's capabilities carefully before awarding the project, hence, the issues of contractor selection.

Three research questions have been developed to explore this further

Research question 1: How do the relationships between developers and contractors affect the selection procedure?

Selecting a contractor is an important undertaking that has a significant bearing on the success of a project (Lingard et al., 1998). Contractor selection procedures such as prequalification is a pre-selection exercise of selective tender bids or negotiation (Russell and Skibniewski, 1988) where only those qualified are invited to bid. In order to achieve the objectives of the prequalification, developers will have to produce a set of selection criteria, usually based on the developer and project requirements. However, the prequalification exercise consumes time and resources and it is often the case that due to a lack of these resources, some developers may simple opt to reuse contractors that they have past experience with before. The tender can then be negotiated with one or two tenderers without prequalification or involvement of other parties. Nevertheless, several studies (Bani Hashemi Chaharom, 2014; Eriksson, 2008a; Pinto et al., 2009), the authors argued that better relationships between project owners and contractors, can potentially produce better project

outcomes. Therefore, the relationship between developers and contractors may affect the contractor selection procedure particularly where the relationship between the parties effectively substitutes the formal selection procedure (Poppo and Zenger, 2002) by prequalification and other methods. The questions are stated in Section B5 of the questionnaire survey. For the prequalification criteria, issue such as tender price, financial standing and main contractors' expertise are important to ensure the tenderers have the sufficient resources and capabilities to complete the project for which they tendered. Hence Research Question 2 follows;

Research question 2: How do the contractor's tender price, financial standing and expertise affect the selection procedure?

According to literature in traditional tender bids, price has a positive impact on the selection; the higher the price the less likely it is the tenderer will be selected and the lower the price, the more likely it is the tenderer will be successful in the so-called "lowest-price wins" practice (Wong, 2001). However, there is a difference between the low initial cost tendered and the high final cost upon project completion (Wong et al., 2000). Therefore, there is a clear need for a multi-criteria tender evaluation to take into consideration criteria such as the contractor's financial standing, past experience and management capabilities, etc. The research questions are stated in the Section B2, B3, and B4 of the questionnaire survey. Further, a contractor with good financial standing will help to ensure the subcontractors and suppliers are paid on time and in return that they (the subcontractors and suppliers) will deliver their works and products as agreed. In addition, successfully completed past similar projects will suggest that the contractor is familiar with the construction planning and methods for the new projects. In order to implement the selection criteria above, one of the key questions concerning this study is whether the developer in Malaysia would carry out prequalification in the contractor selection exercise.

Research question 3: Do housing developers in Malaysia carry out contractor prequalification as part of their contractor selection procedure?

According to Russell and Skibniewski (1988), prequalification is a pre-selection exercise of selective tender bids where only those qualified are invited to bid. However, in Malaysia, prequalification is not widely practiced, so research question 3 seeks to establish from the respondents (i.e. Malaysia housing developers) whether they carry out contractor prequalification as part of their contractor selection procedure. The detailed questions asked are stated in the questionnaire survey Section B1.

1.7 Buyer and supplier relationships in business to business interactions

Further, apart from the contractor selection criteria problem, according to the authors of several studies, the industry has been known for the arm's-length relationship between the project owner and contractor, characterised by a lack of cooperation and trust, hostile and poor customer focus, or disputes leading to litigation cited among other weaknesses (Rahman and Kumaraswamy, 2004; Larson, 1995; Yang et al., 2012; Egan, 1998; Latham, 1994). The traditional procurement route such as design-bid-and-build, where the design functions were separated from the contractor, must take a large portion of the blame (Latham, 1994). Since the parties are engaged in a project based - 'arm's length' relationship, the constant replacement of contractors in construction creates particular cost inefficiencies, low productivity, an incapability to innovate or improve time and cost overrun, and all low quality work and low customer satisfaction. Hence, there is a real need for a change in working procedure, attitudes and behaviours in order to increase the chances of better project outcomes according to Latham's report (1994).

An additional challenge of the project based industry are the house building industry's project teams whose work is based on temporal collaboration set up for a particular project and whose focus may be on short-term gain, in other words, the parties involved will attempt maximise the profit they can get out from the on-going contract leading to opportunism (Cox and Thompson, 1997; Eriksson, 2007b). Further, as highlighted by these researchers in today's highly competitive markets, the buying firms are more dependent on their suppliers (Krishnan et al., 2006) as buying firms are increasingly exploring ways to leverage on the supply chain (Kannan, 2006; Cannon and Perreault Jr, 1999) and to improve their business efficiency and effectiveness of both their marketing and procurement efforts (Cannon and Perreault Jr, 1999). Therefore, the buyer's relationship with the supplier is becoming ever more important due to extensive outsourcing. Forging close relationships with contractors will help buyers (developers) to improve project outcomes. Developers and contractors relationship will be explored in more detail in Chapter 2 and 3.

1.8 The conceptual model

The overall theme of this study is the contractor selection criteria, the influence of relational norm - cooperative norms and trust norms on contractor selection (Pesämaa et al., 2009) and the effects of price, and prequalification criteria – finance, past experience and expertise on contractor selection (Watt et al., 2010a) are shown in Figure 3 – 1. The conceptual framework helps to organise this study research theory from the literature in a diagram and

clearly identifies all the variables involved. The literature (explored in Chapter 2) offers six independent variables; price, trust norms and cooperative norms, finance, past experience and expertise. Four dependent variables derived can be from norms, expertise, prequalification and selection. Refer to Section 3.1 for an explanation and justification of the choice of independent and dependent variables. The two theoretical frameworks proposed are; 1) Transaction cost economics and 2) Relational norms.

1.9 Theoretical frameworks

This study is concerned with contractor selection and the effects of relational norms, price and prequalification on that selection. The frameworks proposed are; 1) Transaction cost economics (Williamson, 1985; Carson et al., 2006; Jeffries and Reed, 2000; Yang et al., 2012), along with supplier selection (De Boer et al., 2001; Kannan, 2006; Spekman, 1988; Wuyts and Geyskens, 2005; Yang et al., 2012). Transaction cost economics is the cost of doing business, motivated by economic self-interested entities; it includes the costs for specifying, monitoring and enforcing the contract (Williamson, 1985) and it is a common theoretical framework for investigating procurement such as make or buy decisions and interorganisational relationships in general (Aulakh et al., 1996; Eriksson and Laan, 2007) and in construction (Winch, 1989). 2) Relational norms (Morgan and Hunt, 1994; Dwyer et al., 1987; Doney and Cannon, 1997). Based on literature, this study proposed the following framework; relational norms with its two sub-dimensions of trust and cooperative norms have impacts on the selection, this is based on social embeddedness theory (SET) (Granovetter, 1985). SET points out the importance of social relations that are embedded in the exchanges. Granovetter (1985) applied the concept of embeddedness to market societies, demonstrating that even there, "rational" economic exchanges are influenced by pre-existing social ties, hence where buyers trusted their suppliers the relationship could generate greater commitment and cooperation (Morgan and Hunt, 1994) as well as better performance (Dyer and Chu, 2003; Sako, 1998). Cooperative working environments like this can create a mutual interdependent relationship (Dyer, 1997; Krishnan et al., 2006); anticipation of future dealing (Doney and Cannon, 1997) and in value creation (Day et al., 2013). For the effects of norms, relational contracting theory is proposed in the domain of cooperative and trust norms (Cai and Yang, 2008; Eriksson and Lind, 2015; Eriksson, 2008a; Eriksson, 2007b; Eriksson and Westerberg, 2011; Pesämaa et al., 2009) and trust norms (Dwyer et al., 1987; Morgan and Hunt, 1994; Anderson and Weitz, 1989).

▪ Transaction cost economics

Interest in transaction cost economics (TCE) is characterised by its potential to explain the cost of conducting business. Firstly TCE helps to explain the firm's boundary and whether the transaction should be governed vertically or use of market governance, i.e. make or buy proposition (Geyskens et al., 2006). TCE focuses on whether a transaction is more efficiently performed within a firm - hierarchical governance; or outsourced to autonomous contractors - market governance. If the construction client chooses to outsource, there is the question of effective procurement of contractor services, hence, the contractor selection proposition. Secondly, due to market failure, there is increase of transaction costs, i.e. the cost of buying the outside services is more expensive than if the firm were to undertake it through vertical integration.

TCE has also become the predominant theoretical framework for dealing with governance of transactions, based on the assumptions of bounded rationality and opportunism (Eriksson, 2006). Bounded rationality is the limitation in actors' rationality due to restrictions in the human ability to process information (Conner and Prahalad, 1996; Williamson, 1979) in situations where contracts are generally incomplete which could give rise to the hazards of opportunistic behaviour. Opportunism means that actors exhibit malicious self-interest; they will deviate from the contract and the spirit of an agreement when it suits their purpose (Williamson, 1985). The three main characteristics (or dimensions) of TCE are;

- Asset Specificity
- Frequency
- Uncertainty

Asset specificity is the most important characteristic, it refers to the dependence party invested in the transaction-specific investment such as manpower or other assets and the switching cost incurred when the relationship is terminated and another exchange party is chosen. Asset specificity mainly depends on the level of complexity, customisation, and adaptability of the assets required for the exchange. The asset specificity increases with the increase in the level of complexity and customisation. (Heide and John, 1988; Dyer, 1997; Artz, 1999). In the construction industry, both clients and contractors are involved in a transaction-specific investment when the project owner engages a contractor for the project which creates a mutual dependence relationship (Ganesan, 1994) in the exchange. Therefore, it is important that project owners select the 'right' contractor. (see Section 2.4.2 for further explanation)

Frequency refers to how many times the transaction is repeated. This will have effects on the time horizon of the relationship repeated transaction may be governed within the long term relationships and an expectation of continuity of relationship may arise (Noordewier et al., 1990). Frequency also includes the transaction duration and is connected to the time dimension since it regards the measurement of how long each transaction lasts (Macneil, 1978) and according to Williamson(1979) transactions with very long duration can have a recurring character. In construction industry's housing development sector for example, the transactions are repeated from one project to another. For frequently repeated transactions, developers may decide to build instead of buy using their own organisation's capacity as this could more efficient way of governing the projects according to Williamson (1975). More explanation is provided in Chapter 2, Section 2.4.2.

Uncertainty may arise due to unexpected changes surrounding the transaction. This uncertainty could lead to adaptation and safeguard problems (Rindfleisch and Heide, 1997; Williamson, 1985), and it causes problem in measuring the exchange partner's expected output accurately ex post and hence the performance evaluation problem. Thus, this type of transaction require other form of governance. According to transaction cost economics (TCE), collaboration is an intermediate form of hybrid governance between the two ends of governance continuum of vertical integration and market exchange. Collaboration is attractive since it puts more emphasis on governance through relational means in addition to the contractual means (Nyaga et al., 2010) which has the potential to reduce the hazards of opportunistic behaviour and improve the exchange performance (Cao, 2011). Uncertainty in construction transactions mainly originate from the idiosyncratic investment made by the parties. The transaction specific assets experience a "lock-in" effect (Williamson, 1985) that forms the relationship between the parties in the transaction and hence, safeguard against opportunism. Further explanation is provided in Chapter 2.

- **Relational norms theory**

Against the safeguard of opportunistic behaviour, TCE has been criticised for over simplistic view between the market and hierarchical governance (Ghoshal and Moran, 1996). Researchers have argued that TCE overstates the desirability of integration and of explicit contractual safeguards to protect against transaction hazards (Poppo and Zenger, 2002). These views derive from many organisations engaged in collaborative exchanges and relational governance could be a viable alternative to hierarchy when market governance fails (Dyer, 1997). Further, according to Bradach and Eccles (1989), relationship incorporate large informal component in governance, and instead of juridical mechanism, non-juridical mechanisms such as mutual dependence, trust, joint action and fairness maintain the

relationships. This type of governance could alleviate exchange hazards in economic and the sociological realm.

Additionally, according to Macneil (1978, 1985) relational contracting concerns the expectation of future business; this would determine collaborative (non-opportunistic) behaviour. The seller's opportunism is curbed as the contractor is given the incentive of future work which could guarantee a stream of income. Nonetheless, as buyers rely more on the market transaction, firms need to build better safeguards against opportunism. Opportunism encompasses a wide range of specific behaviours, including bargaining failing to fulfil obligations and withholding valuable information. In construction industry, developers and contractors are commonly tied-in by their building contracts. According to Cox and Thompson (1997), the purpose of a contractual relationship is to serve the business objectives and to drive performance according to company's business strategic goals whether in terms of time, cost or quality etc. Therefore, relations must be fit-for-purpose and able to deliver these strategic goals which will be explained in more detail in Chapter 2.

- **Cooperative and trust norms**

In a relational exchange, trust can influence the collaborative relationships and improve outcomes (Doney and Cannon, 1997). For example, buyers and suppliers' cooperation and trust would offer long term benefits to the relationship (Ganesan, 1994) control opportunism (Tangpong et al., 2010) enhance competitiveness and reduce transaction costs (Noordewier et al., 1990). In other words, cooperative norms and trust norms could help to build long term orientation exchanges where both buyers and sellers are expected to benefit in the outcomes which could help to reduce the potential interorganisation exchange problems (Ganesan, 1994). Trust also reduces conflict and enhances channel member satisfaction (Anderson et al., 1994). According to researchers, the higher the trust, the higher the cooperation is expected in the buyers and sellers relationship (Aulakh et al., 1996; Bradach, 1989; Das and Teng, 1998; Dyer and Chu, 2003; Eriksson and Laan, 2007).

In the UK study, Latham Reports (1994) recommended that the construction industry needs to reverse the adversarial relationships that has plagued the industry for so long. Further, the report recommended that project owners and contractors should work more closely such as in a partnership relationship, where collaboration and alliances could help the construction companies achieve a better understanding and expectation of the client's requirements and where it is also possible to forge a long term and closer relationship. This non-price based contractor selection criteria such as the developers and contractors relationship could help to break the tradition in the project based procurement. Cooperative and trust norms form part of the relational theory which will be explained in more detail in chapter 2.

1.10 Methodology

This is a study on contractor selection, selection criteria, the impacts prequalification, price and relationship on selection process. Interorganisational interactions between developers (buying organisations) and contractors (selling organisations) were chosen as the empirical setting. In order to obtain data from large number of informants (Remenyi et al., 2000), i.e. for an industry wide survey, a questionnaire survey method was selected for this study's data collection. Questionnaire surveys were conducted on the companies registered with the Malaysia Real Estate and Housing Developers Association (REHDA), the body representing developers in Malaysia. The methodology use for this study is explained in Chapter 4.

Further, according to Holt (2010), collecting data through postal survey is one of the most common methods for contractor selection studies (refer to Figure 4-2 for other methods used). The registered companies were first contacted by telephone or emails and asked for the name of the person in-charge of procuring contractors services in their organisation and if there were willing to participate in the survey. A total of 760 firms (2011) were contacted and 545 firms agreed to participate, the breakdown of these firms is provided on Chapter 4.

The data were then subjected to PLS–SEM – quantitative data analysis techniques. Further, the questionnaire survey respondents were stratified into three categories; small, medium and large firms. According to Coase (1937), the firm's size may present different transaction challenges such as the cost of organising the economic transaction (Coase, 1937: 395 -398), firms would have different project requirements and projects objectives and this would affect the choice of selection procedures greatly. In addition, comparing the contractor selection criteria between the different firm sizes, provides an opportunity to cross validate the selection criteria between different groups. Further detailed explanation is provided in Chapter 5.

1.11 Contributions of this study

As discussed in Section 1.3, there are gaps in the existing literature in the area of contractor selection and the impacts of relationship, prequalification and price on selection that this study will address. The results of this study show different size have different effects on price, prequalification and relationship between developers and contractors on selection, for example, the aggregate model shows that price and relationship have small effects on contractor selection whereas prequalification has a medium effect. Selection criteria such as contractor's qualification on financial standing, past experience and company expertise has a large effect on selection. Therefore, the higher the contractors qualification on those criteria, the more likely they are to be selected for the job. In construction management practice, this

study offers an understanding of how housing developers in Malaysia select their main contractors, including their preferred selection criteria. For example based on the questionnaires survey results, developers pay less emphasis on price and relationship but prefer the use of prequalification in the contractor selection exercise. These results could assist developers in selecting the right contractors for their projects in the procurement exercise. Further explanations are provided in Chapter 5 and 6.

1.12 Limitations of the research

This study was based on empirical work through a questionnaire survey on one side of the dyad i.e. the housing developers (buyer) but the views of contractors (suppliers) were not considered. Further, with a respondents' size of 155 and questionnaire survey carried out for a single industry (the residential building industry) in Malaysia; the result of this study cannot claim a universal generalisability.

This study focuses on supplier selection criteria, i.e. whether the contractor selection is based on price, the relationship with the contractor (such as cooperative norms or trust) or the qualification of contractors. This study did not collect data on outcomes of the interaction or performance that resulted from the selection. Therefore, there is no measure of 'goodness' or quality of the resulting development that can be related to the contractor selection variables. More detail is provided in chapter 7.

1.13 The framework for selection criteria

This study adapted the selection criteria from the empirical work of Watt et al (2010a) on relative importance of contractor selection criteria and common criteria used in contractor selection. The selection criteria such as price, contractor expertise, financial standing, past experience were used for this study. However, there are important differences between the studies.

- The different role of construction clients in the studies. This study considers housing developers as the buyers of contractor services solely on residential building in the exchange while in Watt et al.'s (2010) used mixed group of construction clients.
- The industries in the studies are dissimilar – residential housing development with relatively similar or homogeneous products i.e. residential buildings whereas the Watt et al (2010) study focussed on the manufacturing of consumer products.
- The culture and economies. These studies are country based; Australia for Watt's study (2010) and this study is based on Malaysia context.

- Finally, unlike Watt study (2010), this study incorporates other important selection criteria such as cooperative and trust norms which were not considered in Watt et al.'s study.

1.14 The structure of this thesis

The thesis structure adapted the general convention as recommended in Robson's book (2002). This thesis has 7 chapters as illustrated in Table 1 - 3.

Table 1-3 Thesis Structure

Chapter 1 – Introduction - This chapter provides an overview of the study's main components business operations, rationales of this research, research focus, brief accounts of methodology and implications which are elaborated in subsequent chapters, construction industry and procurement in the Malaysian context.
Chapter 2 – Literature Review - Reviews of relevant literature in six sections, the research problem and theoretical framework proposed for this study – transaction cost economics and relational contracting. Provides explanation of procurement in construction industry, contractor selection practices and a review of selection criteria.
Chapter 3 – Research Model and Hypotheses - Describes the seven research hypotheses and presents the research models.
Chapter 4 – Research Methodology - Describes the research methodology, research philosophy, research design, instruments and data collection methodology.
Chapter 5 – Data Analysis – Data analysis using PLS – SEM software and the results presented.
Chapter 6 – Discussion of Findings and Implications - Interpretation of results based on all the seven hypotheses and implications of the results.
Chapter 7 – Conclusions, Limitations and Future Research - The final chapter provides the concluding remarks, the limitation of this study, and recommendations for further studies.

1.15 Summary

This chapter provides an introduction and overview of this study, the research strategy and addresses the issue of contractor selection and the challenges of the Malaysian construction industry. In order to gain the benefits of using contractors' services, housing developers

would have to adopt new thinking in business-to-business relationships when dealing with external suppliers. Developers need to experiment with new approaches to make the relationship with the contractors more productive, increase efficiency and cost effective such as complete quality management or, process reengineering which required coordinated effort across the value chain partners. Additionally, to govern the market transaction, developers would have to find the right strategy for the contractor selection in order to minimise ex-ante and ex-post costs.

The methodology employed and contribution of this study is outlined. During the past decades, marketing managers and researchers have increased attention on buyer-seller relationships and how to improve firms' competitiveness through proper outsourcing particularly on contractor selection in business markets. Generally, the studies conducted in Malaysia; show that the construction clients are still using traditional competitive procurement procedures and price as their ultimate selection in the buying process. Further, the current practice reveal that construction clients prefer arm's length relationship contracts rather than cooperative ones despite the relational theory literature prescribing otherwise (Cai et al., 2011). According to relational theory buyers can rely more on the cooperative forms of procurement methods to overcome the deficiencies in the fixed price and arm's length relationship.

There are discrepancies between the empirically observed behaviours and the theoretical recommendations in the Malaysia construction industry. Firstly, construction clients in Malaysia are still practicing on the lowest price award of contract basis whilst this study supports the multi criteria contractor selection method and not on price criterion alone. Secondly, the results show relationship is an important criterion especially for small developers' in the exchanges. Finally, from the questionnaire survey, prequalification is shown to be an important criterion to help developers to source for better qualified contractors. Therefore, in order to improve the project delivery outcomes as discussed at the beginning of this chapter, developers in Malaysia are recommended to use prequalification and multi criteria selection in sourcing for contractors' services.

The limitations of this study are briefly described in Section 1.12. Further, this study cannot claim universal generalisability because it is limited by the study's intentionally homogenous design sample i.e. development organisations based in Malaysia. This is to help to deliver 'homogeneous' data results good for interpretation. Therefore, by selecting a homogeneity of firms, this research has better control of variables which are not the focus of this study and to support the best possible conditions for theory testing. However, this intentional design has a methodology limitation which excludes a mixture of firms from other types of firms and from different countries and cultures which reduces any claim for generalisability. Secondly,

the limitation focuses on the study's structural model. Chapter 5 explains the models $R^{2\ of}$ independent latent variables satisfactorily explain dependent variables; statistically the significances of relationships in the variables and the generalisability claim of this study provided in Chapter 6.

This study conclusion and future research opportunities are explained on Chapter 7. The future studies considerations are on selection criteria and the role of relational norms explanation offered.

Chapter 2 Literature review

2.1 Introduction

This review aims to frame the underpinning theories in the literature related to contractor selection, prequalification and developers and contractors relationships. The sequence of this chapter is divided into ten interrelated sections; Sections 2.1 – introduction to this chapter. Section 2.2 – presents literature on contractor selection, contractor selection criteria and decision. Section 2.3 – reviews the literature related to project delivery problems. Section 2.4 - review of theoretical frameworks and Section 2.5 - evaluation of transaction cost economics theory. Section 2.6 - review of relational norms theory. Section 2.7 – presents literature on procurement procedures. Section 2.8 – review of contractor selection criteria and practice. Section 2.9 - review of empirical research related to contractor selection and Section 2.10 summaries the chapter.

2.2 Contractor selection

The topic of contractor selection and prequalification has received a lot of interest in construction management research worldwide (Araujo et al., 2015; Cheng and Li, 2004; Hatush and Skitmore, 1998; Holt et al., 1995; Singh and Tiong, 2006; Waara and Brochner, 2006). The main contractor plays an important role in the project outcome, therefore developers need to entrust the responsibility to right the contractors. There is a general agreement among the studies that contractor selection criteria should not be based on price alone (Holt, 1998c; Holt, 1998d; Waara and Brochner, 2006). A multi-criteria prequalification of contractors is an important step towards better contractor selection practices. A 1965 ASCE seminar on contract award practices, identified only the prequalification of bidders as a possibility for protecting capable and established firms as well as giving the client a better over the years - a more economical job (CI:Waara and Brochner, 2006).

Further, the United Kingdom's government mooted an initiative to improve the UK construction industry; Latham's report "Constructing the Team" (Latham, 1994) recommended among other contractual issues that tenders should be evaluated on quality and well as price. Jennings and Holt (1998d) found that contractor selection is based on low price, company experience of similar projects, company reputation, company financial standing, prior business relationship. Similarly, Alzahrani and Emsley study's (2013) on the impact of contractors' attributes on project success cited that the projects' critical success factors that could affect the project performance include; 1) safety and quality; 2) past

performance; 3) environment; 4) management and technical aspects; 5) resources; 6) organisation; 7) experience; 8) size / type of previous projects; and 9) finance. Whereas, according to Holt et al (1994) the contractor selection should be based on the contractors' current workload, their past experience in terms of size and type of projects completed, their management resource in terms of formal training regime, the time of year and weather and, the contractors past experience in terms of catchment. In the United States study, Meng et al (Meng, 2012) proposed that experience, project understanding and approach, organizational structure and capacity, past performance record, professional qualifications, responsiveness to requests for qualification and familiarity with the local environment, legal status were all important attributes of the contractors. Meanwhile Russell et al (1988) proposed that financial situation and experience, failed performance, performance, capacity for assuming new projects and management skills as important contractors attributes. Another questionnaire survey was conducted in Ghana to establish property developers' perception of critical success criteria in mass house building projects (Ahadzie et al., 2008), factor analysis reveals that the potential success selection criteria ranking highest in the study are projects costs; project quality; customer/client satisfaction; project duration; health and safety measures; environmental impact; risk containment; technology. The measurement factor scales identified four clusters namely environmental impact, quality, customer satisfaction and cost and time, criteria which are well supported in the main stream literature (Ahadzie et al., 2008). In Australia's context, Doloi (2009) proposed that project attributes such as on-time project delivery; compliance with the quality specifications; performance to safety requirements; site safety; flexibility in critical activities; personnel availability; similar work experience; overall experience; tender price and estimates; defects liability attitude as the important selection attributes. In Asia for example, a study conducted by Singh and Tiong (2006) investigated the Singapore construction practitioners opinion found that the contracting company's attributes in terms of past performance, financial capability, performance potential and project specific criteria were the important selection criteria. Whereas Chan et al.'s study (2001) in the Hong Kong context proposed that client's competencies, and contractor's competencies were found to be important to bring successful project outcomes and that the contractor's competencies also contributed to project time performance. In another Australian study, Watt et al (2010a) found that apart from the working criteria such as organizational experience, workload/capacity, project management expertise, past project performance, company standing (reputation), technical expertise, method/technical solution, soft parameters such as client-supplier relations were also considered as an important attributes for contractor selection.

Generally, a contractor selection decision is made following the pre-selection activities as not all the contractors declaring their interest to tender have the capacity to perform the job (Holt, 1998d; Jennings and Holt, 1998). To do this, developers have the option of prequalification of contractors to evaluate their abilities (Spekman, 1988) based on contractor capabilities and qualities; based on price (Waara and Brochner, 2006) or reusing the contractor based on their past project relationship (Macneil, 1978). More critically, once contractors have commenced work on site, it is very difficult to replace them or to replace a contractor without incurring time and costs (Eriksson and Laan, 2007). Both the developer and the contractor will have invested in the project and incurred expenses in the work done. According to Williamson's (1985) transaction cost theory, as a result of specific investments made by the owner in transaction - the fear of contractor non-performance is ever present in exchange relationships.

As mentioned in the literature, the contractor plays a very important role in ensuring satisfactory delivery of projects they undertake as they were entrusted by the project's owners' with full responsibility for carrying out the works. It is important for the housing developers as the construction clients to evaluate the appropriate selection criteria for their projects and fit the purpose of the procurement with the project objectives. However, from developers' point of view, due to conflicting perspectives in construction management on selection and qualification criteria, what are the selection criteria that could help them to filter out the 'good' from the 'bad' contractors to ensure better project outcomes? Should contractor selection be based on price?; relationship?; or contractor's qualification?. Further, the methods of selection and procuring the services of a contractor services can be vary from developer to developer. Notably the size of development firms influences the selection methods and decisions (Macneil, 1978). Project characteristic such as the type and size of project are other criteria can affect the selection process. Therefore, there is a gap in the literature that needs addressing.

Project clients urgently require a set of criteria to assess contractors' capabilities because as shown in Section 2.3, projects tend to fail because poorly performing contractors are unable to fulfil their project responsibilities and are likely to cause their projects to delay and costs to overrun. As explained in Eriksson (2006) purchasing's stages, selecting a suitable contractor is of paramount importance, one that has a significant result on the success; effects on the cost of project (Lingard et al., 1998; Al-Tmeemy et al., 2011; Alzahrani and Emsley, 2013; Doloi, 2009); effects on project performance (Holt, 1998d; Alarcón and Mourgues, 2002; Aulakh and Gencturk, 2000; Briscoe et al., 2004; Carey, 2011) and also the avoidance of outsourcing failures (Geyskens I, 2006) and uncertain project outcomes (Watt et al., 2010a).

2.3 Literature related to project delivery problem

Over the last decade, the study of project deliveries has received increased interest (Frimpong et al., 2003; Le-Hoai et al., 2008; Faridi and El-Sayegh, 2006; Sambasivan and Soon, 2007; Assaf and Al-Hejji, 2006). Due to the poor choice of contractors, projects were awarded to contractors lacking in relevant project experience, the lack of financial capabilities and organisation's expertise caused projects to delay and costs to overrun as shown in Table 2 – 1. As reflected in the table, a major factor contributing to a project's time-delay and cost-increase was contributed by issues such as insufficiency of contractor's cash-flow, contractors' inexperience leading to poor planning of work, and lack of organisational expertise. From the Table 2 -1, it is evident that these contractor deficiencies caused the majority of project delivery problems for all the projects cited in Koushki et al.'s study (2004). Therefore, a contractor selection exercise involves a multi-criteria decision process that requires firm to leverage competing objectives and limited resources when making their decisions (Watt et al., 2010a; Liu et al., 2014a).

Table 2-1 Comparison of studies in Major Causes of Delay and Cost Overrun in Construction Projects- Developed from Toor and Ogunlana (2008)

	Major Causes					Author
	1	2	3	4	5	
Vietnam (a)	Poor site management and supervision	Poor site management and supervision	Financial difficulties of owner	Financial difficulties of contractor	Design change	(Le-Hoai et al., 2008)
Malaysia (b)	Improper planning	Site management	Inadequate contractor experience	Finance and payments of completed works	Subcontractors	(Sambasivan and Soon, 2007)
Jordan (b)	Financial difficulties faced by the contractor	Too many change order from the owner	Poor planning and scheduling by the contractor	Presence of unskilled labour	Shortage of Technical professionals with the contractor	(Sweis, 2013)
South Korea (b)	Public interruptions	Changed site conditions	Failure to provide site	Unrealistic time estimation	Design error	(Acharya et al., 2006)
Hong Kong (b)	Inadequate resources due to contractor / lack of capital	Unforeseen ground conditions	Exceptionally low bids	Inexperienced contractor	Works in conflict with existing Utility	(Lo et al., 2006)
UAE (b)	Preparation and approval of drawings	Inadequate early planning of the project	Slowness of the owner's decisions making process	Shortage of manpower	Poor supervision and poor site management	(Faridi and El-Sayegh, 2006)
Nigeria (b)	Contractor's financial difficulties	Client's cash flow problem	Architects incomplete drawing	Subcontractor's slow mobilization	Equipment breakdown and maintenance problem	(Aibinu, 2006)
Saudi Arabia (b)	Changes in orders by owners during construction	Delay in progress payments	Insufficient planning and scheduling	Shortage of labour	Difficulties in financing contract	(Assaf and Al-Hejji, 2006)
Kuwait (b)	Change orders	Financial constraints	Owner's lack of experience	Materials	Weather	(Koushki et al., 2005)
Kuwait (c)	Contractor	Materials	Financial constraints	Change order	Weather	
Ghana (a)	Monthly payment difficulties	Poor contract management	Material procurement	Inflation	Contractor's financial difficulties	(Frimpong et al., 2003)

	Major Causes					Author
	1	2	3	4	5	
Jordan (b)	Poor design	Changes in orders/ design	Weather	Unforeseen site conditions	Late deliveries	(Al-Moumani, 2000)
Saudi Arabia (b)	Cash flow problem financial difficulties	Difficulties in obtaining permits	“Lowest bid wins” system			(Al-Khal, 1999)
Lebanon (b)	Owner’s more concern in financial issues	Contractors regarded the contractor relationship the most important	Consultant considered project management most important			(Mezher and Tawil, 1998)
Saudi Arabia (b)	Slow preparation and approval of shop drawings	Delays in payment to contractors	Changes in Design / Design errors	Shortage of Labour supply	Poor workmanship	(Assaf et al., 1995)
India (b)	Lack of commitment	Inefficient site management	Poor site coordination	Improper planning	Lack of clarity in project scope	(Doloi et al., 2012)
Singapore (b)	Site management	Coordination among various parties	Availability of labourers	Experience of contractors	Financing by contractor during construction	(Hwang et al., 2013)

Note:
(a) Delay and cost overruns (b) Delays only (c) Cost overruns only

Figure 2 -1 provides a summary of reviews of literature for this study.in a diagram.

- Firstly, this study is focused on contractor selection and the effects of selection criteria such as price, prequalification and cooperative and trust norms on selection. Literature on contractor selection is discussed.
- Secondly, literature on outsourcing is discussed and possible theoretical frameworks are reviewed; i.e. 1) transaction cost economics; 2) supply chain management, and 3) agency theory.
- Thirdly, TCE is reviewed together with an explanation on why TCE is selected. Further, this review examines the theory description on make or buy; the governance mechanism and the behaviour safeguard or opportunism (Williamson, 1979; Williamson, 1996; Williamson, 1973; Dwyer and Oh, 1988; Geyskens et al., 2006) issues.
- Fourthly, the review deals with relational norms, in the buyer and supplier interaction (Arranz and Arroyabe, 2012; Cannon et al., 2000; Berthon et al., 2003; Heide et al., 1992). The relational norms in the domain of cooperative norms and trust norms (interorganisation trust) between the buyer and sellers were the focus of this study
- Fifthly, discussion on procurement procedures for contractor services (Bajari and Steven, 2001; Eriksson and Westerberg, 2010; Spekman, 1985) and the selection criteria.
- Sixthly, a review of selection criteria, prequalification, price, contractors financial standing, past experience, contractor expertise and contractor selection practices were presented.
- Lastly, a review of an empirical work by Watt et al (2010a) on the relative importance of contractor selection criteria and common criteria used in contractor selection provides a framework for the selection criteria.

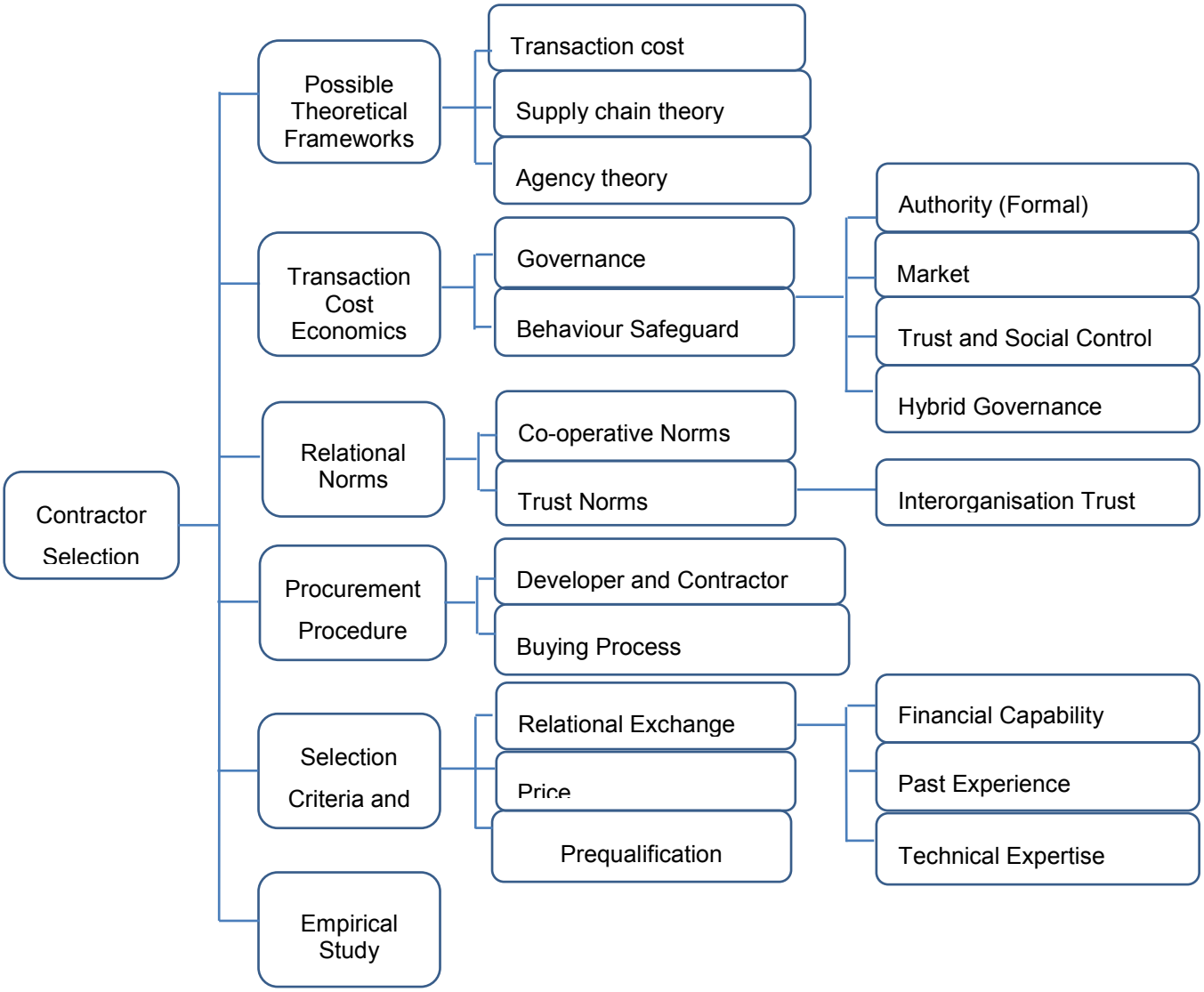


Figure -2-1 Structure of literature review

2.4 Theoretical frameworks

2.4.1 Introduction

According to Robson (2002), a theory is a proposed explanation for phenomena whereas theoretical frameworks are used to introduce and describe the theory and explain why such research problems uncovered in a study exist (Swanson and Chermack, 2013). The framework thus provides the structure to hold and support a theory under research.

The possible theoretical frameworks reviewed for this study are:

- Transaction cost economics
- Supply chain management
- Agency Theory

2.4.2 Transaction Cost Economics

Transaction cost economics (TCE) (Williamson, 1985; Williamson, 1979; Williamson, 1975) is a common theoretical framework for investigating the decisions in procuring contractor services (Cannon and Perreault Jr, 1999; Winch, 1989; Yang et al., 2012). TCE is essentially the cost of doing business, motivated by economic self-interested entities; it includes the costs for specifying, monitoring and enforcing contract (Williamson, 1985). In the construction industry for example, these costs include the detailed specifications, close monitoring and frequent negotiation contracts (Eccles, 1981; Winch, 1989). A construction client may choose to make and build all building components with in-house capabilities without involving any outside contractors. Where contractor selection is not necessary, this is known as vertical integration in TCE.

In vertical integration clients execute their own projects with the help of in-house project team similar to an external construction firm. This arrangement reduces the operational costs such as contractor evaluations and negotiating contracts because the works are awarded automatically within the company. However, in vertical integration, developers may not enjoy the market economisation of production costs which could lead to a higher cost of production and also often the fluctuation of workload for the employees which can lead to manpower problems within the organisation. An alternative approach is for developers to opt to outsource the whole project to an independent contractor entity known as market governance. In outsourcing the works, the developer will be required to affect its resources to handle procurement exercises such as pre-contract - prequalification, bid invitation and evaluation, negotiation and award of the project and post-contract - monitoring of the contractor's work and performance. Developers may enjoy the market economisation of production costs and lower costs of production as well as flexible manpower management. Nonetheless, in practice, due to bounded rationality, limited knowledge caused by imperfect information, and behavioural uncertainty, developers may not be able to economise on transaction costs fully by outsourcing. Frequently, due to the idiosyncratic nature of the transaction where the transaction has no value outside the relationship, market governance may give rise to safeguarding problems where one party to the relationship may act opportunistically and exploit the other vulnerable party.

2.4.3 Supply Chain Management

Supply chain management (SCM) is a concept that originated and thrived in the manufacturing industry. It was developed from innovations such as just-in time (JIT), it forms a part of the Toyota Production System in car manufacturing, and the field of quality control and total quality management (TQM). Now, it has become a buzzword in the field of operation management. Although a number of scholars have provided contributions to the understanding of SCM, there is a lack of agreement among researchers, consultants and practitioners on the precise definition of SCM. Generally, SCM can be defined as an integrative philosophy to manage the total flows of the entire business process.

From the literature, the supply chain in construction industry is known as construction supply chain (CSC) (Xue, 2007). According to Xue et al (2007), CSC is not a chain of construction businesses with business-to-business relationships but a network of multiple organisations and relationships, which includes the flow of information the flow of materials, services or products, and the flow of funds between client, designer, contractor and supplier. The construction process is initiated by owners or construction clients; with the help of designers to produce the building design the general contractor (GC) and subcontractors and suppliers involved in carrying out the construction works before handover to the owner on completion of the project, as shown in Fig. 2-2.

CSC management emphasizes long-term win-win, cooperative relationships between the stakeholders with the ultimate goal being to improve construction performance and add client value at less cost (Xue, 2007).

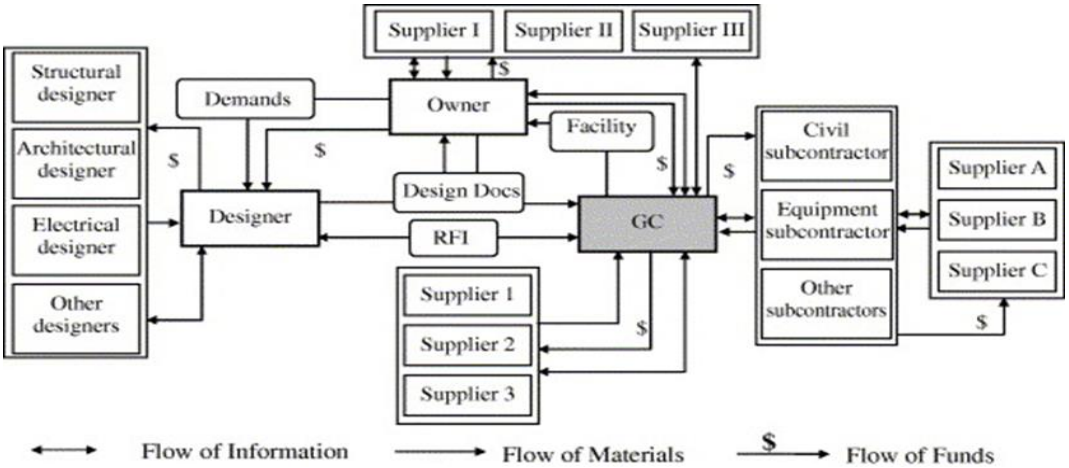


Figure 2-2 – Construction supply chain (Xue, 2007)

The construction “factory” is set up around the single product (Vrijhoel and Koskela, 2000), in contrast to manufacturing systems where multiple products pass through the factory and are distributed to many customers. It is a temporary supply chain producing one-of-its-kind construction projects; as a result, the construction supply chain is typified by instability, fragmentation, and especially by the separation between the design and the construction of the built object. The construction supply chain is also usually a make-to-order supply chain, with every project creating a new product, with variation in size and design. In housing projects for example, there may be similarity in house design but ultimately, the site conditions are different for each project as well as the subcontractors and suppliers involved. Further, construction projects involve large numbers of special labourer such as carpenters, bricklayers, plumbers, electricians, painters, roofers, dry-wallers, sheet metal workers, glazers and general labourers, and at any one point of time a number of these subcontractors will be working simultaneously on the project. Therefore, coordinating the works of these labourers is a complex task.

From the property development perspective, the whole supply chain may be divided into several tiers. The main contractor is the first-tier supplier that links the upstream client and the downstream specialist contractors. Specialist contractors are the second-tier suppliers and labour, materials and equipment suppliers form the third tier of suppliers (Meng et al., 2011). In this study the focus is on the first-tier supplier and the upstream client; the developer.

SCM has the potential to improve coordination among the participants and enable integration of construction business processes with proper planning between companies as construction industry has for a long time been characterised with fragmentation and poor coordination among project participants caused by high outsourcing activities and their interorganisation relationships. However, unlike TCE, supply chain theory unable to provide explanation on make or buy decision, hence, the contractor selection problem. SCM focusses on interaction

and coordination among the participants. There are many interorganisation problems in construction such as inaccurate information transfer and wrong deliveries in terms of quality and time for which supply chain theory could not demonstrate testable hypotheses. TCE goes on to identify the critical dimensions with respect to which transactions differ. These include: (1) the frequency with which they recur, (2) the degree and type of uncertainty to which they are subject, and (3) the condition of asset specificity that affects the interorganisation exchanges (Williamson, 1979). TCE then considers the implication of these dimensional differences – asset specificity, frequency and uncertainty. Particularly the dimension of asset specificity the careful choice of contractor will help to reduce transaction costs - is core to this study.

2.4.4 Agency theory

Agency theory was originated in the 60s and 70s by the economists explored risk sharing among individuals or groups (Arrow, 1971; Wilson, 1968; Eisenhardt, 1989) and has been used by the scholars in the fields of finance, marketing, political science and organizational behaviours (Eisenhardt, 1989).

Agency relationship was defined by Jensen and Meckling (Meckling, 1976) as a contract under which of one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision authority to the agent. The principal is the dominant partner in this relationship, whereas, the agent is working for principal where the principal does not actually get involve. In the case of the current research the developer (Owner) is the principal and the contractor its agent. The principal would have to trust the agent working for his interest and the cost is the asking of the agents. According to Bergen et al. (1992), the focus of the theory is on determining the most efficient contract to govern a particular relationship given the characteristic of the parties involved and the fact that environment uncertainty and the cost of obtaining information make it impossible for the principle to monitor the agent completely, therefore, agency cost is asking the agent to do the right job. In current research context, property developers is asking contractors to act as their agents and to carry out construction projects on their behalf based on the agreed contract sums.

Conflict arises in principal-agent relationship because moral hazard, adverse selection and asymmetry of information underlie the theory. Therefore, given that both parties in a relationship are "utility maximisers" there is no guarantee that the agent will always act in the best interests of the principal (Jensen and W.H., 1976). In the transaction cost theory, there is a cost of monitoring by the principal on the agent's work, for example developers would have to monitor contractors' output to ensure that they carry out the work according to the agreed delivery time, order accuracy and product quality (Heide et al., 2007a).

Agency theory focuses primarily on self-interested human nature as shown in Table 2-9, in the principal-agent interaction and the use of formal controls (contracts) to explain the exchange rather than on the account of social embeddedness, therefore, contractual relations are the most important element of the firm, not only with employees but with suppliers, customers, and creditors.

Table 2-2 - Agency Theory Overview - K. M. Eisenhardt (1989)

Unit of analysis	Contract between principal and agent
Human assumptions	Self-interest Bounded rationality Risk aversion
Organisational assumptions	Partial goal conflict among participants Efficiency as the effectiveness criterion Information asymmetry between principal and agent
Information assumptions	Information as a purchasable commodity
Contracting problems	Agency (moral hazard and adverse selection) Risk sharing
Problem domain and goals	Relationships in which the principal and agent have partly differing risk preferences (e.g. compensation, regulation, leadership, impression management, whistle-blowing, vertical integration, transfer pricing)

There is similarity between agency theory and TCE (Williamson, 1975). The theories share assumptions of self-interest and bounded rationality and comparable dependent variables hierarchical that similar to behaviour-based contracts and markets correspond to outcome based contracts. There are dissimilar properties in economics where TCE concern with

organisational boundaries whereas agency theory concern with contract between cooperating parties, regardless of boundary. The unique difference in these theories is the independent variables. In TCE the independent variable are asset specificity and small numbers bargaining and whereas in agency theory there are the risk attitudes of the principal and agent, outcome uncertainty and information systems (Eisenhardt, 1989);

• Goal congruence when interest diverges.

• Appropriate incentive to ensure performance.

• Alignment of attitude to risk and uncertainty.

• Monitoring and remunerating performance.

Further these normative aspects of agency relationships are more likely to entice the agent to make choices which will maximize the principal's welfare (Jensen and Meckling 1976).

The parallel between agency theory and TCE is their fundamental assumptions of *opportunistic behaviour* by economic agents and the constraints of *bounded rationality*. In fact, Williamsons (1981b) stresses that but for the simultaneous existence of both bounded rationality and opportunism, all economic contracting problems are trivial.

In agency theory, there are the risk attitudes of the principal and agents, outcome uncertainty, and information systems. Where, the transaction is the basic unit of analysis in TCE, the individual agent is the primary concern of agency theory. Having focused on the transaction, TCE goes on to identify the critical dimensions with respect to which transactions differ. These include: (1) the frequency with which they recur, (2) the degree and type of uncertainty to which they are subject, and (3) the condition of asset specificity Williamson (1993b, p. 93). TCE then considers the implication of these dimensional differences, particularly asset specificity, for the design of appropriate governance structure for the transaction. In contrast, agency theory's focused on the agent emphasising the impact of (1) characteristics differences of individuals, and (2) differences in incentive stimuli, across the principal-agent dyad. These may help to build trust and commitment which in turn form the basis of supportive norms (Bergen et al., 1992). However, since relational norms have been accounted for by the conceptual reasoning of Macneil (1978, 1980), the conceptual model of Dwyer *et al*. (1987) that developing buyers and suppliers relationship can help to improve performance and empirical support from Heide and John (1992) where supportive norms play an important role in structuring more efficient economic exchange, agency theory is unable to contribute greatly to the current study interests.

Finally, a crucial difference between the two theories is stressed by Perrow (1986), in his view TCE, unlike agency theory, has an explicit prescription for a well-defined problem, which is where asset specificity is great, buyer and seller that will make special efforts to design an exchange relation that has good *continuity properties* (Williamson, 1981b, p. 1546).

In summary, from the review of three theoretical frameworks above, TCE was found to be the most relevant theory to explain this study in contractor selection and selection criteria. The supply chain management theory and agency theory are incomplete to examine the problems of contractor selection as they do not provide testable to hypotheses to the problem being examine.

Further, transaction cost provides the explanation on make or buy decision, the specific dimensions of asset specificity, frequency and uncertainty in the interorganisation exchanges. Further according to Heide and John (1988) TCE has emerged as a primary framework for identify governance concept and 'under which kind of governance structure are transactions performed most efficiently'. Therefore, in next section, TCE theory is review in more detail on how the TCE theory framework could help to explain the phenomenon related to this study.

2.5 Transaction cost economics

Transaction cost economics (TCE) are the costs related to carrying out business, motivated by economic self-interested entities; it includes the costs for specifying, monitoring and enforcing contract (Williamson, 1985). Williamson's book 'Market and Hierarchies' (1975) served as the base from which the theory of TCE was developed (Rindfleisch and Heide, 1997; Williamson, 1975; Williamson, 1985). The basic proposition of TCE has its origins in Coase's (1937) classic article, 'The Nature of the Firm'. In the article he described markets and hierarchies as alternative governance structures with the choice between markets and hierarchies determined principally by differences in transaction costs, i.e. if a product is cheaper to produce by the market exchange, then the firm should outsource and vice-versa, hence, the existence of the firm. However, the difficulty in directly measuring transaction costs rendered Coase's article being "much cited and little used" (Coase, 1972).

TCE is a common theoretical framework for investigating procurement and inter-organisational relationships both in general (Aulakh et al., 1996; Eriksson and Laan, 2007; Heide et al., 2007b) and in construction (Winch, 1989; Geyskens et al., 2006; Ghoshal and

Moran, 1996; Yang et al., 2012). The detailed specifications typical in construction projects, close monitoring and frequent negotiation contracts are examples of transaction costs (Eccles, 1981; Winch, 1989). The relevant characteristic here is the transaction between construction clients and contractors i.e. the construction client could choose to 'make' and build in-house or outsourced all the construction works to a contractor. Further, according to Waara and Brochner (2006) another advantage of relying on TCE is that it makes it possible to consider the use of non-price criteria applied by the project owners before the awarding contracts. According to Geyskens (2006), the operationalisation problem of TCE was resolved by Williamson or more predictively (Madhok, 2002) where Williamson demonstrated that testable hypotheses could be developed by associating the relative efficiency of alternative governance structures with observable dimensions of transactions, namely, asset specificity, uncertainty and transaction frequency.

Asset specificity refers to the act of tailoring specific transaction or service to a specific transaction that cannot be easily redeployed or has no value outside the relationship of the parties to the transaction. Due to this idiosyncratic nature of transaction such as asset specificity, it gives rise to a safeguarding problem where one party of the relationship may act opportunistically and exploit the other vulnerable party. In the construction industry, once contractors have commenced work on site, any switching of the contractor will incur extra time and costs (Erik Eriksson and Laan, 2007) this is the result of specific investments made by the owner in TCE (Williamson, 1985). More critically, the asset specificity created a significant "hold-up" potential which could be exploited opportunistically by the contractor if there is no appropriate safeguard in place (Heide et al., 1992).

Nonetheless, according to Williamson (1985), the solution to this safeguarding problem identified in transaction cost theory is vertical integration where the transaction may be brought under the firm instead of relying on a market transaction. Unlike market governance, hierarchical control procedures are assumed to embody greater safeguarding capabilities although authors like Moran & Ghoshal (1996) disagree with these propositions. These authors believe that Williamson over stated the effectiveness of hierarchical governance and understated the capabilities of market governance.

Second dimension uncertainty arises when either the relevant contingencies surrounding an exchange are too unpredictable to be specified ex ante in the contract (an environmental uncertainty) or when performance of the exchange cannot be easily verified ex post (behavioural uncertainty). For example problems encounter in a construction project such as lack of communication, including strategic non-disclosure, disguise and distortion of

information are all examples of uncertainties (Williamson, 1985) in project environments, which, give rise to safeguarding issue.

The third dimension frequency arises in considering the type of governance structure due to its frequency of transaction (Williamson, 1985). For example, when the volume of transaction is high through specialised production techniques, the investments in the specialised governance structures will be easier to recover for large transactions in recurring kind as compared with when the frequency of transaction is low. For the construction industry, developers with high frequency of building programme, they may choose to make by setting up in-house construction arm to handle the projects.

Further, according to Yang (2012) the governance problems are compounded by the fact that formal contracts are not sufficient to promote the deeper desired changes in attitude because behaviour is not determined simply by formal structures and systems. They are rather the result of conscious choices and actions a complex interplay between structural imperatives and their subjective interpretation and enactment (Yang et al., 2012). Despite the challenges in market governance, the construction industry is still thriving and relies heavily on outsourcing (Yang et al., 2012; Eriksson and Westerberg, 2010; Barthélemy and Quélin, 2006; Broedner et al., 2009; Winch, 1989). In the next section the choice of governance mechanism is reviewed.

2.5.1 Governance mechanism

As explained above, the main characteristic of TCE is the 'make or buy' decision, i.e. should a firm make the product in-house or should it be outsourced? Williamson (1985) referred as modes of governance – organisational hierarchy and market. In making this decision, developers in this study for example, would need to balance the savings made from completing construction works in-house against the result of outsourcing. In outsourcing, the operational costs include the 'search costs', contractual costs (such as writing, monitoring and enforcing a contract) (Qu and Brocklehurst, 2003). If the cost of making exceed the market transaction cost, then it is worth the developer outsourcing the works. In order to outsource effectively, TCE has emerged as a primary framework for identifying governance concepts and 'under which kind of governance structure are transactions performed most efficiently' (Heide and John, 1988: 52) TCE offers three main governance mechanisms (Eriksson, 2006; Williamson, 1985), namely;

1. *Authority* or hierarchy mechanism is described as 'visible hand', adjusting the transaction by giving authoritative orders to the agents executing them (Larsson, 1993). The authority is tasked to regulate and monitor for the achievement of organisation goals. It is a powerful lever for assuring stability and equity (Adler, 2001) but it decreases supplier participation and innovation and stifles commitment and motivation (Aulakh et al., 1996; Das, 2001).
2. *Market* or price mechanism can be illustrated by the 'invisible hand' fluctuation of transaction in relation to the prices as the result from supply and demand (Larsson, 1993). The price mechanism creates incentives and opportunities (Williamson, 1985)
3. *Trust* or social control can be described by the 'handshake', adjusting the transaction in relation to structural agreements resulting from negotiation between organisations (Larsson, 1993). When a transaction is governed by trust, the exchange partners can get what they want from each other without the exercise of authority and without fear of opportunism (Håkansson and Snehota, 1995). Trust can decrease the need for formalisation and monitoring (Adler, 2001) and lower transaction costs (Dyer and Chu, 2011). However, the downside is that trust creates interdependencies with a smaller pool of exchange partners and the burden of relationship (Håkansson and Snehota, 1995), as well as creating rigidity and risks (Adler, 2001).

TCE transactions are mainly governed within these three different structures. Williamson (1985) proposed a model when asset specificity and frequency variables are involved (see Table 2-3).

Table 2-3 - Model for the Choice of Governance Structure – Williamson (1985)

		Asset Specificity		
		Low	Medium	High
Frequency	Occasional	**Market** Purchasing standard equipment	**Trilateral Hybrid** Purchasing customized equipment	**Trilateral Hybrid or Hierarchy** Constructing a plant
	Recurrent	**Market** Purchasing standard material	**Bilateral Hybrid** Purchasing customized material	**Hierarchy** Site-specific transfer of intermediate product

He proposed that purchasing from an independent supplier in perfect competition with others implies market governance when asset specificity is low and frequency is occasional or recurrent. Purchasing is most efficient when standardisation and mass-production make transaction-specific investments redundant (Williamson 1975; 1985). However at the other end of the scale, for production demanding very high and specialised knowledge such as constructing a plant that cannot be used for other purposes, potential scale economies through inter-firm trading are diminished (Williamson 1975). Hence, the exchange should be governed internally within the organisation's hierarchy, especially when the frequency is high (Williamson 1985).

Nonetheless, as mentioned in section 2.2, selecting contractors based on selection criteria alone could not help to safeguard clients' interests from opportunistic contractors due to asset specific investment, uncertainty and incomplete information provided due to limitation of human learning ability (Simon, 1991). Further, as identified in the literature, it is likely that in competitive tendering, contractors submitted unrealistically low bids (Wong et al., 2001) to win the contract, playing to the clients' tradition of placing heavy emphasis on lowest bid price (Sullivan and Guo, 2009). This exposes the client to two possible risks:- Firstly, the risk that the contractor will collapse under financial constraints as they are unable to complete the project due to their extremely low price bid. Secondly, the risk of opportunistic post-contract behaviour by submitting additional work claims to increase the contract price and cause price overruns (Crowley and Hancher, 1995). During post-contract, the contractors' opportunistic behaviours were additionally encouraged by the fact that due to the monopolistic circumstances the client will find it difficult to remove the existing contractor and appoint a new one. Hence, according to TCE and the "hidden agenda" of the contractor, the practice of awarding the contract to the lowest tenderer could in fact attract relatively high transaction costs owing to the level of contracting uncertainty and the prospect of opportunistic behaviours. In the next section safeguarding the opportunistic behaviours are further discussed.

2.5.1.1 Safeguarding behaviour under conditions asset specificity and uncertainty

The TCE dimension of asset specificity investment which is the most significant part of construction transactions, where the asset or works are tailored to a particular transaction made by the parties, thereby holding the invested parties to ransom (Heide et al., 1992). In outsourcing, project owners will have to monitor suppliers' performance in order to mitigate opportunism and achieve the outsourcing objectives. The phenomenon of opportunism

encompasses a wide range of specific behaviours, including bargaining shirking, failing to fulfil obligations, and withholding valuable information.

This is particularly evident in the construction industry where very often the design professionals are unable to provide a complete detail design of all the clients and authorities requirements ex-post. Further, due to this bounded rationality changes take place during the pre-construction and construction stage is a normal occurrence. The element of uncertainty, such as changes in the nature of the works and requirements after the appointment of contractors could facilitate the opportunistic behaviour of contractors. Further, due to reasons such as asset specificity, contractor replacement costs are high and time consuming. The higher uncertainty, the higher the transaction costs in preventing contractor opportunism and monitoring of contractor performance. Therefore, it is important to find the right procurement method and sign the right contract (Håkansson and Jahre, 2005) to minimise the ex-ante and ex-post transaction cost. (Williamson, 1985; Grossman and Hart, 1986). Studies have shown that firms are likely to build cooperative norms as a safeguard for their investment. In Noordewier et. al.'s study (1990) shows that under uncertain conditions, organisations tend to introduce more relational elements into their supply arrangements whereas Cannon et al.'s study (2000) shows that relational norms are more effective at enhancing performance under conditions of higher uncertainty than under lower uncertainty conditions. Based on the above studies, Cai and Yong (2008) theorised that - environmental uncertainty is positively related to cooperative norms. In an environment that lacks alternative contractors for example the more alternative suppliers that exist, the less a buyer is motivated to develop cooperative norms with its supplier. Further, TCE prescribed that the only way of economising on transaction costs in construction would be to increase the contractor's economic incentives to co-operate (Williamson, 1979). The next section reviews the effectiveness of formal contracting. Frequently, contracts are prescribed as the default nonmarket safeguard for dealing with specific assets owing to their purportedly strong ability to constrain opportunism (Carson et al., 2006). However, contracts tend to be inflexible and not well suited to an environment of change.

2.5.1.2 Formal contracting

A formal contract (Williamson, 1975) is a legally binding agreement to exchange goods or services by specifying each exchange partner's roles and responsibilities: they provide a formal governance structure. Formal contracts have traditionally been viewed as legally enforceable safeguards that control partner behaviour, guarantee performance and deter opportunism (Williamson, 1985; Winch, 1989). Further, due to the size of investments in the

building industry (properties represent high investments) and the long duration of delivery period, a formal contract of some form is widely used in construction transactions in accordance with the clients and the project's needs. However, given that these contracts are frequently incomplete, the veracity of contracts as legal safeguards is questionable. Instead, contracts are now cast as a framework for coordinated exchange by clarifying and elaborating the precise objectives and roles and responsibilities in a relationship (Das and Teng, 1998; Carson et al., 2006). Contracts have the effect of narrowing the scope of ex post actions to those specified formally in advance. Further, contracts serve as reference point in evaluating opportunism (Carson et al., 2006) where the duties of the parties are formalised ex ante, making the evaluation of the partner's behaviour easier. In her 2013 book, Mitchell (Mitchell, 2013)(Mitchell, 2013)proposes that commercial contract law should become more relational and that law should take greater account of the context in which the parties made their agreement, the understandings that they derived from that context, and the difficulties that they may have faced in translating those understandings into contract terms that are sufficiently precise to meet the current law's requirements for certainty. Mitchell argues that the parties will frequently have 'commercial expectation' that are derived from previous experience, shared norms or social institutions including commonly accepted practices, including more flexible forms of contracting with reference to partnership loyalty, moral contract and mutual trust. Formal contract or legal origin ((Kim, 1998; Arranz and Arroyabe, 2012) is a form of governance mechanism and through formal contracts, the interorganisation exchanges are regulated and a system of reward and incentives are stipulated (Arranz and Arroyabe, 2012). Further, despite the weakness of formal contracts as governance, according to Arranz (2012) formal contracts and relational norms and trust are both important in mitigating opportunistic behaviour and improving relationship performance in inter-organisational agreements. Therefore, based on literature above, there is controversy regarding the use of formal contracts in governing the relationship in a complementary role or as a substitute. However, for most building contracts, there are some kind contract documents in place to provide information on product specifications, agreed prices and delivery schedule by the contractor. Therefore, formal contracts cannot be substituted but play the complimentary role in developers and contractors relationship as prescribed by Poppo and Zenger study (2002).

Other forms such as hybrid governance, represent a wide range of cooperative arrangements which include long-term contracts, networks and alliances (Heide and John, 1990; Eriksson, 2007b), which may be divided into two main forms bilateral and trilateral hybrids. Their main difference is that the trilateral hybrid relies on third-party assistance to

determine performance and resolve disputes, while the bilateral hybrid is based on private ordering. The bilateral bond based on private ordering is the highest form as the parties would use more cooperative and trust norms in governing their relationship instead of formal contracts order especially when the entire relationship is developed over a time frame that is longer than their original contract (Eriksson, 2007b; Macneil, 1978). The hybrid is most efficient for intermediate degrees of asset specificity, requiring rather high and specific knowledge, for which contractual safeguards are demanded (Williamson 1991). Trilateral governance is appropriate for short-term relationships regarding occasional transactions while the bilateral hybrid is favoured for long-term recurrent transaction relationships (Williamson 1985).

2.5.1.3 The quasifirm governance

Eccles offered another branch of hybrid mechanism between the market and hierarchy. According to Eccles (1981) and Winch (1989), there is an organisational form with characteristics of both markets and hierarchies which is called 'quasifirm'. This is a unique form of relational governance mechanism, being the outcome of close relationship between general contractors and specialist trade contractors. Further, Eccles proposed that this intermediate structure for a relational contracting mode exist within the Williamson (1979) framework of governance structures. According to Eccles, this organisation form is the result of stable relationship between a general contractor and special trade subcontractors similar to an internal contracting system as proposed by Buttrick (1952), which falls between markets and vertically integrated hierarchies proposed as the alternative contracting modes by Williamson (1975). According to Eccles (1981) the four main distinctive features of the quasifirm in business relations are; 1.the low number of subcontractors that are generally considered for performing each trade of a house project, 2. the long-term or stable business relationship between home builders and subcontractors; 3. the frequent use of labour-only subcontracting (a form of employment relationship) by home builders; and 4. the procedures used for selecting subcontractors for a project, namely the low frequency of formal competitive bidding.(Eccles, 1981; Costantino and Pietroforte, 2002).

Another form of quasifirm can be found in labour supply only specialisation contracts as mentioned in Eccles's study (1981). Construction projects require a unique combination of labour and material inputs, performed and coordinated at the site. This results in transaction implications quite different from mass assembly and process technologies typically found in manufacturing industries (Eccles, 1981). Typically, construction projects require a large number of labour specialties such as carpenters, steel bar fabricators, concrete casting

teams, bricklayers, plumbers, electricians, painters, roofers, sheet metal workers, glaziers, and other labourers. These trades differ in terms of work activities, training, skill level, and assessed value in the labour market (Eccles, 1981). Coordinating the work of these labour specialties over the course of a project is a complex undertaking because at times these works are carried out simultaneously by numerous specialists' trade contractors and at other times the works can only proceed when other works are completed in a sequential method (Eriksson and Westerberg, 2010). Furthermore, unlike the mass assembly in a manufacturing setting where the labourers are working from the same location, the specialist contractors will typically handle several projects at the same time and at different locations. Therefore, the coordination of work of these contractors is important to reduce idling time and hence labour costs.

Gadde and Dubois' study shown in Table 2-4, found that construction faces similar characteristics due to the industry specific attributes relating to interdependence and uncertainty (Dubois and Gadde, 2002) where the project is a temporary relationship (or network) within the permanent network and the firms can simultaneously involve in a number of projects which therefore involve co-ordination at different levels such as project, firms and relationship levels. Construction products have five characteristics in common; immobility, complexity, durability, costliness and a high level of social responsibility affecting the industry and its actors in various ways (Eriksson, 2007b; Nam and Tatum, 1988). Further construction procurements are traditionally undertaken using fixed price competitive tendering which focus on lowest fixed bid price (Kadefors, 2005). The division of work in the traditional procurement route leads to detached business relationships (Eriksson, 2007b) and this fragmentation of functional roles pose governance challenges. A proper governance mechanism must be in place in order to manage the relationship successfully (Aulakh and Gencturk, 2000).

Table 2-4 – Characteristics of Construction Industry - Gadde and Dubois (2002)

Central features of construction	Independence	Uncertainty
Focus on single projects Local adjustment Utilisation of standardised parts Competitive tendering Market-based exchange Multiple rules	Number of technologies and interdependence Rigidity of sequence between the various main operations Overlap of stages or elements of construction	Lack of complete activity specification Unfamiliarity with local resources and local environment Lack of uniformity of materials, work and teams with regard to time and place unpredictability of environment

In summary, TCE explains the make or buy decision and economising on transaction cost. Further, according Heide and John (1988) TCE is the primary framework for deciding which governing structures such as authority, price and trust are most efficiently performed. For example, firstly, due to the frequently incomplete contract, formal contracts using authority as legal safeguards are questionable. Secondly, as identified in the literature, it is likely that in competitive tendering, contractors submit unrealistically low bids (Wong et al., 2001) to win the contract playing to clients' tradition of placing heavy emphasis on the lowest bid price (Sullivan and Guo, 2009) with the risk of opportunistic behaviours during post contract stage. Once construction owners invested in the specific assets, a significant "hold-up" potential is created which could be exploited by opportunistic contractors. However, selecting contractors based on criteria alone is not sufficient, they cannot help to safeguard clients' interest from opportunistic contractors due to asset specific investment, uncertainty and incomplete information provided due to limitation of human learning ability (Simon, 1991). Thirdly, Cai and Yang (2008) theorised that: environmental uncertainty is positively related to cooperative norms, i.e., the higher the environmental uncertainty, the higher the cooperative and trust norms desired. Spekman's study (1998) shows that the clients would select supply chain partners who are trustworthy, have integrity and who know their business and have fair dealings with them. Therefore, the relational norms framework can help to explain the phenomena. Accordingly, in the next section relational norms are examined to deal with these governance mechanisms.

2.6 Relational norms

In inter-organisational exchanges, there is a need to find the right mechanism to govern the relationship in order to achieve the parties' objectives (Arranz and Arroyabe, 2012; Poppo and Zenger, 2002). According to Arranz et al (2012), the governance mechanism will have an economic and legal origin (formal contract) or social cause (relational norms and trust) (Cannon et al., 2000; Liu et al., 2009; Poppo and Zenger, 2002). In order to create the desired performance, clients should utilise the right governance mechanisms having considered the objectives and the exchange hazards (Poppo and Zenger, 2002).

When studying cooperative relationships, relational exchange theory suggests that these relationships are not one time economic transactions but are embedded in a rich social context of norms and trust (Das and Teng, 2002; Gulati, 1995; Morgan and Hunt, 1994) (Lui and Ngo, 2012: 80), hence, relational exchange theory is also known as social embeddedness theory (SET) as it is embedded in social context. It is used to described the opposite of Williamson's TCE theory that transactions are governed by "self-interest seeking

with guile" and opportunism. According Granovetter (1985), SET embeddedness theory stresses instead of "self-interest seeking" such relations can generate trust and discourage malfeasance.

Despite considerable advances in the field, TCE has been criticized for downplaying the aspects of social and relational exchange (Carson et al., 2006). The relational contracting literature takes up this issue by emphasizing the embeddedness of individual transactions within larger systems of economic and social interactions (Macaulay, 1963; Macneil, 1980; Granovetter, 1985). In the construction industry, the exchange participants could not achieve discrete transactions as defined, as the contractors are known to the client before they were invited to tender for a project; therefore, all exchanges throughout the selection process in construction are relational in a sense of having prior knowledge about the firms. Further, Macneil (1980: 60) described that "discreteness is the separating of a transaction from all else between the participants at the same time and before and after. Its [pure form], never achieved in life, occurs when there is nothing else between the parties, never has been and never will be."

"Relational exchange participants can expect to derive complex, personal, noneconomic satisfactions and engage in social exchange" (Dwyer et al., 1987: 12) and social embeddedness (Granovetter, 1985) but buyer and seller relations involve "analogous benefits and costs" (Dwyer and Oh, 1988). The benefits include reduced uncertainty, managed dependence, exchange efficiency and social satisfactions from the association (Dwyer et al., 1987; Spekman, 1985). In line with this, Tangpong et al (2016) found that "the norm of reciprocity can lead to cooperation, equitable commitments and benefits among supply chain partners, which can temper opportunism" and reduce transaction costs in the exchange. One of the important benefits to the seller is that the effectiveness of exchange relations would inhibit mobility and a potential competitive advantage for the seller that could help them from price competition. However, the costs could outweigh the benefits if the parties spend considerable time and resources in conflict and haggling processes. And the opportunity costs lost should the contractor take the resources elsewhere and achieve greater benefits with other exchange partner. As proposed by Dwyer et al., there are grounds for a relationship to form; "a relationship seems unlikely to form without bilateral communication of wants, issues, input, and priorities" (Dwyer et al., 1987: 17) and therefore, *norms* offers the "guidelines for initial probes that potential exchange partners may take towards each other" (Scanzoni 1979, p68. CI Dwyer 1987: 17).

However, despite the challenges of the market governance, the construction industry is still relies heavily on outsourcing and promotes inter-organisation exchanges (Yang et al., 2012; Eriksson and Westerberg, 2010). In the governance of inter-organisational relationships, researchers proposed that the exchange parties can utilised multiple governance mechanisms to regulate and facilitate the exchange among the parties (Poppo, 2014; Gulati and Singh, 1998; Ring and Van de Ven, 1994; Liu et al., 2009; Cannon et al., 2000; Heide, 2014; Rai et al., 2012). For example, according to Liu et al (2009) formal contracts are frequently used in economic transactions and detailing the parties obligations and rights.

According to researchers, relational norms such as trust and cooperation are both important in mitigating opportunistic behaviour and improving relationship performance in interorganisational arrangements (Berthon et al., 2003; Heide, 1994; Heide and John, 1990; Heide et al., 1992; Heide et al., 2007b; Stump and Heide, 1996). Relational norms or social norms (Cannon et al., 2000; Arranz and Arroyabe, 2012; Tangpong et al., 2010) are defined in the literature as shared expectations regarding behaviour. Further according to Cannon et al (2000), the norms reflect expectations about attitudes and behaviours towards which the exchange parties working cooperatively jointly to achieve mutual and individual goals. According to MacNeil (1980) the core set of relational values are 1) flexibility; 2) solidarity; 3) mutuality; 4) harmonisation of conflict; 5) restraint in the use of power. Collectively, these values are called cooperative norms and due to the exchange hazards in the market exchanges, their adaptations is important in dynamic market conditions and safeguarding the continuity of exchange (Cannon et al., 2000).

2.6.1 Definition of cooperative marketing

Cooperative comes from the word cooperation, with *co* in Latin meaning together and *operari* 'to work' refers to situations which parties work together to achieve mutual goals (Morgan and Hunt, 1994), therefore promote marketing success. Further, "a collaborative climate is required for project success and that this collaborative climate can be established through the use of cooperative procurement procedures" (Eriksson and Westerberg, 2011: 205).

2.6.1.1 The concept of cooperative norms

What is a cooperative norm? According to Heide et al. (1992), it is a set of expected behaviours that are at least shared by a group of decision makers. Whereas Macneil (1980) has interpreted the concept of cooperative norms in two ways, 1) those that contain expectations about an individualistic or competitive interaction between the individual parties; and 2) those that are based on the expectations of mutual interests. Forming cooperative

norms based on trust (Das, 2001), joint action (Arranz and Arroyabe, 2012), close and long term relationship (Wuyts and Geyskens, 2005) is an essential step in guiding these cooperation-orientated supply chain practices (Cai and Yang, 2008; Heide and John, 1990) and positively influencing project outcomes (Eriksson and Westerberg, 2010). Cai and Yang (2008) defined cooperative norms as the shared belief and expectation of two parties that they must work together to achieve mutual goals, as shown on Figure 2-3.

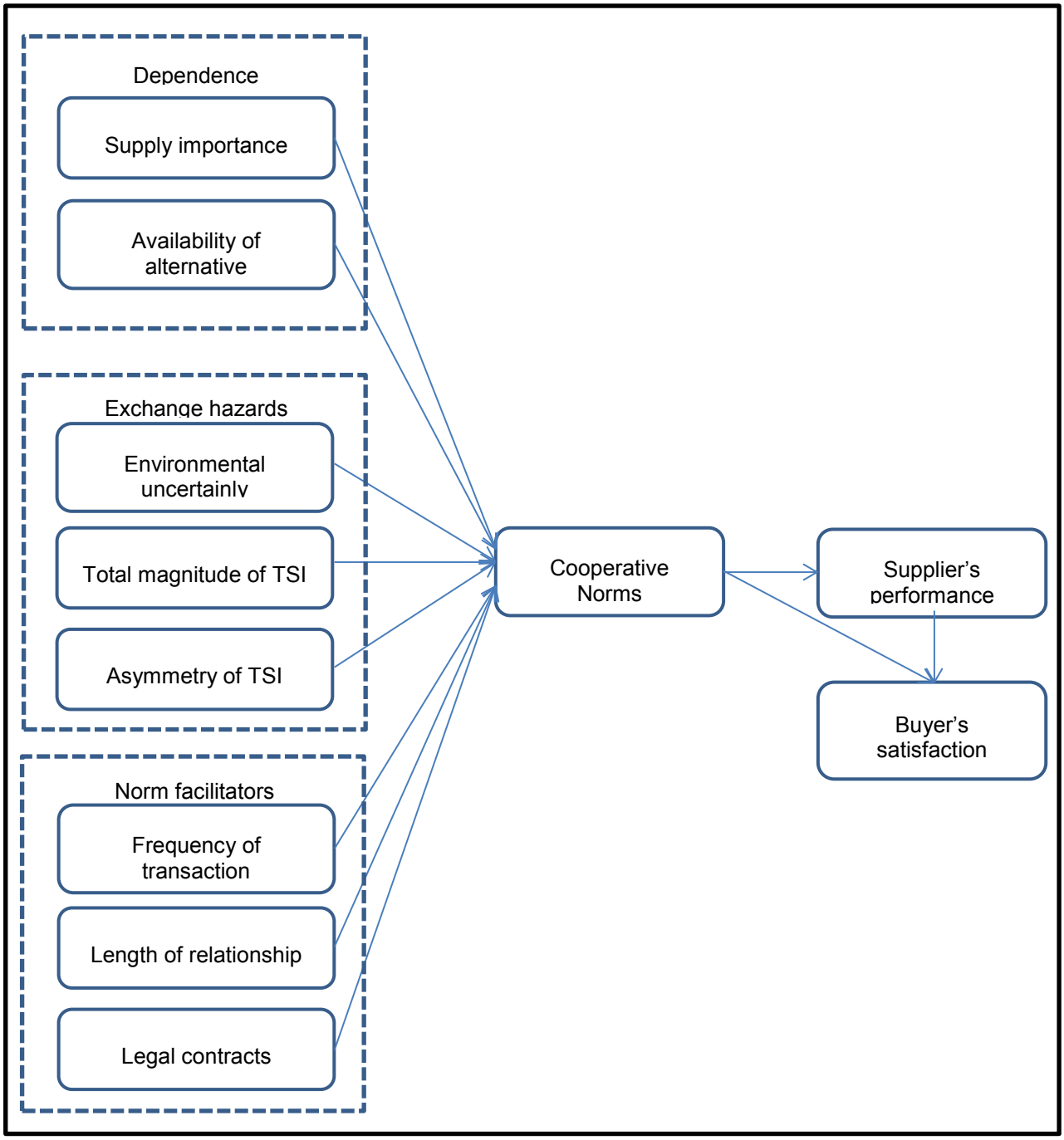


Figure 2-3 – Cooperative Norms model – Cai and Yang (2008)

Table 2-5 – Cai and Yang (2008) research hypotheses.

Dependence	
Supplier Importance	Positively related to cooperative norms
Availability of alternative supplier	Negatively related to cooperative norms
Exchange Hazards	
Environmental uncertainty	Positively related to cooperative norms
Total magnitude of transaction specific investment (TSI) made by both trading partners	Positively related to cooperative norms
Asymmetry of TSI	Related to cooperative norms (non-directional hypothesis)
Norm Facilitators	
Frequency of transaction	Positively related to cooperative norms
Length of relationship	Related to cooperative norms (non-directional hypothesis)
Legal contracts	Positively related to cooperative norms

According to TCE (Williamson, 1975; Cai and Yang, 2008), the antecedents of transaction costs include transaction specific investments, uncertainty and frequency. As shown in Table 2-5, transaction specific investments are the amount invested by the trading partners for that specific transaction whether in the form of human or physical assets dedicated for the particular relationship (Cai and Yang, 2008). Uncertainty refers to environmental uncertainty (Cai and Yang, 2008) and the high cost of governing these transactions using legal contracts (Cai and Yang, 2008; Williamson, 1975; Gundlach, 1994).

In summary cooperative norms emerge from the frequency of transactions and help reduce the need for legal contract governance. Further Cai and Yang's (2008) model links cooperative norms to supplier performance and buyer satisfaction. It differs from the relational norms developed by Heide and John (1992) in that it comprises three sub-dimensions: flexibility, information exchange, and solidarity. However in the study carried out in the UK construction industry by Meng (2011), the key indicators of the relationship areas are: mutual objectives, gain and pain sharing, trust, no-blame culture, joint working, communication, problem solving, risk allocation, performance measurement, and continuous improvement. The study reveals that a deterioration in the relationship between project parties may increase the likelihood of poor performance. Further in Eriksson's study (2006), cooperative procurement procedures such as partnering were shown to increasing cooperation and integration, building trust and commitment and decrease disputes (Eriksson and Pesämaa, 2007; Latham, 1994) can influence positively on quality, safety performance,

sustainability, disputes resolution innovation, time and cost reduction (Egan, 1998; Latham, 1994; Chan et al., 2003).

2.6.1.2 Inter-organizational trust

”Trust avoids contracting costs, lowers the need for monitoring, and facilitates contractual adaptation. Trust counteracts fears of opportunistic behaviour and as a result, is likely to limit the transaction costs associated with an exchange“ (Gulati, 1995: 93). Additionally, according to Granovetter (1985), social embeddedness (relational norms) can promote trust and decrease malfeasance.

This study investigates the role of inter-organisational trust in the realm of negotiation costs, conflict and performance (Zaheer et al., 1998). In the past few decades, inter-organisational trust has received increasing focus especially in the field of construction (Aulakh et al., 1996; Bradach, 1989; Capaldo and Giannoccaro, 2015; Jeffries and Reed, 2000; Morgan and Hunt, 1994). The trust-based relationship between the developer and contractor is described as the important foundation for achieving successful project partnering (Lazar, 2000). Accordingly, Lazar argued that trust can be developed from a series of successfully calculated risks taken by the construction owner and from a deeper knowledge of the other party, however, from the transaction cost economics point of view, this implies that firms tend to behave opportunistically (Williamson, 1985; Williamson, 1975) when there is a net gain from such behaviour. Therefore, according to Dwyer trust is “an important concept in understanding expectations for cooperation and planning in a relational contract”(1987: 18).

Table 2-6 Trust defined by predictability on human behaviour, cited in (Cheung, 2003)

Definition of Trust	Citation
“Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another.''	Rousseau et al 1998
‘‘Trust is a psychological construct, the experience of which is the outcome of the interaction of people’s values, attitudes, and moods and emotions.''	Jones & George 1998
Trust is the ‘‘expectation of regular, honest, and cooperative behaviour based on commonly shared norms and values.”	Doney et al 1998
‘‘Trust is the degree to which the trustor holds a positive attitude toward the trustee’s goodwill and reliability in a risky exchange situation.''	Das & Tang 1998

‘‘Trust exists in an uncertain and risky environment; trust reflects an aspect of predictability—that is, it is an expectance.’’	Bhattacharya et al 1998
Trust is ‘‘one’s expectations, assumptions, or beliefs about the likelihood that another’s future actions will be beneficial, favourable, or at least not detrimental to one’s interests.’’	Robinson 1996
Trust is ‘‘the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.’’	Mayer 1989

However, in today’s construction industry there is a real tension in the development of trust between clients and contractors - where frequently, contractors have been linked to concealing opportunistic behaviours. As shown in the Table 2-6, the party willingness to be vulnerable to the action of another party (Mayer et al., 1995) will require a high level of trust and the expectation of regular, honest, and cooperative behaviour based on commonly shared norms and values (Doney et al., 1998).

Further, there is the disagreement amongst the scholars as to whether trust is a complimentary governance instrument of economic transaction or a substitute for formal governance. According to Gulati, trust can substitute for hierarchical contracts in many exchanges and serves as an alternative control mechanism (Gulati and Nickerson, 2008; Gulati, 1995). According to Bradach and Eccles (1989), there are three main control mechanisms in transaction between firms namely price, authority and trust. Further, they observed that firms rely all three control mechanisms as price gives the value of their equity, authority because of the hierarchy they created between buyer and supplier, and firms rely on trust that results from relationships built over time through repeated ties where trust has substituted the formal contract as a safeguard against opportunism in the transaction. The implication is that if trust exists when firms enter an exchange relationship, they may use less formal modes of governance, and therefore, pre-existing trust enhances exchange performance. Since neither formal contracts nor informal agreements are sufficient guarantees of efficient and effective relationships between business partners, the trust phenomenon has become a key concept in analysing the processes, structures, and performance of inter-organisational relationships. Other research suggests that trust between firms involved in an exchange is likely to increase confidence in and positive

expectations about each partner's behaviour reducing the need for control through formal governance mechanisms.

However, despite the benefit of trust such as lower opportunism (Rindfleisch and Moorman, 2003) transaction cost savings (Noordewier et al., 1990; Das and Teng, 1998; Eriksson, 2008b) and greater commitments (Doney et al., 1998; Das and Teng, 1998), lesser negotiation costs (Zaheer et al, 1998), some studies point out the vulnerability inherent with trust as a supplementary control mechanism (Gundlach and Cannon, 2010). This is what Grayson and Ambler (1999) refer as the dark side of close relationships, and dark side of buyer- supplier relationships (Villena et al., 2011) in which an increased level of trust may in fact lead to "loss of objectivity" (Locke, 1999), opportunistic behaviours (Granovetter, 1985), where a reduced level of monitoring and vigilance and safeguards can be subjected to manipulation by contractor. Therefore, studies calling for higher levels of trust may actually harm rather than enhance performance.

In the construction industry for example, there is a hierarchy of site management structures to monitor and verify contractors' performance on site because while contractors may promise to deliver certain standard products or delivery dates, without proper monitoring, contractors may shirk on their promises and deliver cheaper substitute products or change to later delivery date to take advantage of the payment term due date. According to Eriksson (2008a) traditional procurement focussing on competition is suitable for simple and standardised projects with low uncertainties, and cooperative procurement procedures are used for high uncertainties projects. However in the Malaysian construction industry, in contrast to the construction management literature (Dubois and Gadde, 2000; Eriksson, 2008a), project clients still favour competitive fixed price tender for all types of contracts. This is due to the fact that price based procurement procedures have been used for the last few decades and most of the project clients are familiar with this method. To change the mind-set of project owners, there needs to be a change in organisation culture (Bresnen and Marshall, 2000) because according to these authors, attitudes and behaviour are deeply rooted and difficult to engineer away from such an embedded culture. Unfortunately this procurement route has created the arm's-length and untrustworthy relationship between the project owners and contractors where according to literature; a relationship based on trust is more desirable.

2.6.1.3 Trust and transaction costs

According to Doney and Cannon (1997: 35), trust enables the exchange partners to "focus on the long-term benefits of the relationship, ultimately enhancing competitiveness and reducing transaction costs." and perceived trustworthiness reduces transaction costs and is correlated with greater information sharing (Dyer and Chu, 2003).

Transaction cost theories focuses the dichotomy on make versus buy. According to Williamson (1985) the firms should make unless the cost of making is higher than buying. High trust relationships are important in lower transaction costs (Dyer, 1997; Eriksson and Laan, 2007; Gulati and Singh, 1998) where the buyer has the opportunity of lowering transaction costs in transactions where the risk of opportunism is present. Trust reduces transaction costs and facilitates coordination (Aulakh et al., 1996), and business people often rely on trust even when a transaction involves exposure to exchange hazards (Macaulay, 1963). Therefore, a buy mode is effected where prior research suggests that trust between firms would increase confidence in partner's behaviour and reduce the need for formal governance mechanisms; the trust and commitment serves to offset the risks of opportunistic behaviour, that they would not "act or do something detrimental to one's supply chain partner's interests" (Spekman, 1998). According to Noordewier (1990), even in the face of uncertainty, if the parties know they are in trusted and extended arrangement, they are more willing to accept short term losses because it will be levelled in the long term. Hence, as the efficiency of the market increases, and transaction costs are reduced and performance of buying improves, therefore buy mode is selected. Further, the development of trust between organisations is seen as a function of the length of the relationship between them and the mechanism that fed to alignment (repetition, routine, understanding) are viewed largely as informal (Bresnen and Marshall, 2000).

2.6.1.4 Trust and control

In the study of trust and control between parties, empirical evidence shows that trust enhances cooperation (Lazar, 2000; Morgan and Hunt, 1994). Trust decreases opportunistic behavior, meaning that strategies become more focused on cooperation than defection. It also leads to less need for monitoring and control in long-term relationships, which decreases transaction costs (Parkhe, 1993; Hill, 1990; Eriksson, 2007a).

2.6.1.5 Trust in project-based industry

In many countries project clients' and contractors' relationships in the construction industry are often adversarial (Kadefors, 2004) and there is very little trust in construction projects. It is well established fact that the architects and engineers are unable to detail or specify all the clients' requirements in advance in the documents (Kadefors, 2004) due to time constraints in the tender documents preparation, changes made by clients during the construction stage, or changes necessitated by site conditions or errors committed by the consultants in tender documents. These weaknesses give contractors the opportunity to try to submit claims for any change and extra works claims which has created uncertainty for project clients. Krishnan and Noorderhaven (2006) found that trust matters more to performance under behavioural uncertainty and less under environmental uncertainty. In return, the client will engage a team of site management staff to monitor and inspect the site work to prevent any opportunistic exploitation from the contractor, but the act of monitoring itself will trigger further distrust in the relationships (Gundlach and Cannon, 2010). According to a study conducted by Ali and Larimo (2016), there is a negative relationship between inter-partner trust and perceived level of opportunistic behaviour. The study refers to a partner firm's willingness to accept vulnerability towards another partner firm and that a positive relationship could help the parties to be reliable, fair and demonstrate goodwill (Dyer and Chu, 2011; Krishnan et al., 2006). Therefore, trust is very important in the construction industry relationship to mitigate opportunistic behaviour and obtain positive outcomes.

For most developers for example, the preferred procurement method is through a competitive tendering exercise where they can compare the tenderers' prices submitted and award the lowest possible price after a few rounds of price lowering negotiations resulting in a lump sum contract. These create adversarial and low trust relationships from the start of the project as contractors would use a low pricing strategy to get the job (Wong et al., 2000). However in order for contractors to find additional profit after winning the contract, they will then begin a cost engineering exercise and check the contract documents to explore any weaknesses that may be to their advantage (Chen and Chen, 2012; Sullivan and Guo, 2009). Notwithstanding the initiatives to replace traditional procurement procedures with more cooperative types such as partnering (Eriksson and Westerberg, 2010; Eriksson, 2010; Kadefors et al., 2007), there is no 'silver bullet' for fixing the interfirm exchange problems. The specific characteristics of the construction industry make the development of interorganisation trust in this context a fascinating puzzle (Laan et al., 2012b). On the one hand parties involved in a construction project have no time to engage in the lengthy

processes that usually contribute to the development of trust in more enduring organizational forms. On the other hand, independent strangers faced with a deadline also have to handle issues of vulnerability and risk adequately to end up with a satisfactory project performance (Meng, 2012). Therefore, they may have to act as if trust is present although the trustworthiness of a business partner has yet to be proven (Laan et al., 2012a). According to Kanawattanachai and Yoo (2002) project partners import expectation of trust from comparable settings with which they are familiar.

According to Lazar (2000) the three general ‘‘rules of thumb’’ based on strategies of behavior that owners and contractors can use to optimize relationships in partnering projects are as follows;

• Owners or contractors should not make a request in the spirit of partnering that puts the other party at risk unless and until they are prepared to reciprocate at a similar level.

• If unable to reciprocate, an owner or contractor should clearly communicate why no reciprocation was possible and whether, when, or how such reciprocation can take place in the future.

• If, during the life of the project, the reciprocation in the relationship has turned non-collaborative (adversarial) and threatens to expand into a spiral of conflict (a relationship of escalating conflict that feeds on itself), that is the time for intervention with facilitated communication and not at the end of the project (Brett et al. 1998).

In summary, trust reduces transaction costs and facilitates coordination (Aulakh et al., 1996), malfeasance (Granovetter, 1985) and business people often rely on trust even when a transaction involves exposure to exchange hazards (Macaulay, 1963). In contrast, TCE theorised that in order to safeguard supplier opportunistic behaviours, vertical integration should be considered (Williamson, 1985). As described in the study by Ghoshal and Moran (1996), TCE theory was criticised for its assumption on opportunism as being biased and its overstatement on the cause of opportunism. According to the authors, markets using price mechanisms are the most efficient way of governing economic exchanges. Therefore, businesses are still heavily reliant on market resources through outsourcing, especially in construction sector as in this study.

Generally, due to characteristics of construction transactions that are project based, of a fixed duration and a temporary nature linking the parties’ relationship, the parties in the coalitions are constantly changing from one project to another. These project characteristics prevent the developers and contractors from building a team that could gain from the mutual

experience and develop predictability regarding each other's actions in the long term (Laan et al., 2012b). Therefore, the development of trust in a project based environment is complicated by the temporary characteristics of the project and the previous experiences and the prospects for the future became important. The research by Laan et al. (2012a) shows that previous experiences, the personnel in project team along with the firm's reputation have significant influence in the project based trust. Additionally, according to Eriksson (Eriksson and Laan, 2007), the type of procurement procedures have effects on trust, the control of client and contractor relationship and procurement methods also have effects on project performance (Eriksson and Westerberg, 2010). These effects will be reviewed in detail in the next section.

2.7 Procurement procedures

Procurement is the acquisition of appropriate goods services or works from an external source at the best possible cost to meet the needs (Weele JA, 2010). This definition explains that procurement involves buying of good and services from an external body i.e. outsourced and most importantly at the best possible price to meet the needs. Another definition states *"procurement is the process which creates, manages and fulfils contracts. Procurement commences once a need for goods, services, works or disposals has been identified and it ends when the goods are received, the services or works are completed or the asset is disposed of"* (Watermeyer, 2012: 1).

Therefore, when an organisation decides to buy the services from external sources, they would need to make a decision on what to buy and at what price. As organisations become more focuses on their own core business, outsourcing those activities outside their core competence, the decision to buy or outsource has become an important element of competitive advantage (Yang et al., 2012; Noordewier et al., 1990), and it is expected to remain an important component of business strategy in future years (Broedner et al., 2009; Kroes and Ghosh, 2010; Kremic et al., 2006). This also creates an opportunity for buyers of services to reduce production costs and profit enhancement (Anderson and Katz, 1998) and the primary determinants of profitability (De Boer et al., 2001). In line with general business strategy , Michael Porter's one of the five forces highlights firms' can gain competitive edge by using bargaining power of buyer (Porter and Millar, 1985). The way the project client deals with procurement determines responsibilities and authorities in the entire contraction process and this also affect the degree of integration and cooperation among project participants (Love et al., 1998; Briscoe et al., 2004; Eriksson and Westerberg, 2010).

Procurement strategies have a direct impact on the type of buyer-supplier relationship (Plane and Green, 2012). The conventional competitive price procurement method which focuses on price alone is considered as an adversarial relationship between developers and suppliers and affects performance. Whereas, cooperation between buyers and suppliers has been considered a critical determinant of successful supply chain management (Carey, 2011; Mohr, 1994; Cai and Yang, 2008), construction procurement involves high levels of coordination and cooperation among the project participants not seen in other industries. All the trade' specialists for example carpenters, building products suppliers, electricians, plumbers, roofers, machines operators have to work together in a coordinated way and with correct sequencing to complete a project. Therefore, the procurement route is fundamental in setting the basis of the client contractor relationship and their cooperation in the dyad (Pesämaa et al., 2009). It further determines responsibilities and authorities in the construction process (Love et al., 1998) and affects the degree of cooperation and integration between the participants (Briscoe et al., 2004).

Property development firms need to make the decision of whether the construction works services transaction is more efficiently performed within the firm such that the firms are directly responsible for producing all of the inputs required for its products i.e. residential houses (vertical integration) or whether a market transaction, carried out by autonomous contractors in the construction supply chain will improve their competitiveness in the industry (Dyer, 1997; Noordewier et al., 1990). If firms choose to obtain the output from other firms, they face the question of how to; firstly, select a contractor (Lingard et al., 1998) and secondly, manage these relationships (Eccles, 1981), or market governance (Geyskens I, 2006) to avoid outsourcing failures.

Should firms decide to make or vertically integrate the product, they are then faced with the question of how to organize their production. Williamson (1975) addressed the issue of the division of labour between and among firms and markets in terms of a transaction cost approach. The economic activity is one of cost economizing, Williamson (1979) suggests that firms generally be economical for both production expenses and transaction costs, to the extent that if the transaction costs are negligible, buying rather than making will be the most cost effective way of procurement. Nevertheless, firms have different objectives in their make or buy strategies based on their own requirements.

As far as the procurement objectives are concerned, housing developers do not necessarily have similar needs in their procurement objectives. This may of course be due to, for example, the different nature of their individual projects (Love et al., 1998) and project

requirements. According to Masterman and Gameson (1994), the common clients' objectives or needs are; 1) certainty of final cost; 2) certainty of completion date; 3) value for money; 4) lowest possible tender. Some of more recent literature stresses not only on meeting the needs of time, cost and quality; which is sometimes known as 'the iron triangle of project management' but also the needs of other project stakeholders. According to Bryde and Robinson (2005) project stakeholders are defined as people or organisations who have a vested interest in the environment, performance and/or outcome of the project.

However, according to Nahapiet and Nahapiet (1985) whilst agreeing that the key to successful procurement is the identification of the client's objectives and the matching of these to the most appropriate procurement system, the study also points out that there is no one best method, but what is likely to be most appropriate depends on the particular circumstances of the client and project.

2.7.1 The developer- contractor function within organisation

In speculative building according to Eccles (1981), the owner-general contractor is the same party - in a set-up prescribed in TCE as vertical integration. For example in Malaysia, the housebuilders typically mirrored this arrangement where more than 50% of the respondents of the survey questionnaire for this study have an integrated construction arm in one form or another within the firm, especially amongst single-family property developers. The integration of the developer – contractor roles may result from two ways. Firstly, the history of firms that started out as general building contractors and moved up stream after acquiring sufficient capital to invest in land development. Sales of final products allowed them to enjoy higher profit margins from the upstream business and the construction division remained in place to use as a back-up builder when required, as prescribed in TCE. A second route results from payment defaults problems, whereby the contractor moves into the development business as a business strategy to avoid issues such as non-payment or late payment by clients. Owing to the low entry requirements into house development industry in Malaysia, especially in the single family house building sector, contractors can build and sell their products direct to the final consumers, playing the developer and the contractor role at the same time. Next, the functional relationship between the parties is examined.

2.7.2 The owner-general contractor and subcontractor relationship

Generally, the organisation structure of construction projects involves the developer (owner), consultant, main contractor, subcontractor and supplier as shown in the Figure 2-4 below.

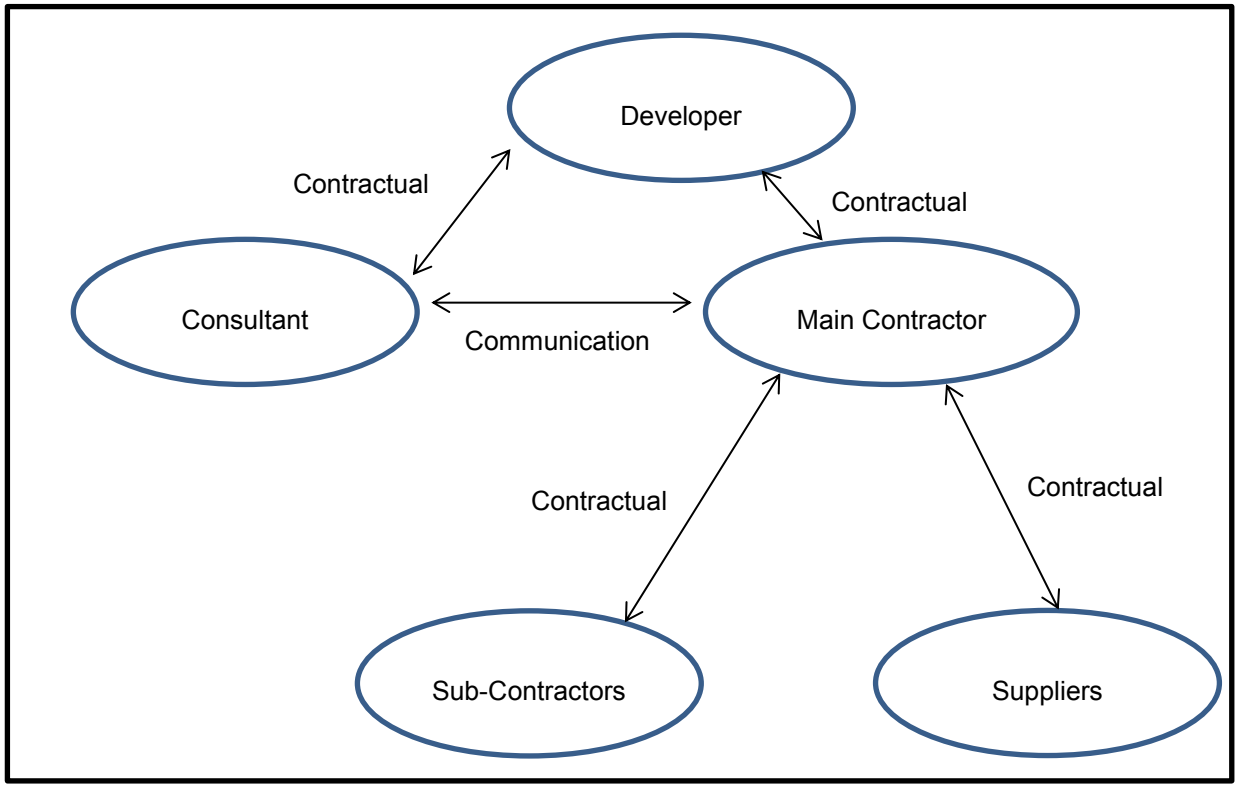


Figure 2-4 Construction project team relationship in the traditional procurement route

Note: 1. The design and bid procurement route, developers appoint the main contractor after their consultants completed the design. The main contractor will usually outsource part of the works to sub-contractors and suppliers.

2. Only communication role between the consultant and the main contractor

Generally, contracts are awarded to general or main contractor by the developer in housing construction projects. The main contractor assumes full responsibility for completing the project based on a fixed price, sometime with incentives and penalties (Eccles, 1981). The main contractor typically faces resource planning problems as they generally rely on many trade' sub- contractors to carry out the works. Unless the main contractor is certain about the future work load, they will subcontract a large proportion of the work, which will increase their flexibility and minimize the capital committed to the project (Winch, 1989). The subcontracting function could help the main contractor to reduce the total project liabilities by appointing subcontractors to carry out certain works on a project basis for fixed price contracts, to ease cost control and reduce some of the responsibilities on delivery of the final products such as time and quality (Eccles, 1981). The relationship between the main contractor and subcontractors may extend over fairly long periods of time or over several projects depending on their working relationship. This type of integration is called 'quasifirm' (Eccles, 1981) as the preferred form of governance over either market transactions or formal

vertical integration. According to Eccles (1981), the relationship is similar to neoclassical contracting since the parties have strong incentives to complete the project and these parties continue to work and cooperate in future projects; the relational contracting mode appears (Eccles, 1981). These subcontractors who focus on one trade will work with a few main contractors to achieve an economy of scale in the production and by serving a few main contractors the subcontractors can maintain the constant level of work force and economise on transaction costs which could result from recruitment of manpower in response to demand changes (Eccles, 1981).

Through continuous working together, the main-contractor and subcontractor can benefit from the idiosyncratic investment of learning to work together and since this investment is not high, the parties are free to terminate the relationship at the end of the projects. The temporal nature of the project cycle makes it possible for the parties to negotiate the terms of contract for every new project (Eccles, 1981).

2.7.3 Labour-only subcontractors

The subcontracting of works can be also effectively handled by the construction equivalent of inside contracting system. Similar to Buttrick's (1952) inside contracting system, developers in Malaysia commonly engage the specialist trade contractors on a fixed price or piece-rate basis to provide for what is known as labour-only subcontracting (Dainty et al., 2005) whereas the developer-main contractor role will provide plant, equipment and materials for the works (Buttrick, 1952). This supply inputs by the developer fits in an intermediate form between bilateral and unified structures. The aim of this practice is to reduce the contracting price where developers could obtain the materials and labourers directly instead of engaging a main contractor services.

2.7.4 Concepts of procurement and clients' characteristics

The selection of a suitable procurement system commonly depends on the client's requirements and experience. Masterman and Gameson's study (1994) reports that the key characteristics that determines a client's choice of a procurement system is their level of experience of implementing construction projects. For experienced clients their decision on procurement is mainly based on their corporate environment, previous experience of organisation's personnel as well as the experience of the external consultants they employed. Unlike inexperienced firms, these developers carry out development regularly

and build up enormous expertise over the years in establishing procedures for managing projects and choosing procurement systems (Masterman and Gameson, 1994).

In this study the clients are housing developers that develop different types of residential properties, from the simple to construct single family low rise dwelling to the complicated construction of multi-family high-rise skyscraper dwellings. Due to the low entry barrier (Ball, 2003), new developers join the industry regularly. These new firms may not have the experience of the more established firms which have built up their expertise to handle the contractor selection procedure. Due to their limited knowledge, these entrant firms may be more inclined select their contractors based on price criteria alone when procuring the services of contractors. A principal assumption in this neoclassical view is that price leads to a satisfying decision and that the decision maker(s) is capable of achieving a thorough positive outcome (Pesämaa et al., 2009).

Further, the distinctions need to be made at the level of turnovers of the developers. Developers with the lower turnovers will employ fewer full time staff and may not have experienced personnel within the organisation to handle a complex procurement procedure. Developers with large turnovers will have the in-house expertise or external professional firms to assist them in using more complex procurement procedures such as contractor prequalification and to help in the contractor selection for the particular type of building. Therefore, for this study the respondents are stratified based on firm turnover in order to cross validate the selection criteria between different size firms.

Masterman and Gameson (1994) defined client type into four categories. 1. Primary; clients such as property developers, whose main business and primary income derives from constructing buildings. 2. Secondary; clients for whom expenditure on constructing buildings is a small percentage of their turnover, and for whom buildings are necessary in order to undertake a specific business activity, such as manufacturing. 3. Experienced; client with recent and relevant experience of constructing certain types of building, with established access to construction expertise either in-house or externally. 4. Inexperienced; clients without recent or relevant experience of constructing buildings with no established access to construction expertise. Further, procurement criteria could fall under one of the following clients' selection criteria (Love et al., 1998).

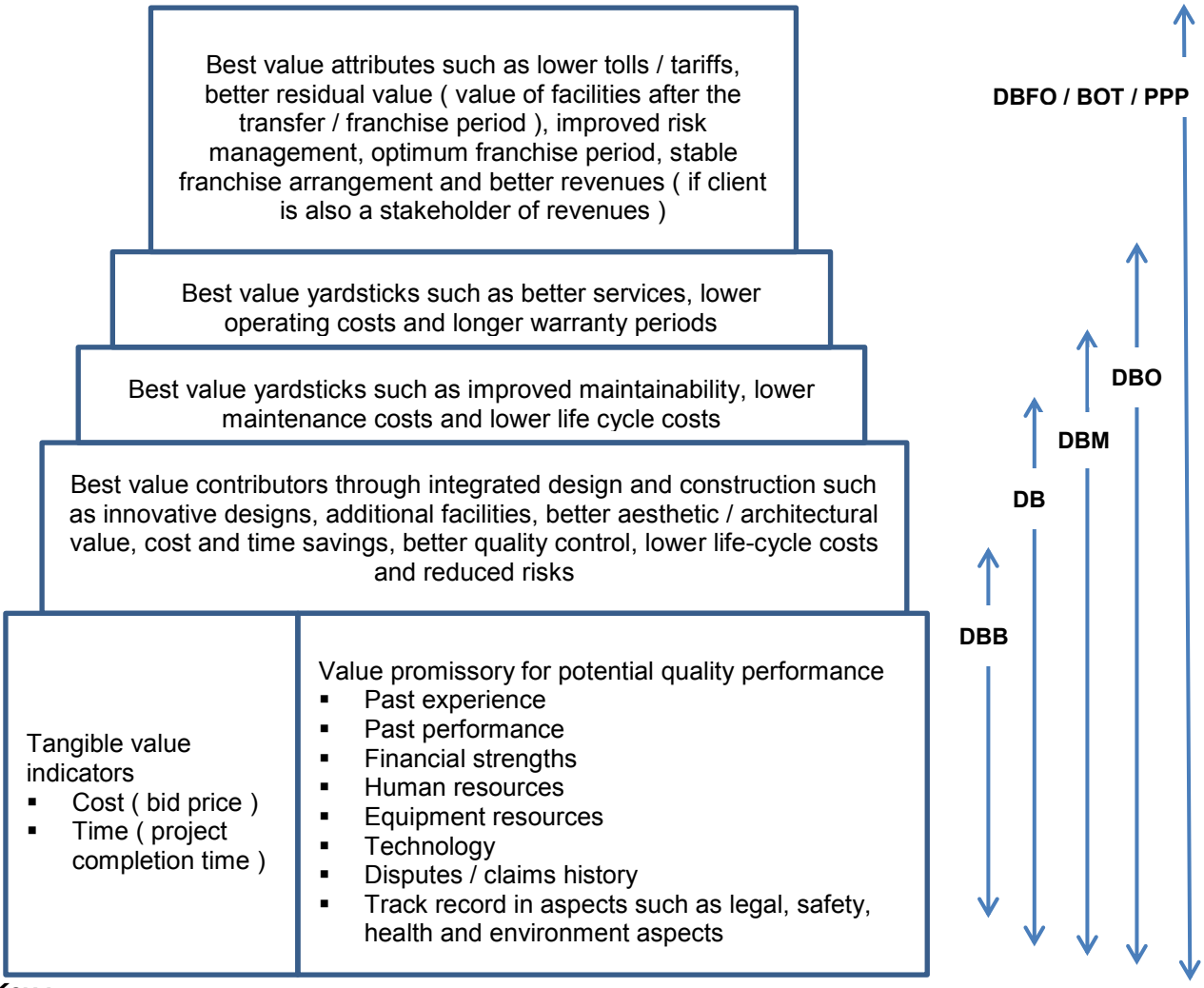
- Speed (during both design and construction. The client would decide how fast they wish to commence work on site. For example, design and build contracts usually allow early start on site as contractors construct while their consultants develop full design for

the building. This contrasts with the traditional lump sum contract, where the client would need to get the full design before tender issuance and work commencement.

- Price certainty during construction stage. Lump sum contracts and design and build contracts, for example, usually give client the assurance on final contract sums. In contrast, a cost reimbursement or cost plus contractual arrangement would not give this kind of price certainty. Whereas in 'lump sum' contracts, clients can have better cash flow planning based on the progress of work on site. Therefore, the procurement method suitable for price certainty would involve less complex, repetitive and well proven construction methods where contractors are unlikely to encounter the unknown.
- Design flexibility. Cost plus contracts provide total design flexibility and are usually chosen for complex building procurement where the architects or engineers are not able to develop a full and detailed design at the tender stage. Whereas design and build contract, would not have the flexibility and any design changes would be costly.
- The quality of work. In high-end city dwellings and resorts, for example, the clients are in the business of competing with their latest design concepts and building aesthetics and also seek to create a market reputation for interesting and quality buildings. The quality of work is critical to these types of developers. They will typically rely less on the price criteria and time criteria for contractors to produce better workmanship and finishing works.
- Technical complexity and use of specialist subcontractors. Clients may choose technologically advanced and highly specialised building elements. Clients procure the services of the subcontractors in advance on the basis of their technical competence and collaborative ability (Eriksson et al., 2007).

- Risk allocation / avoidance. This is the decision clients have to make on the risk apportionments. For example how much risk they willing to take and how much risk is 'transferred' to contractors.
- Price competition. Clients may to try to lower their construction sum by using competitive tender procedures, hence requiring contractors to compete among themselves on price basis. For simple and repetitive contracts, clients may use this method to gain cost advantage. However, in the long run maintenance costs must be considered along with whether the price they paid is good value for money.
- Responsibility sharing. The client must decide to what extent the contractors is responsible for the completion of design and construction.
- Disputes and arbitration. According to many buyer and supplier relationship studies (Eriksson, 2006; Heide and John, 1990; Mohr, 1994; Dewulf and Kadefors, 2012), a more collaborative type of contractual relationship arrangement such as partnership could help increase trust and collaboration and reduce disputes, obviating the need for arbitration as any problems could be solved by the firm's personnel.

Palaneeswaran et al. (2012), recommended a best value procurement route for different types of project and projects needs as shown on Figure 2 -5. For example the design, bid and build (DBB) route provides a potential quality route and tangible value on bid price and completion time. Whereas, the design and build route (DB) offers best value for integrated design, innovative designs and speed of construction because this will allow early start on site work. For large infrastructure works, for example where public finance is not available, the developer may opt for design-build-finance-operate (DBFO). The best value for this procurement route is that reduces the host developers financing costs, and provides value after the facilities are transferred after the franchise period. These are the routes proposed by the authors with the potential for best values procurement routes.



Key :

DBB - Design-Bid-Build

DBFO - Design- Build-Finance-Operate

DB - Design- Build

BOT - Build – Operate – Transfer

DBM - Design- Build-Maintain

PPP - Public – Private – Partnership

DBO - Design- Build-Operate

Figure 2-5 Best Value Focus Areas in Different Procurement Route – A 'Source' Selection Perspective (Palaneewaran et al., 2012)

2.7.5 The effects of cooperative and trust norms on procurement

The choice of procurement method made by project owners during buying stages affects the relationships between the buyers and suppliers and how the project is governed (Eriksson and Laan, 2007). It will also, according to Eriksson and Laan (2007), affect the governance mechanism and control types. Further, as demonstrated by Eriksson et al. (2010) (see Table 2-7) the procurement procedures would have a positive effect on the project outcomes, a more collaborative procurement process will help the exchange parties to build stronger trust and commitment in the exchange, decrease disputes and bring about the advantages in the areas of quality, safety performance, disputes resolution, innovation, time and cost reduction (Egan, 1998; Chan et al., 2003; Eriksson and Pesämaa, 2007).

Table 2-7 - Procurement procedures relation to competition and cooperation – Eriksson and Westerberg (2010)

Buying stage	Procedures related to competition	Procedures related to coopetition	Procedures related to cooperation
Design	By the supplier (or by the client)	Joint specification with one party responsible	Joint specification with shared responsibilities
Tendering	Competitive tendering (multiple bids)	Selected tendering (a few bids)	Direct negotiation (one bidder)
Bid evaluation	High weight on price	Equal weight on price and soft parameters	High weight on soft parameters
Subcontractor selection	By the contractor (or by the client)	Joint selection with one party responsible	Joint selection with shared responsibilities
Payment	Output based (fixed price)	Fixed price and shared profits	Including incentives (shared profits)
Collaborative tools	Low extent	Medium extent	High extent
Performance evaluation	By the client	Both by client and by supplier	By the supplier

As for the future projects, the research shows that in anticipation of future contracts and cooperation, the contractor may refrain from seeking short term gain by acting opportunistically. This behaviour is in-line with the prisoner's dilemma theory (PD) (Eriksson, 2007a) the theory prescribed that where the parties involved are assumed to be in an

indefinitely repeated PD and as long as the future pay-off is higher than the short term gain the contractor may choose to cooperate with the developer fully.

2.7.6 Procurement focus

Traditional procurement procedures are much to be blamed for causing ineffective contract governance and impacting negatively in the developers and contractors relationships. A arm's length (less trust) contractual relationships are not suitable for the project based industries (Eriksson and Pesämaa, 2011; Kadefors, 2004; Löfgren and Eriksson, 2009; Nahapiet and Nahapiet, 1985). Wang and Huang's (2006) results show that in China engineers use "relation/*guanxi*" among the key stakeholders as the most important criterion of project success. In Sweden, Eriksson and Westerberg's study (2010) examined how a broad range of procurement related factors could affect project performance criteria. The study proposed that cooperative procurement procedures such as joint specification, selected tendering, soft parameters in bid evaluation, joint subcontractor selection, incentive-based payment, collaborative tools and contractor self-control generally have positive effects on project performance. Another study by Pesamaa et al (2009), found that traditional procurement procedure are competitive, resulting in conflicts and adversarial relationships, further the same authors proposed that an alternative procurement model based on cooperative procurement procedures can help to facilitate cooperation between project clients and contractors and lead to better long-term buyer and supplier relationships (Spekman, 1988).

In Malaysia, where the use of traditional contracts still popular, the industry encounters poor productivity and quality, cost and time overruns and customers' dissatisfaction. The problems have reached endemic level. There is a need to shift focus from the price based selection to more collaborative procedure which could integrate contractor's expertise in joint specification and buildability, and use more social or relational controls in the procurement such as trust (Eriksson, 2007b). Eriksson's (2007b) effects of different type of governance mechanisms; output, process and social control are shown in Table 2-8.

Table 2-8 Procurement effects on control types and governance mechanisms – Eriksson 2007

Buying Stage	Price focus through output control	Authority focus through process control	Trust focus through social control
Specification	By Client	By Client	Joint Specification
Bid Invitation	Open Bid	Limited Bid invitation	Limited bid invitation
Bid evaluation	Focus on tender price	Focus on authority-based soft parameters	Focus on trust-based soft parameters
Contract formalisation	Formal, comprehensive contracts	Formal comprehensive contracts	Informal and incomplete contracts
Type of compensation	Fixed price	Reimbursement	Including incentives
Collaborative tools	Low usage of collaborative tools	Low usage of collaborative tools	High usage of collaborative tools
Performance evaluation	Output control by client	Process control by client	Self-control by contractor

The relational contract draws on sociology theory which argues that exchange is typically embedded in social structures (Heide and John 1992). In Macneil's (1980) typology, the concept of "relationalism" may be manifested in several different but related domains, such as flexibility, solidarity, and information exchange. This could help in the governance mechanism where the contracts are incomplete due to bounded rationality and especially the nature of construction works which take longer to complete and are subject to external and environmental conditions.

The early works of contractor selection criteria often ignored the role of relational contracting in the selection process (Jennings and Holt, 1998; Ng and Skitmore, 1999; Palaneeswaran and Kumaraswamy, 2001; Plebankiewicz, 2009; Russell and Skibniewski, 1988). Most of these studies concentrate on the effect of the tenderers' price, past experience and financial standing in the exchange. One exception is found in the Watt et al. study (2010), an empirical work carried out in Australia, which contemplate relationships in the study but reveals that only a small percentage of the respondents consider that client/ supplier relations are important selection criteria, whilst greater importance is placed on past performance, technical expertise and tender price, followed by project management expertise. In another study by Doloi (2009) which is more construction industry centric, relationships with the client have been rated higher than technical expertise in the ranking of the project attributes based on a relative importance survey. In the construction industry, managers engage in highly complex, collaborative market exchanges that involve many smaller subcontractors and suppliers, relational contract such as trust, information exchange

and flexibility are viewed in several studies as substitutes for complex, explicit contracts or vertical integration (Dyer and Singh 1998; Bradach and Eccles 1989; Gulati 1995b). The relational contract in a study by Poppo and Zenger (2002) found that formal contracts and relational governance function as complements and generate improvements in exchange performance. Another study of relational exchange which is highly relevant to the construction industry reveals that the performance and duties of the participants in the exchange is highly complex and occurs over an extended period (project duration), relational exchange transpires over time, each transaction must be viewed in terms of its history and its anticipated future and the participants can be expected to derive complex, personal, noneconomic satisfaction and engage in social exchange (Dwyer et al, 1987). However there is hope for the future of buyer and supplier exchange as Daneke et al (2015) reported that social sanctions against opportunistic behaviour functioned precisely because most members of the group had internalized cooperation and altruism as the norm (Daneke and Sager, 2015), countering the advice of TCE theory. The opportunistic behaviour would not threaten the future of business management as good business ethical social norms will prevail (Ghoshal and Moran, 1996).

While most of the literature argues for more collaborative and relational contracting, Villena et al.'s (2011) research shows that there is a dark side (negative side) of buyer-supplier collaborative relationships (Villena et al., 2011; Grayson and Ambler, 1999). Generally, most of the construction management literature confirmed the positive effects of collaborative buyer-supplier relationships on performance. However, according to Villena et al. (2011) the building of higher levels of social capital could lead to a waste of resources and frustration and an indiscriminate increase in the use of social capital may actually hurt rather than enhance performance. According to Granovetter (1985), the more complete the trust, the greater the potential gain from misdeed or "malfeasance" - the actor may conceal certain information or action for personal gain and in order to achieve such high damages or gain, there must be high trust in the relationship. This theory is in line with the prisoner dilemma theory (Eriksson, 2007a) that when the immediate pay-off is higher than the incentive to cooperate for future move, the player will defect. In other words, contractors may adopt an opportunistic in their behaviour firstly; when they know that their clients will not find out their misdeeds, and secondly; when the future benefits of their cooperation with the developer are less than if they defect now.

2.7.7 Type of control

In the construction industry, the outsourcing mechanism has been a major source of companies' competitiveness strategies as proposed by construction research literature. The question now is what is the most effective way of governing these transactions, such as managing the complexity of outsourcing contracts and ex-post transaction costs (Barthélemy and Quélin, 2006) and controlling supplier opportunism in industrial relationships (Stump and Heide, 1996). Nonetheless, construction clients or developers in this study have the option of utilising different types of control depending on levels of asset specificity, and frequency of transactions (Williamson, 1985). In traditional construction procurement, especially in the public sector, price has been used as the market relationship for standardised, (Eriksson and Laan, 2007), less complex and repetitive transactions. According to the researchers, there are three main types of controls (Ouchi, 1979; Aulakh and Gencturk, 2000), output, process and social control. These are closely linked to the three governance mechanisms (Eriksson, 2006), therefore, the use of the three types of control to facilitate the three mechanisms used (Eriksson, 2006). According to Das and Teng (2001), the three types of control are suitable for different situations mainly depending on the variable output measurability and knowledge of the transformation process as shown in Table 2-9.

Table 2-9 Control types and their suitability – Das and Teng (2001)

		Control Level	
		High	**Low**
Trust Level	High	High confidence in partner cooperation	Moderate confidence in partner cooperation
		Joint ventures	Minority equity alliances
	Low	Moderate confidence in partner cooperation	Low confidence in partner cooperation
		Minority equity alliances	Non-equity alliances

Firstly, when the buying firms monitor their partner's behaviours or the means to achieve the desired ends this is referred to process control (Aulakh et al., 1996; Eriksson, 2006; Eriksson and Pesämaa, 2007). Increased interdependencies caused by transaction specific investments make output control less efficient and process control more suitable (Gencturk and Aulakh, 1995), and also when the outputs may be hard to measure due to bounded rationality and asset specificity (Das, 2001; Williamson, 1996). Process control is then

feasible if the monitoring party knows the appropriate action to achieve the goal. According to Hennart (1993), process control is related to authority through the visible hand of management (Gencturk and Aulakh, 1995; Williamson, 1985; Williamson, 1996), therefore, the buyer focuses more on the authority in this transaction relationship.

Secondly, price mechanism is closely related to output control (Hennart, 1993; Ouchi, 1979; Eriksson and Westerberg, 2010; Eriksson, 2007b) through the invisible hand of the market when the client's focus is to obtain the most competitive price in the transaction.

Thirdly, social control or relational contracting is achieved by minimising the differences in preferences between the exchange parties by building common organisational cultures such as trust and cooperative norms that encourage self-control (Eriksson, 2008a; Aulakh et al., 1996; Williamson, 1975; Williamson, 1996). According to Das and Teng (2001) in situations where the measurement of goal attainment is not possible due to high asset specificity and the monitoring party does not have specific goals to achieve, the social control is most efficient. However, in order to utilise this type of control, there is a potential problem in the design of a relational contract that allows and motivates the supplier to use his superior knowledge efficiently (Eriksson, 2006). Further, joint goal setting, building consensus among the parties and teambuilding activities are important examples of social control (Das, 2001) which can work as substitute to the more formal safeguards (Rokkan et al., 2003; Poppo and Zenger, 2002; Gundlach and Cannon, 2010). Solidarity and mutual understanding is developed through the shared norms and values that encourage desirable behaviour and lead to a higher level of behavioural predictability (Das, 2001; Poppo and Zenger, 2002). The predictability of positive behaviour encourages a common ideology and facilitates trust (Gundlach and Cannon, 2010). Social control is therefore a powerful form of control in trust-based relationship (Das, 2001) and through the use of social control the client can utilise trust in the transaction relationship.

According to Hennart (1993), there is another alternative organising structure between hierarchy and the price system called hybrid organisation, which emphasises both properties of prices and hierarchy. Under the hierarchy structure, companies would pay their staff for taking direction instead of rewarding them for output and the in price structure, it governance the self-employed individuals for the output produced. The empirical evidence of this hybrid structure can be seen where developers employ individuals for the project management, co-ordination, and monitoring of the works of direct trade subcontractors without a main contractor such as carpentry, metal works, plumbers, electrician and other direct trade contractors. This would reduce the cost of paying the main contractor for the management

and coordination works performed under a hierarchy structure and procure the services of trade contractors using price system, but developers must assume all responsibilities for the direct subcontractor's actions as well as paying for the cost of monitoring and coordinating subcontract works.

There are costs and benefits of these two types of organisations, however, developers would need to decide on the type of structure that would most benefit them based on their experience, type of projects, the availability of trade contractors and so on. Should the developer be able to handle the management well there is potential to reduce the construction sum and to reduce the opportunistic behaviour of contractors and cost-shirking (Hennart, 1993) as the benefits of shirking are low.

Before an organisation initiates a purchase, there must be a purchasing plan, De Boer (1998) proposed the initial purchasing model. Due to the increase in outsourcing activities, organisations are allocating more resources towards purchasing decisions and using a larger set of selection criteria as the purchasing decision increases in complexity and importance. In the construction industry, developers spend a considerable amount of time and resources in finding and engaging contractors, suppliers as a high percentage of their products are outsourced. The next section explores the literature on the buying process in inter-organisational exchange relationships.

2.7.8 Buying process

In the literature, different types of models are proposed for the buying process, for example Chan (2003) proposed an Analytical Hierarchy Process (AHP), De Boer (2001) proposed positioning of decision methods in supplier selection and Eriksson (2006) proposed a six stage buying process in the construction industry. As shown in Figure 2-6 according to De Boer (2001), the are four stages in the selection of suppliers. Firstly, the problem formulation; to consider whether to make (if they have internal spare capacity then they can internalise the activity) or buy (then the decisions of what to buy). Secondly, the selection criteria; where the clients need to consider what criteria are important to that particular project. Thirdly, developers need to consider the qualification of the contractor for the project and lastly, the developers' final selection.

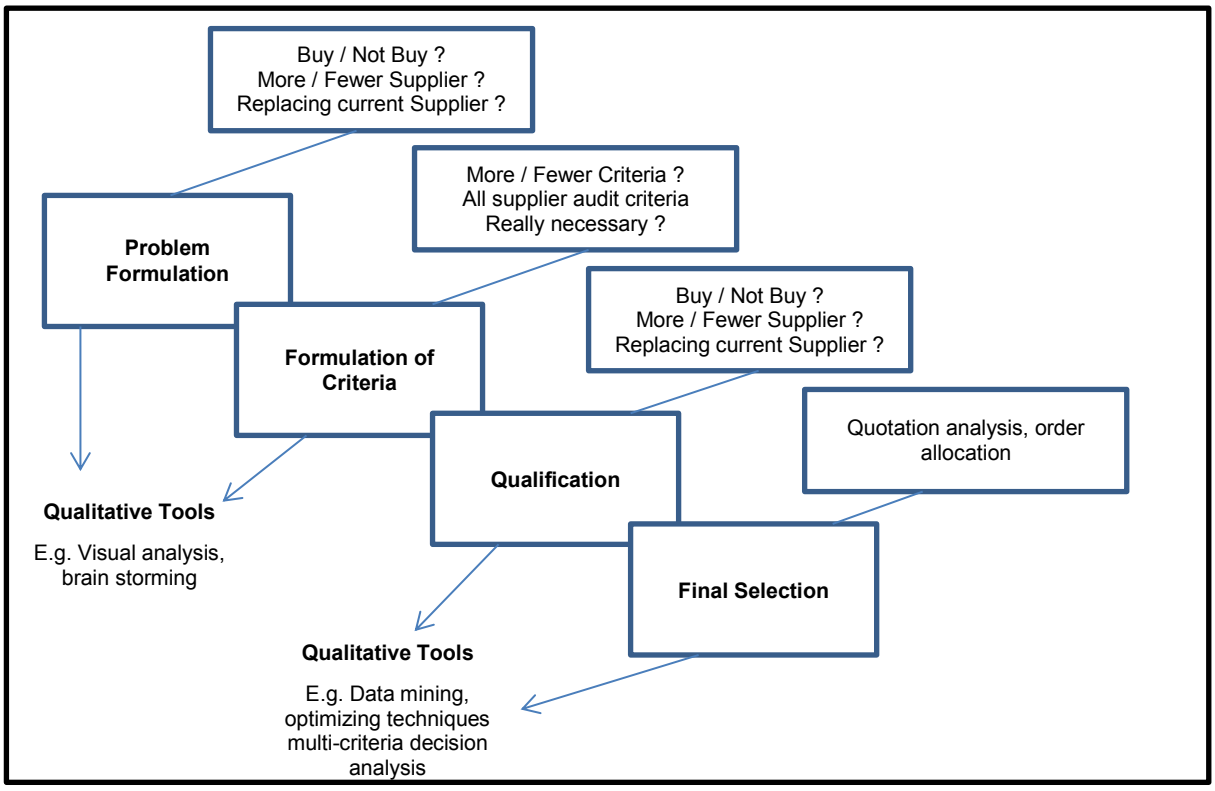


Figure 2-6 Rough Positioning of Decision Methods in Supplier Selection – De Boer (2001)

Another model proposed by Chan (2003) use Analysis of Hierarchy Process (AHP), where due to subjective human judgement in the supplier selection process, the interactive selection model is proposed, the decision makers would identify the interactions and verify how important a criterion to the project is as compared to other criterion. The more interactions or connections associated with the criterion, the more important it is. The analytical hierarchy process (AHP) method could help to generate results in multi-criteria decision making to find the best possible suppliers. "The hierarchical representation of a system can be used to describe how changes in priority at upper levels affect the priority of criteria in lower levels" (Chan, 2003: 3552) refer to Figure 2-7.

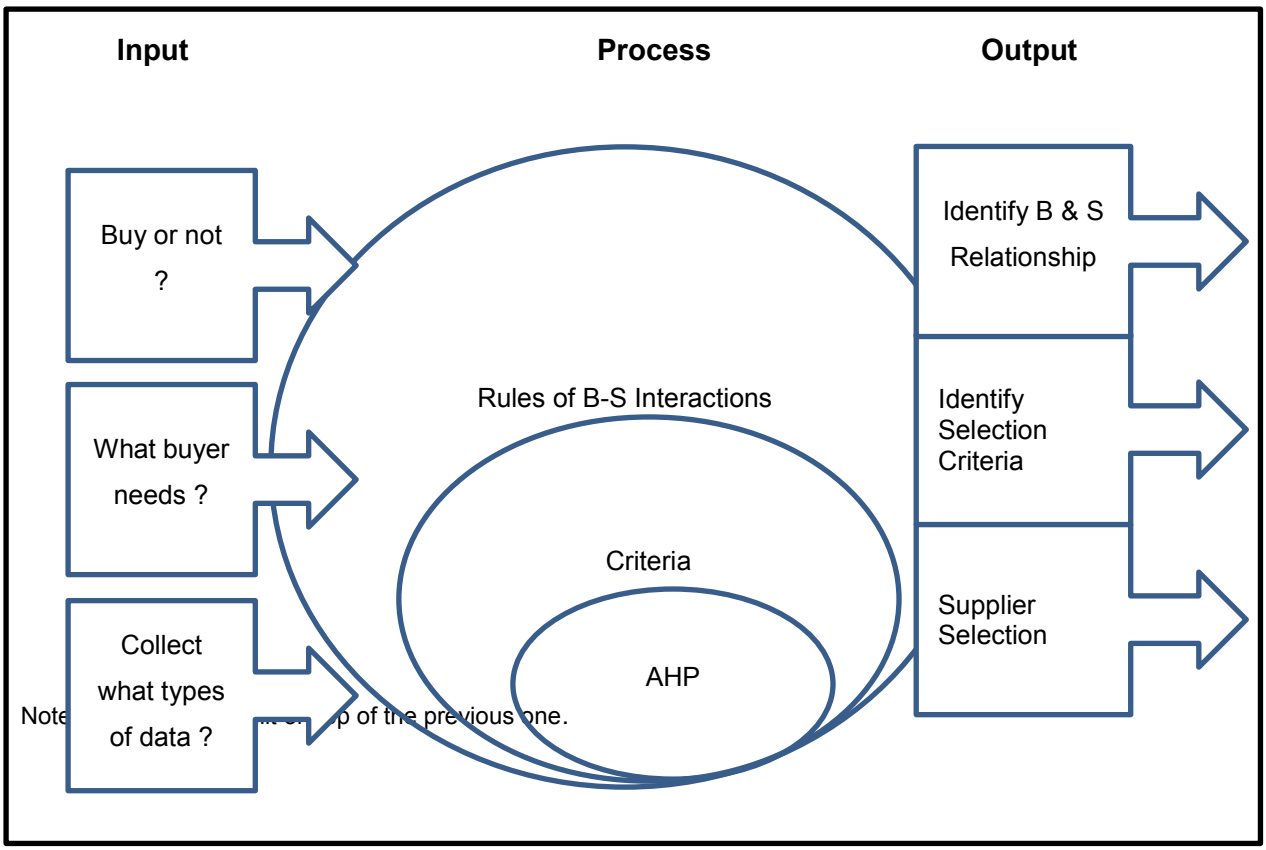


Figure 2-7 Structure and Idea of Interactive Selection Model (ISM) – Adapted from Chan (2003)

According to Eriksson's study (2006), there are basically 6 stages in the procurement procedure which reflects the buying process in the construction industry. In this section, a procurement procedure based on a model created by Johnston and Bonoma (1981) and cited in Eriksson (2007) is used to illustrate how different decisions and causes of actions during the stages of the buying process will involve different types of control, thereby affecting the levels of price, trust and authority.

Stage 1- Identification of a problem and the awareness that the needs may be satisfied through a purchase (De Boer et al., 2001; Eriksson, 2006) resulting in a make or buy decision. According to Eriksson (2006) the purchaser would need to decide the type of transaction at hand depending mainly on two variables, the frequency and asset specificity such as level of complexity and customisation. If the decision is to buy from an external supplier, the buying process continues to next stage.

Stage 2 – Specification; this stage is translating the requirement or needs into products that can be communicated to others. This specification of products can be carried out by; firstly, the buyer or client, secondly, selected contractor or thirdly, by both parties in joint

specification - joint specification will be explained in more detail later. There are three types of specification congruent with the three control types: Output control, process control and social control.

The procurement activity at this stage usually starts with tendering. Tendering is an exercise for the project clients to confirm their intention to outsource a work trade and invite interested contractors to submit their bid price or quotation based on the criteria set out in the tender documents. The tender documents usually consist of description of the works' scope, specification, and overall quantities on which tenderers (contractors) base their price.

In competitive tender procedures, those interested contractors will be invited to submit bids to the client. The tender is usually pursued either through open or selective tendering. Open tendering allows all interested contractors to submit their bid whereas in selective tendering, contractors are subject to prequalification. In prequalification, firms are shortlisted based on the selection criteria set by the client and only a limited number of shortlisted candidates will be invited to bid (Willis et al., 1980). In some instances, the client may engage in a direct negotiation with the perspective tenderer rather than going through the bidding exercise to reduce the tendering process.

Nonetheless, the tendering process is a time consuming exercise as the parties involved need substantial time to prepare comprehensive tender documents for bidders to price, hence the client needs to factor in the time for the shortlisting of contractors (Eriksson and Westerberg, 2011), issuance of documents and pricing of the works by the tenderers. After the tenders return, the clients (or consultants) need to evaluate the tenders and tender reports are duly prepared, negotiations conducted with two or more shortlisted tenderers before the final award. Hence, an early start of the project is not possible as compared to direct negotiations with contractors. Therefore, according to Eriksson and Westerberg (2011) using selected tendering can enhance continuity and long term cooperation, improving the understanding of the client's demands and thereby enhancing long term customer value whereas competitive tendering-based strategies emphasise short term value (Ahola et al., 2008). Due to the shorter tendering period associated with selected tendering, the fewer number of contractors that are invited in the selected tendering process, the better the project performance in terms of time (Eriksson and Westerberg, 2011). According to Kim (1998), excessive tender bidding can lead to cost overruns as the winning bidder could renege from the contractual obligations, when the one time opportunism gain is greater than the long term gain. Conversely, having a few highly qualified bidders creates a more

effective competition than having a very large number of bidders (Gansler, 1989: CI Kim, 1998).

Stage 3 – Supplier search. This stage involves the search for alternative sources of supply, resulting in qualification of suppliers which will be explained in more detail later. If the number of potential vendors is low, a direct negotiation may take place and if there are many competing vendors, the main selection mechanism could be price (Spekman, 1988; Adler, 2001). Other broad selection criteria include past experience, financial standing, technical expertise and relationship between buyer and supplier (Aulakh and Gencturk, 2000). Sourcing for the right supplier is one of the most important stages of the buying process. A large number of suppliers is related to output control and selection based on price, whereas a small number of bidders are related to social and process control and enhancing trust and authority (Eriksson, 2006).

Stage 4 – Bid evaluation. At this stage, various offers from potential vendors are analysed, compared and the best offer will be selected. In the traditional bidding process, price is often the most important criteria in a straight re-buy repetitive project. This will be explained in more detail in following section.

Stage 5 – Selection of sub-suppliers and sub-contractors. The selection of sub-suppliers and sub-contractors is made by main contractors in which the client will often have no control. However, according to a study by Wathne and Heide (2001), downstream buyer-supplier relationships are to a large extent affected by the upstream relationships with sub-suppliers. Further, the authors suggested that to increase the ability to adapt to uncertainty in relational governance, the selection of sub-suppliers is crucial (Wathne and Heide, 2004). The selection of sub-suppliers will affect the levels of price, trust and authority in the transaction. More detail on sub-supplier selection follows later.

Stage 6 – Formalization and product exchange. At this stage, the contract design is formalised, the final contract sum; payment terms and conditions of contracts must be agreed upon before the exchange takes place. According to Blois (2002), price-based market governance emphasises the importance of legal rules and formal documents as an important part of output control and formalisation may decrease trust and increase opportunism, for which reason relational norms should be used as safeguards instead (Heide et al., 1992). More detail on the relational norms follows later. Therefore, the contracts between the parties will affect the levels of price, trust and authority in the transaction (Eriksson, 2006). Types of compensation are closely related to the types of control according to Gencturk and Aulakh (1995). For example, a compensation system rewarding

the supplier for his output entails output control, compensation for the costs of the supplier based on time worked and costs input material entail process control (Gencturk and Aulakh, 1995), while profit sharing together with joint objectives indicates social control (Das and Teng, 1998). Therefore, the type of compensation used will affect the levels of price, trust and authority in the transaction. A fixed price for a product delivered facilitates a high emphasis on price, through output control, compensation based on time indicates authority and reimbursement based on incentive schemes and profit sharing reflects social and output control (Eriksson, 2006).

2.7.9 Joint specification

During the design stage, there are three different ways of specifying the product as explained in Stage 2 of the procurement procedure. In the design-bid-build (DBB), the client is responsible for carrying out the whole building design with the help of consultants before the information are sent to contractors in the tendering exercise. This method will develop a competitive base, as all the contractors will have same information to submit their bids. In design and build (DB) contracts, contractors are procured through prior prequalification based on the project brief or client requirements. The contractor will then be responsible for the full design of the building woks. This method would enhance the buildability due to a contractor focused design (Masterman and Gameson, 1994). However, the disadvantage of this system is that client will have little input in the design process and selection of materials which often results in the cheapest construction method being utilised and a low quality performance (Eriksson and Westerberg, 2011; Cheung et al., 2001). An alternative approach between these two extremes, is the joint specification method (Eriksson and Nilsson, 2008), this parallel design makes the integration of design and construction possible, reduces the risk of defective design and increases coordination (Eriksson and Westerberg, 2011). Further, this concurrent engineering utilising contractor expertise early on in the design process could facilitate cost saving and shorten project duration due to improved buildability (Rahman and Kumaraswamy, 2004), improvement in clients satisfaction since the client could maintain an influence and control the design work (Eriksson, 2008a), and due to a better understanding of the clients requirements (Ahola et al., 2008). Therefore, according to Eriksson et al. (2011), the higher the level of integration between clients and contractors in the design stage the better the project performance in terms of cost, time, quality and work environment.

2.7.10 Type of compensation

After the contractor selection procedure presented above, this section goes on to present types of compensation or works payment and their effects on control. In construction contracts, the payment system is design to compensate the contractor for his output. As proposed by Genturk and Aulakh (1995), the type of compensation is closely related to the type of control. A compensation system rewarding the contractor for his output (e.g. based on a fixed price for a product delivered) indicates output control and high emphasis on price. Compensation for the costs of the contractor based on the time worked (e.g. salaried agents) and costs of input material entail process control (Gencturk and Aulakh, 1995). This type compensations also achieves contract flexibility and is suitable for transaction in which change is anticipated (Macneil, 1980). The last compensation method is profit sharing together with joint objectives, indicating social control (Das and Teng, 1998) and emphasising trust. This profit sharing also facilitates social and output control which increase the levels of trust and price while authority decreases, resulting in a medium emphasis on all three mechanisms (Eriksson, 2006). Consequently according to Eriksson (2006) the type of compensation used will affect the levels of price, trust and authority in the transaction.

In summary for this section, the above reviewed procurement procedures, the types of control dependent on level of trust, the buying process and decisions by the decision makers. Further, six steps of selection process are considered along with the type of compensation for the work to be awarded. The next section discusses selection criteria and practice.

2.8 Selection criteria and practice

The main objective of this section is to review current contractor selection criteria and current contractor selection practices.

2.8.1 Contractor selection criteria

2.8.1.1 Lowest price selection practices

Ruskin (1889) observed; *"It is unwise to pay too much but it is worse to pay too little. When you pay too much you lose a little money that is all. When you pay too little you sometimes lose everything because the thing you bought is incapable of doing what it was bought to do. If you deal with the lowest bidders it is well to add something for the risk you run. And if you do that you will have enough money to pay for something better"*. Hence, the selection criteria, is a question of strategic importance for the construction industry.

As explained earlier in Section 2.2, there are conflicting views in the literature as to what contractor selection criteria should be. For example, in a study on the Malaysian context (Idrus et al., 2011), bid price among other criteria were seen as the most important selection criteria. However, most construction clients favour competitive tendering both in Malaysia and elsewhere (Lingard et al., 1998; Xia et al., 2014; Shehu et al., 2014a) because of the perceived value and low transaction costs, further, tender evaluation has long emphasized tender price (Wong et al., 2000). In competitive tendering, contracts are usually awarded to the lowest priced bidder (Merna and Smith, 1990) and also for accountability in public sector tender (Palaneeswaran and Kumaraswamy, 2000). It is the traditional belief that using the lowest price tender selection method ensures that the client gets value for money through free and fair competition (Lingard et al., 1998). However, Shapiro (1985) argues that while the primary purpose of the competitive price bid method is to minimise the price of purchased goods and services, it also builds of arms-length (less trust) relationships and that using formal, short-term contracts and frequent rebidding, suppliers are chosen largely on the basis of price criteria. Unlike the recommendations in most literature (Doloi, 2009; Jennings and Holt, 1998; Watt et al., 2010a; Wong et al., 2001) other criteria such as health and safety at the work site, health and safety education within the organisation and environmental issues were not considered as important key criteria in the Malaysia construction industry which is still a developing country in which safer construction practices are associated with higher construction costs.

The selection procedures practiced in Malaysia have remained largely unchanged over the years. Price remains the single most important criteria in the selection process. (Sambasivan and Soon, 2007; Shehu et al., 2014b). However, Idrus (2011) found that clients placed high emphasis on past experience, technical capacity and financial standing, this could be due to the assessment of contractors' capabilities at different stages. The common criteria at prequalification stage are focused on past experience, technical capability and financial standing but at the final stage of selection, the selection criteria are usually based on lowest price tender and the contractors bids will be compared and negotiated to get the most competitive price. Too much emphasis on price means that developers will frequently try to put pressure on the tenderers during the tender stage to reduce their price, even though they may have already met the developer budget requirement. This is an example of developers trying to drive their project cost down further at the expense of contractors. Hence, in competitive tenders, developers will invite large numbers of contractors to bid for their projects, where they can be played off against each other to gain a lower priced tender.

Many researchers found that low-bid, competitive contracting generally inhibits the development of long-term relationships as this practice encourages opportunistic behaviour amongst contractors, conflicts and, adversarial relationships after they have obtained the contracts (Wong, 2001; Spekman, 1988; Pesämaa et al., 2009). Under the fixed price contracts, there are obvious incentives for contractors to shirk performance requirements (Eccles, 1981). Further, when a contractor has a shortage of work, it is more likely that he will intentionally submit a low bid price to secure business in the short term. Contractors who submit such low bids will then try to regain profit by cutting corners, replacing construction materials with cheaper types where possible and submitting additional claims for works not fully specified or incomplete described (Hatush and Skitmore, 1998; Walraven and de Vries, 2009).

In the UK development, the Latham Report (1994) confirmed that clients should base their choice of contractor on a value for money basis with proper weighting of selection criteria for skill experience and previous performance. Additionally, rather than accepting large number of tenderers (Holt et al., 1995) construction client should only invite a limited number of contractors for cooperation to emerge, continuance is of the essence (Heide and John, 1990). Therefore, instead of price based tender selection, developers should consider multi-criteria selection in order to obtain 'best value' for money (Wong, 2001) It is also evident that the current procurement and selection procedures' focus on price is insufficient to provide effective governance of the transaction.

Lowest price tender selection cannot guarantee to yield the overall lowest project cost and it may not be in the interest of the client to pursue the contractor's pricing strategy (Merna and Smith, 1990; Wong et al., 2000; Xia et al., 2014). In construction, contractors commonly implement the practice of adjusting their bid price in an attempt to outbid the competitor and win the contracts (Lingard et al., 1998). In Figure 2-8, the survey of owners, consultants and contractors carried out in Singapore Singh and Tiong, 2006 shows the importance of tender price as selection criteria above all other criteria such as company attributes, past performance, financial capacity, performance potential and project specific criteria.

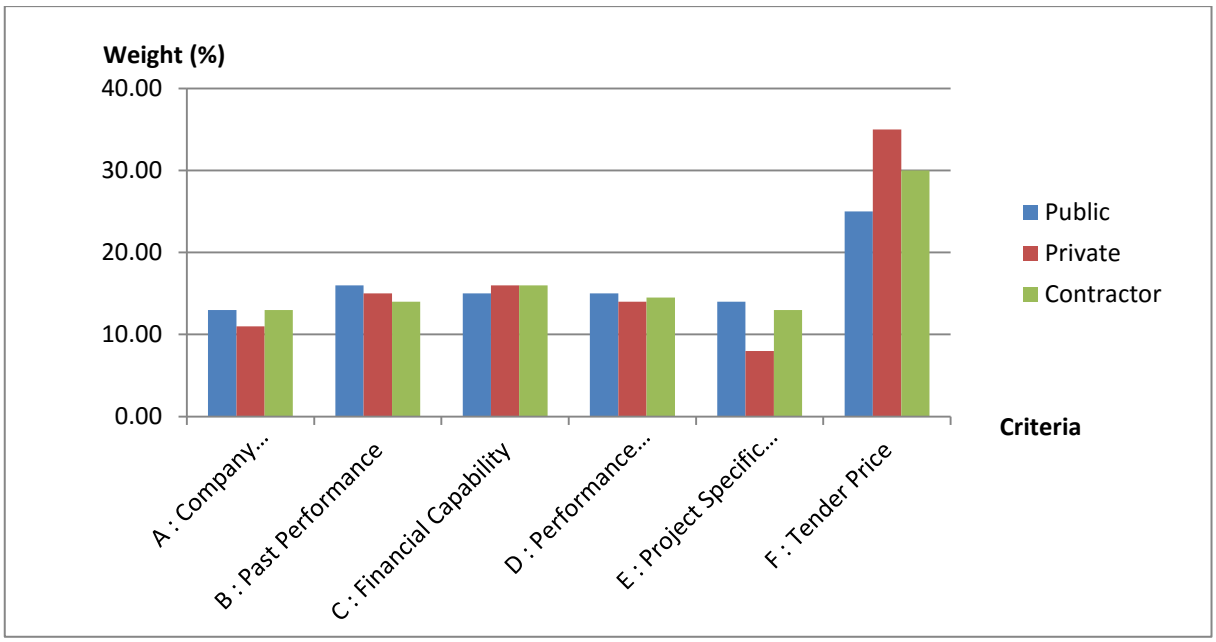


Figure 2-8 Singapore Selection Experience – adapted from Singh and Tiong (2006)

Whereas in Australia, Watt et al.'s (2010) study shows that past project performance and technical expertise are the most highly ranked selection criteria with tender price ranked third highest.

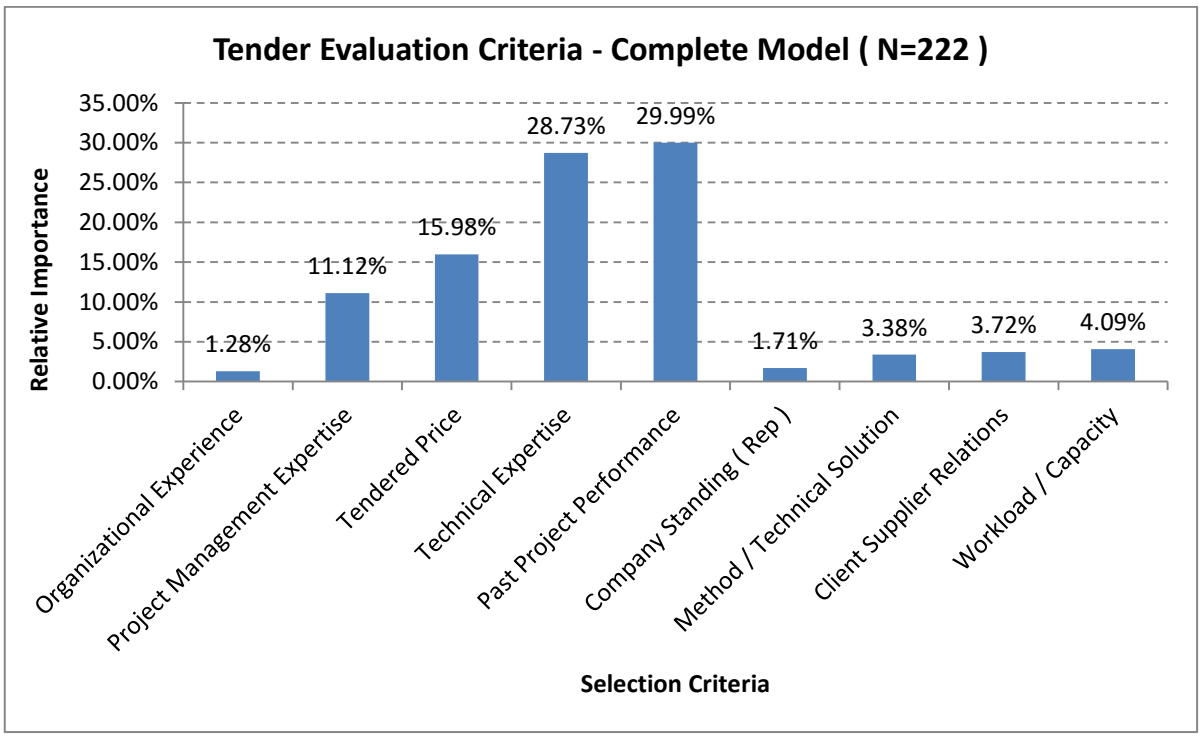


Figure 2-9 Tender Evaluation Criteria - Watt et al (2010)

This survey was conducted on amongst Australian professionals and engineers from a variety of industries such as construction, mining and exploration, manufacturing and telecommunication sectors and owners. Other selection criteria such as tender price, project management expertise, client- supplier relations, method/technical solution, company standing and organisational experience are cited in the survey.

According to another study carried out in Malaysia on contractor selection, track performance, financial capability, technical capacity along with past experience on similar project, bid price and management efficiency are some of the highly rated selection criteria, as shown on the Figure 2-10.

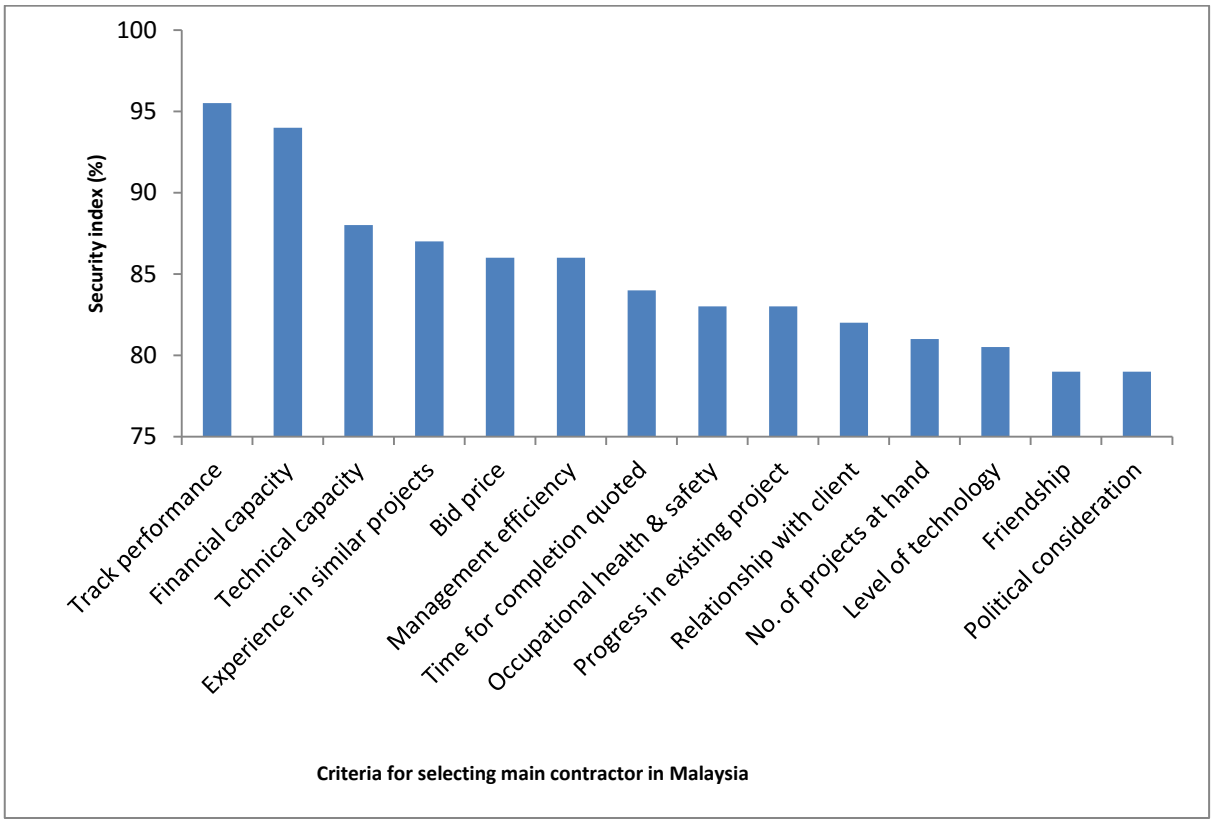


Figure 2-10 Criteria for selecting main contractor in Malaysia –Idrus et al (2011)

The figure above shows the results of a questionnaire survey conducted amongst construction clients, of the 150 respondents who completed the questionnaire, 64 were residential projects clients, 46 were from commercial projects, 26 were from infrastructures projects and 14 were firms from industrial projects. The severity index indicates the importance of selection criteria the higher the percentage, the higher the importance of the criteria.

Despite recognising the problems of procuring contractor services based on price, there are no strong suggestions from the earlier literature for any potential solutions. The UK based Latham Report (1994) suggested that construction clients should use more partnering arrangements and that "tender should be evaluated by clients on quality as well as price". This initiative was followed by a Swedish study according to Ericsson (Eriksson, 2007b), buyers should focus more on cooperative procurement and partnering. This could help the parties to the contract in becoming less competitive but more cooperative. However, in order to benefit from such a contractual arrangement, the parties especially the client would need to know how to implement collaborative relationships. They (the clients) would have to forgo the power relationship (Spekman, 1988) which they been enjoying in traditional contracting, further collaborative relationships require planning for the future (Spekman, 1988), joint action (Eriksson and Pesämaa, 2011; Heide and John, 1990) and are a long term arrangement, whereas in construction projects the organisation set up is typically temporal, or for the duration of the project only.

2.8.1.2 Contractor's expertise

In Watt's study (2010), expertise and past project experience ranked top in the empirical study on multi industries. Another study by Doloi (2009) uses multiple regression analysis to study 43 influencing technical attributes in contractor selection and their links to project success objectives. The research reveals that contractor expertise, past success, time in business, work methods and working capital significantly impact contractor performance across time, cost and quality success objectives. Doloi et al. (2010) further used a structural equation modelling technique to study 29 contractors' qualification criteria and their links to contractors' performance on a project. Based on the survey data collected across medium size construction projects in Australia, the results of the model showed that contractor expertise in technical planning and controlling expertise of contractor is key in achieving success in projects. According to Sambasivan and Soon (2007) contractors' improper planning, site management and inadequate contractor experience ranks 1, 2 and 3 based on the responses by clients, consultants and contractors. The studies above show the importance of contractor expertise such as experienced technical personnel, satisfactory past performance and good financial management in reducing the risk and uncertainties associated with the success of the project in terms of time and costs. In Singapore, the Building Control Authority has made the requirement of quality certificates such as ISO: 9000 mandatory for contractors to be eligible for bidding public projects (Singh & Tiong).

2.8.1.3 Financial capability

Financial capabilities are one of the most important selection criteria due to the nature of payment systems in the construction industry, in which construction debt, work-in-progress, retained money by clients has to be carried by the contractor all along the project life (Singh and Tiong). This necessitates substantial working capital by the contractor to finance the project before they get paid. Any delay in the payment by the developer would greatly affect the progress of work as shown in an empirical study (Frimpong et al., 2003) where monthly payments and contractors' financial difficulties ranks no 1 and 5 respectively in the ranking of all the factors responsible for project delays and cost overruns according to contractors, consultants and owners. According to Sambasivan and Soon (2007), finance and payment of completed works ranked no 4 in causes and effects of delay in the Malaysian construction industry. This is a case where opportunistic developers may expect contractors to fund their projects for a period of time before they release payments, and often these slow payments by developers cause the job progress to slow down. Therefore, developers will prefer award their projects to contractors with stronger financial backgrounds to avoid short term cash-flow problems.

According to Park et al (2005) contractor cash flow in a project consists of: 1) cash out such as bid costs, preconstruction costs engineering, design, mobilization, etc., materials and supplies, equipment and equipment rentals, payments of subcontracts, labour and overhead; and 2) cash in such as billings less retentions, retentions, claims and change orders. The factors that affect cash flows are the duration of the project, the retention conditions, the times for receiving payments from the client, credit arrangements with suppliers or vendors, equipment rentals, and times of payments to subcontractors (Park et al., 2005). To further assess the contractors' financial health, the developers could study the contractors' financial performance ration in terms of the firms' profitability ratios: measure the overall performance, or returns, which management has been able to achieve, leverage ratio measuring the debt financing and activity ratios measuring the efficiency in the resources management.

Further, companies in the construction industry are more prone to bankruptcy compared with other sectors (Huang et al., 2013) because of the unique characteristics of the industry such as very high capital products, one of its kind product, long project duration, complexity and uncertainties involved in the construction activities (Horta and Camanho, 2013). Any failure in a project delivery will have severe effects on the company's financial performance that

could lead to company closure. In Malaysia, this financial criteria ranks second in the selection criteria as shown Idrus et al.'s study (2011); see Figure 2-8.

Construction firms financial standing has not received much research attention (Watt et al., 2010), generally, the focus is on selection criteria such as project management expertise, price, contractor resource expertise such as past project experience (Holt, 1998d; Jennings and Holt, 1998; Mills, 2005). However, financial management is very important for the success delivery of the project (Huang et al., 2013). Typically, construction contracts require the contractors to submit progress claim to their clients' for work done before they will get paid. Therefore, they need to have sufficient funds in advance to purchase construction materials and engage subcontractors and suppliers before they are paid. In the construction business and especially in competitive tenders, profit margins are narrow and high levels of uncertainties must be dealt with (Morrell, 1987). These uncertainties typically include the project itself, exogenous impacts, involvement of parties, types of contracts, project financing methods, professional consultants, and completeness of information available at tender stage. It is costly for contractors when such uncertainties are present, which often drive construction contractors out of business due to largely unforeseeable expenditure (Morrell, 1987). The numerous financing alternatives used to reduce financing costs brought about discussions in the construction industry (Chen 2005). Another way to resolve this type of problem is financing from banks, however, this increases the company's financial commitments such as monthly repayment of loan facilities, which can lead to financial burdens if payments from the owners are delayed or the set payment period is too long.

Further, contractors need to have good credit management to maintain the flow of materials to their construction sites. In Malaysia, the contractors would normally source materials from their supplier or the building materials manufacturer on credit terms anytime from two weeks to three months, but contractors need to maintain a good relationship and payment records in order to enjoy the credit terms offered by their suppliers. Therefore, instruments such as supplier credit line, long payment terms afforded by suppliers are important for main contractor project delivery.

Another consideration of the contractor's financial capability is his current business turnover, where each tender success can lead to large changes in turnovers (Winch, 1989). What this mean is that each new project undertaken by a contractor will have significant impact on the company resources, especially it's finance. While it may be difficult to achieve in practice, it is important that the tenderer has a past business turnover that is the same or greater than the contract sums that they are tendering to ensure they are not too financially stretched if

the project is awarded to them. In competitive tendering, each project won will add a significant demand on an individual firm, if the project undertaken is a few times greater than their current business turnover, the contractor may not have short term the financial capability to fund the new project due to their prior capital capacity. Therefore, it is important to evaluate a balance between the sizes of firms in relation to the project size undertaken. For example, a contractor whose normal annual turnover of various projects is in the region of less than RM 5,000,000, it would be highly risky if they are allowed to tender for project many times higher than their annual turnovers say for a project of RM 20,000,000 or above. Firstly, they may not have sufficient working capital (in saving or suppliers' credit supports) to fund the project; secondly, for large projects, the contractor would need to obtain bank facilities to cover for any temporary short fall in the cash-flow, this will add pressure to the company finance. Therefore, it is important that developers prequalify the tenderer to evaluate their current and past project sizes, contract sums, company turnovers and other commitments to ensure they have the financial capability to fund the new project if they are awarded it.

2.8.1.4 Past experience

Apart from the financial standing explained above, contractors past experience reflects how well a contractor handled a similar type of project in the past (Cai and Yang, 2008; Shehu et al., 2014a; Wood and Ellis, 2005). Unlike in the manufacturing industry, construction projects often involve a high degree of customisation, uncertainty, time pressure, and uncertainty (Pesämaa et al., 2009), and high levels of planning and coordination among the project team are required. Therefore, contractors need to have the necessary experience in the management of all the project participants. Contractors with similar past project experience, reduce the risk of construction failure as they are deemed to be able to adapt and solve unforeseen project difficulty during the progress of the project. According to Singh and Tiong (2006) contractor experience and ability in troubleshooting a wide range of problems such as unforeseen underground obstacles, handling of the regulation requirements, and efficiently coordinating other parties such as subcontractors and suppliers are an essential quality of the tenderer in order to achieve the desirable project outcomes. According to Idrus et al. (2011), the contractor's past experience ranks first in the tender evaluations. Further, a contractor who has completed a similar project in the past will most likely repeat that performance in the next project.

2.8.1.5 Relationship or repeated exchange

Repeated exchange has received a great deal of attention in buyer and supplier relationship literature (Elfenbein, 2014; Heide et al., 1992; Eriksson, 2007a; Heide and Miner, 1992; Villena et al., 2011) as most of the transactions, especially in the construction industry, are not a discrete (Macneil, 1980) or 'one-off' transactions (Eriksson, 2007b). In fact, due to the immobile nature of work and high levels of work coordination and monitoring in the construction industry, contractors usually carry out their works within a fixed region or for bigger contractors within a country. Therefore, depending on their length of establishment, developers may have some business dealing with the contractors in the past. In the sociological study, repeated interaction generates a latent asset with the potential to deliver value in future exchanges. The origin of this valuable relational asset stems from the simple fact that repeated exchanges form embedded social relationships (Granovetter, 1985).

Through repeated exchange, social relations across organizations deepen while repeated personal contacts across organizational boundaries support some minimum level of courtesy and consideration between the parties (Williamson, 1975). This promotes norms of flexibility, supports information exchange, and generates commitment to mutual problem solving, all of which facilitate the requisite adaptation vital to sustained and effective exchange (Uzzi, 1997; Poppo and Zenger, 2002; Dyer, 1997). The survey conducted in this study, shows that clients from the small to medium size firms usually use less formal selection methods, and do not have the intention to search for new contractors due to their familiarity with their existing ones. As such, there is no need for them to waste time and efforts to find new contractors unless their current contractors are unable to perform up to their requirements. Their construction projects would be awarded to the existing contractors using direct negotiation methods for a new job or using the existing price for repeat jobs. As a result, this repeated exchange relationship helps contractors to secure continuous jobs and reduce the likelihood of them behaving opportunistically.

This assumption is further empirically tested by other researchers. According to Dore (1983), repeated exchange also promotes personal attachments among individuals within these organizations that further support the required adaptation. As exchange partners accumulate a shared history, the resulting trust generates an expectation of future behaviour that, as Bradach and Eccles (1989) describe, moderate the fear that one's exchange partner will act opportunistically (Kale et al., 2002) label this asset relational capital and argue that it emerges through a history of close relationships and resides in individual-level attachments that support mutual trust, respect, and friendship. The relational contracting literature takes

up this issue by emphasizing the embeddedness of individual transactions within larger systems of economic and social interactions (Macaulay, 1963; Macneil, 1978; Granovetter, 1985).

In the construction industry, the exchange participants could not achieve complete discrete transaction as defined, as the contractors are usually known to the project client before they were (Eriksson, 2007a) selected to tender for a project and vice versa, therefore, all exchanges in through the selection process in construction are relational. We could not achieve the conditions stated by Macneil (1980) which describe that discreteness is the separating of a transaction from all else between the participants at the same time and before and after. Its [pure form], never achieved in life, occurs when there is nothing else between the parties, never has been and never will be. Hence, the construction industry exchanges are generally relational.

Further, according to Dwyer et al. (1987) relational exchange participants can expect to derive complex, personal, noneconomic satisfactions and engage in social exchange but buyer and seller relations involve analogous benefits and costs (Dwyer and Oh, 1988). The benefits include reduced uncertainty, managed dependence, exchange efficiency and social satisfactions from the association (Dwyer 1987; Spekman et al 1985). One of the important benefits to the seller is that the effectiveness of exchange relations would inhibit mobility and a potential competitive advantage for the seller that could help them with price competition. However, the costs could outweigh the benefits if the parties spend considerable time and resources in conflict and haggling processes. And the opportunity costs will be lost should the contractor take the resources elsewhere and achieve greater benefits with another exchange partner. According to Eriksson and Lind (2015), long term relationships can create long term benefits such as collaboration that can be greater than the short term benefits of opportunism due to the shadow of the future (Rokkan et al., 2003).

2.8.1.6 Contractor prequalification

Contractor prequalification is commonly conducted to assess contractor's qualities such as technical ability and competence (El-Sawalhi et al., 2007; Idrus et al., 2011; Holt et al., 1994), financial standing (Russell and Skibniewski, 1988; Singh and Tiong, 2006; Ng and Skitmore, 1999), workload (Watt et al., 2010a; Holt et al., 1994), health and safety, relationship (Watt et al., 2010a) before the tender documents are issued to them. Contractor prequalification is generally preferred by project owners to assess the capabilities of the contractor ex ante to minimise the risks and failures and therefore, to enhance the performance levels by selecting

the right contractor. Further, according to Huang (2011), the contractor prequalification can also be grouped in accordance with their area of expertise to execute a given project. Based on the study, either per project prequalification is used or alternatively, a standing list record is kept where project clients collate a list of past contractors as well as new contractors who are capable of completing similar projects registering their interest to carry out the work for a particular organisation.

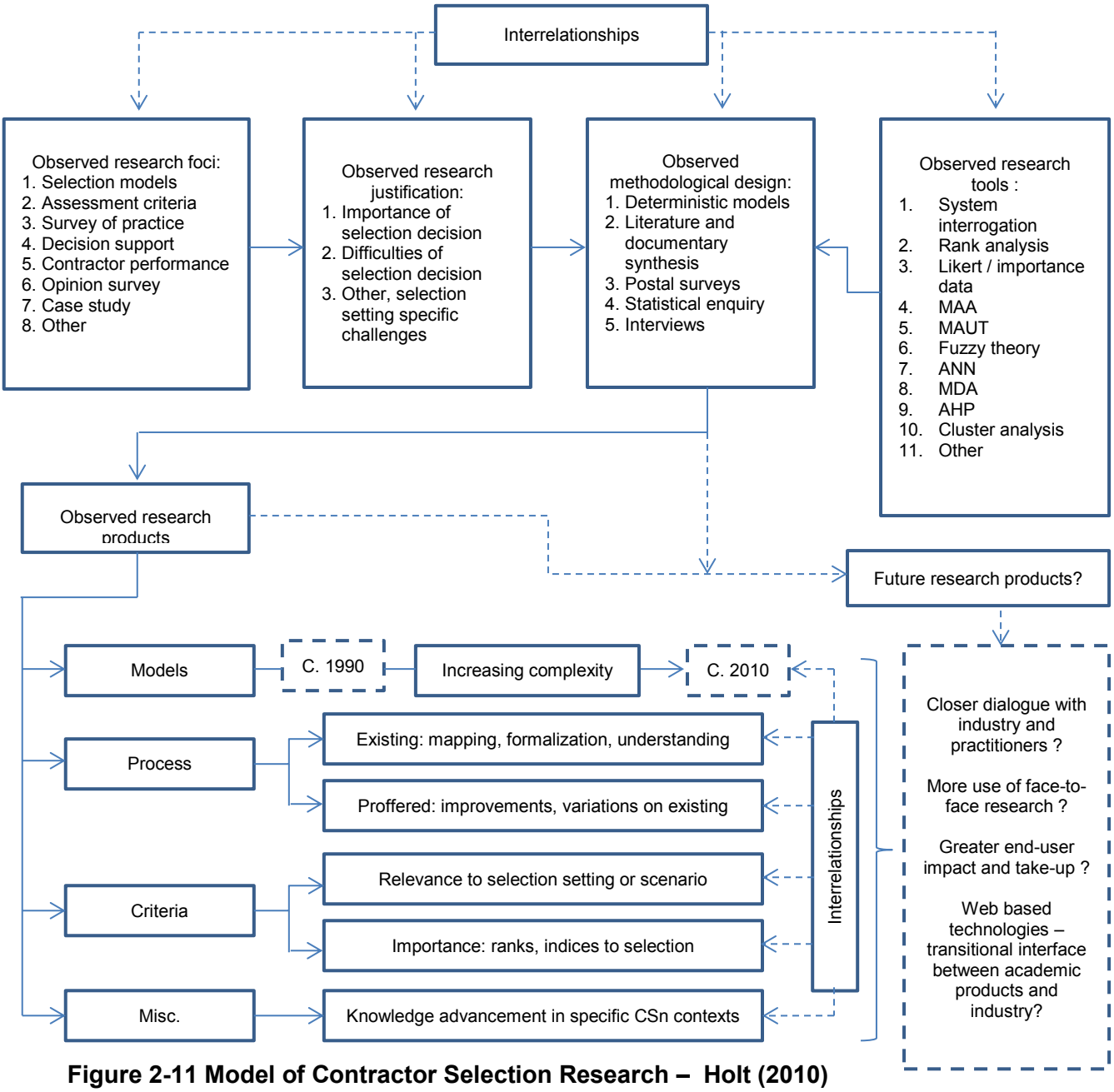


Figure 2-11 Model of Contractor Selection Research – Holt (2010)

According to Holt (2010) and as shown in Figure 2-11, the importance of selecting the most appropriate contractor for a project this is associated with achieving the desire project

outcomes by employing the right contract for the project. The interrelationships between the research instruments justify the relevance of contractor selection in the overall context of construction product procurement (Holt, 2010).

Some of the repeated themes for the prequalification of contractors include past experience, financial standing, workloads, and health and safety records. However, there is no universal prequalification method or criteria being use, according to Hatush (Hatush and Skitmore, 1998) it is essential to know how various contractor selection criteria can affect the project objectives such as time, cost and quality. According to Doloi (Doloi, 2009) the aim of selection is to achieve project success and the ultimate goal for every project. Some authors suggest a multi – parameter qualification methods to be used but the cost and time consumed to carry out the prequalification is high. Nevertheless despite the literature prescriptions above, the prequalification exercise usually depends on the project needs and requirements as well as the time and resources available to process the information by developers. Amongst regular developers the prequalification may be an on-going process to maintain an updated record of qualified contractors or it may be undertaken on a project basis when there is new project. For those contractors submitting prequalification documents and information, only contractors that fulfil the criteria set by the developers will be invited to submit a bid price. In multi criteria prequalification project clients assign different weights for different criteria and these can differ from project to project (Ke et al., 2013).

Eriksson and Westerberg's study (2010) recognised that the project characteristic moderates the type of procurement and cooperative relationship. For example traditional competitive procurement procedures are suitable in small, simple, and standardised projects where both time pressure and uncertainty are low (Eriksson and Westerberg, 2010). Further according to Eriksson (2007) reasons for construction failure then as many research found that majority contractor failure was due to the client having spent minimum time in evaluating and prequalifying the contractor ability to carry out the work before the contract was awarded and subsequently, the contractor failure increases the project cost and time overrun (Eriksson, 2007b) ex-post.

2.8.2 Bid evaluation

As mentioned in paragraph 2.3.3, the bid evaluation method for contractor selection frequently involves comparisons of price, contractor expertise, contractor financial standing among other factors depending on client needs and requirements, resulting in the approval of

one or more suppliers offers and rejecting others (Robinson et al., 1967). Price is often the most important parameter when buying standardised products (Eriksson, 2008a). When clients focus on price, they fail to take the opportunity to influence the characteristics of the supplier as this is considered unimportant in the pure market relationship (Heide and John, 1990). The research carried out for this study, most of the respondents replied that price is one of the important selection criteria in bid evaluation. This indicates a *laissez-faire* approach which according to Anderson and Oliver (1987) is related to output control.

Comparative bid evaluation techniques are useful in identifying sources of opportunistic behaviour before entering into a contract (Lingard et al., 1998). The client and his team will have the opportunity to clarify any misunderstanding and errors that could give rise to opportunistic practices. This evaluation technique could assist in identifying the pricing strategies of various tenderers and unethical practices of price loading at the beginning of the contract and eliminate sources of opportunistic behaviour.

However, these bid comparison evaluation techniques are based on the assumption that tendering is rational. In reality the bidding is unpredictable and far from any certainty, prices can vary according to type of material used, techniques of working, technological and economic factors. There is no certain method to measure the exact building component costs, further the tendering exercise by the contractor may not be a rational act and there are other criteria such as the contractor's technical ability, reputation, previous project achievement and quality of work, health and safety performance, all of which – along with others - will create the prospect of opportunistic behaviour. Additionally, the number of tenderers invited for the tender exercise must be controlled (Kim, 1998). For example in an excessive bidding situation, the winning bidder will renege on contractual obligations if any short term gain from opportunism is greater than a long term gain and according to Gansler (1989 CI Kim 1998), having fewer highly qualified bidders creates more effective competition than having a very large number of bidders. This contrasts with a normal free market environment, where as, the number of bidders increases the competition becomes more intense (Kim, 1998). Therefore, the developers will need to take a broader view and empty broader selection criteria when shortlisting and selecting contractors for their project in the bid evaluation, instead of simply selecting the contractor who performs the work at the lowest price.

Furthermore, construction transactions are highly complex, customised and of long duration (Eriksson and Laan, 2007) and yet the current procurement procedures such as those in Malaysia are highly focused on price (Shehu et al., 2014b). The traditional lowest price

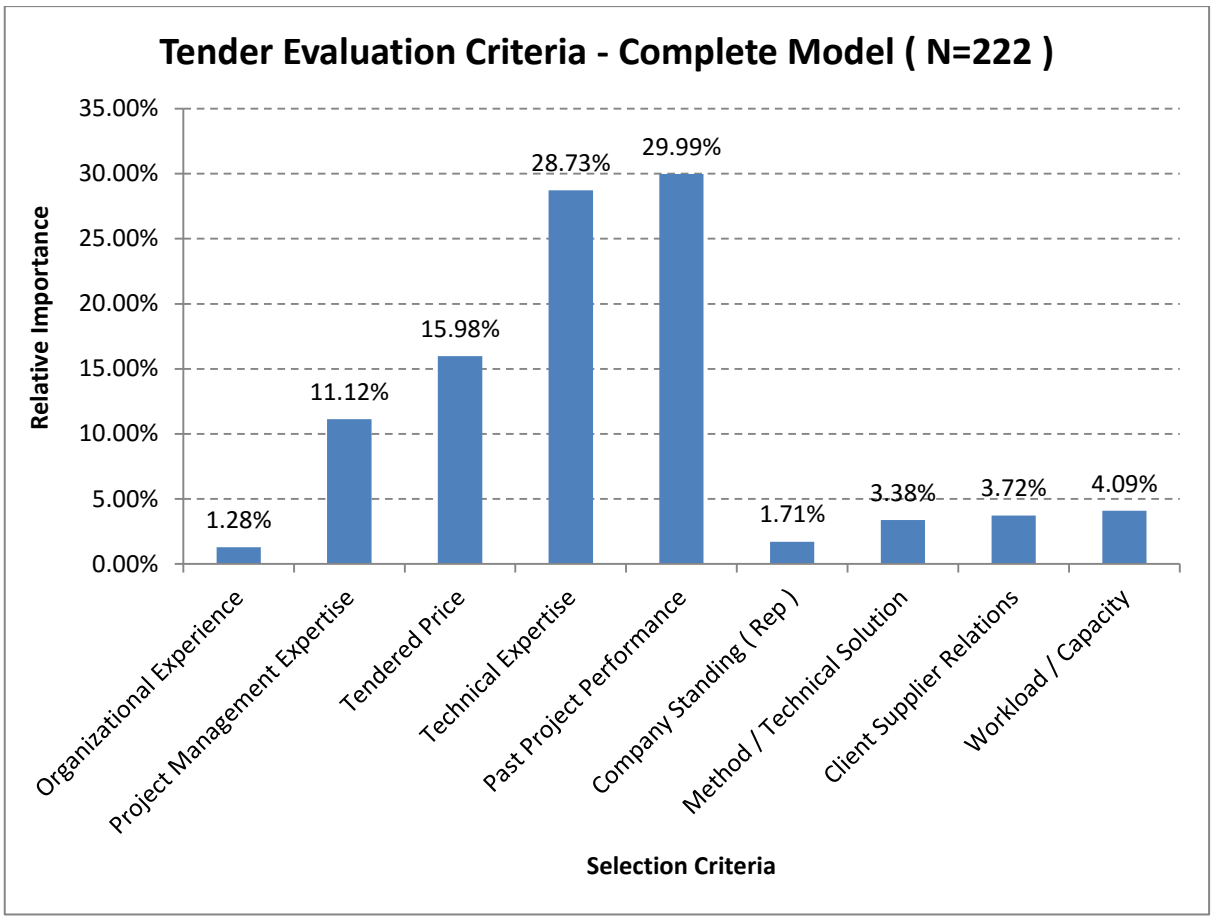
based award has been criticised for being incapable of being innovative (Egan, 1998), for poor productivity, low customer satisfaction (Rindfleisch and Moorman, 2003), conflicts (Shehu et al., 2014a) and, cost overruns (Eriksson and Laan, 2007; Egan, 1998; Kumaraswamy, 1996; Shehu et al., 2014a). Therefore, many literature especially those following the Latham Report (1996) call for procurement based on soft parameters such as contractor management competency, experience and financial standing (Doloi, 2009) in order to improve project performance in terms of time, quality, work environment and innovation (Eriksson and Westerberg, 2011).

2.9 Empirical study examined

2.9.1 Empirical study

This study extends the empirical study by Watt et al (2010) on the relative importance of tender evaluation and contractor selection criteria; and sets the framework of construction selection criteria for this study; the study was selected because it focusses on the domain of contractor selection, contractor selection criteria, and effects of relational norms on selection between the buyers and suppliers interaction as in this study.

From the survey carried out by Watt et al. (2010) the main criteria selected by the respondents are; past project performance (29.99%), tender expertise (28.73%), tender price (15.98%), project management expertise (11.12%) and other less important criteria. According to Watt et al. (2010) other criteria such as workload / capacity (4.09%), client supplier relations (3.72%), company standing (1.71%) and organizational experience (1.28%) make up the remaining selection criteria in their questionnaire. The important selection criteria resulting from Watt et al (2010) such as tendered price, technical expertise, past project performance, company standing and client supplier relations constructs are replicated for this study. Due to complexity surrounding the selection of contractor, and the variety of selection criteria available, the research set out to find how the housing development clients in Malaysia choose their contractor and what the influencing criteria in their choice of contractors are. (Note: Figure 2-9 below Tender Evaluation Criteria - Watt et al (2010) repeated here for easy reference)



In Watt et al.'s study (2010), there is a total of 222 respondents from mixed industries from pharmaceutical, construction, defence and aerospace, infrastructure and energy, manufacturing and processing, mining and exploration, telecommunications and information. Each respondent evaluated 16 individual Choice Sets comprising three alternatives, for a total of 10,656 observations. The study by Watt et al (2010) is concerned with establishing a common basis for determining the relative importance of criteria in the evaluation and selection of contractors. A multinomial logit model (MNL) was specified and Maximum Likelihood Estimation (MLE) was used to determine the utility estimates for all levels of criteria (attribute) under consideration, whereas this study uses the PLS method for data analysis and the benefits as described in the Chapter 4 – Research Methodology. Although Watt et al.'s study (2010) used a different approach; the selection criteria are relevant to the current study.

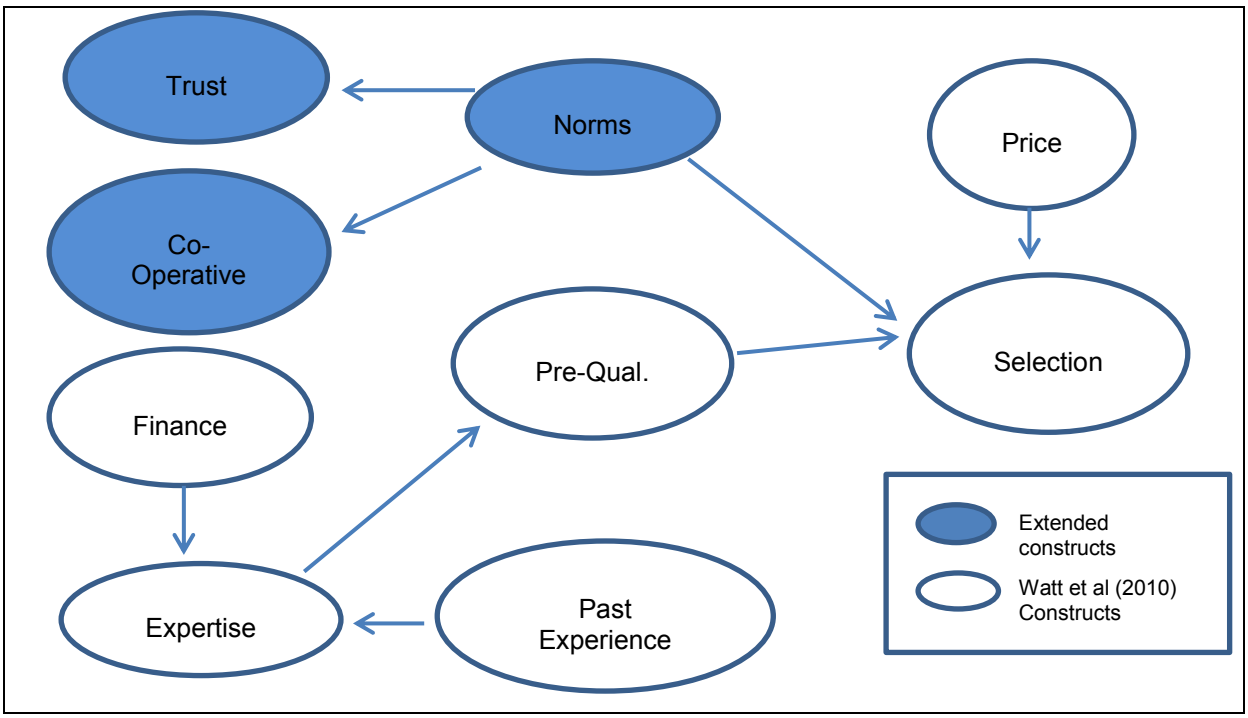


Figure 2-12 Conceptual model and additional constructs for this research

The current study extends Watt et al.'s study (2010) by firstly replicating the study's selection criteria and secondly, incorporated the trust and cooperative norms and to test the second order construct Norms in the new study. This approach is use to confirm and extend existing theory so that knowledge is more complete (Remenyi et al., 2000).

2.10 Summary

This review presents the literature on TCE and the make or buys decisions faced by the buying organisations. However, as explained in section 2.5 above, TCE theory is incomplete in explaining the state of market transaction. In fact according to Moran and Ghoshal (1996:41) the TCE theory is 'bad for practice' because Williamson's work assumption on behavioural uncertainties of the exchange partners is wrong, and that economic exchanges need to consider the social relations (Ghoshal and Moran, 1996: 41) and relationship dimension of the exchange partners as no one transaction is totally discrete (Macneil, 1978) - particularly in construction industry exchanges. Further, outsourcing remains an important part of the construction industry as developers and main contractors alike try to source for their 'best value' contractors, subcontractors, suppliers etc., in order to obtain the market rent. Therefore, the market does not develop as TCE theory prescribed and there is a need for better organisational economy (Simon, 1991) through the use of market resources.

Social embeddedness theory (SET) focuses on the relationship dimension of the exchange dyads as defined in Granovetter's study (1985). According to the literature, the exchange partner relationship can help not only improve the working relationships such as reducing cases of litigations, improve communication and reducing misunderstanding between the parties, but more importantly by improving project outcomes by using better selection practices (Amit and Schoemaker, 1993; Artz and Norman, 1998; Dyer, 1997; Heide et al., 1992; Morgan and Hunt, 1994). All these are the possible positive outcomes that a buyer can benefit from according to the literature. However, in order to implement the relationship dimension as suggested, the exchange partners will need time to develop and to build trust between them. Unless there is trust, the relationship dimension will not be possible. In a construction project context, the limited project duration may forbid such a long term relationship, after the project completion the parties may not have more dealing with the exchange partners involved. Therefore, in the project context, SET theory would only have limited application, despite the huge potential benefits.

Further, in practice, the trust between the organisations are handled by the individuals involved in the project who may change job or be replaced by their organisations, and the trust will have to be rebuilt which is time and resource consuming. These critiques of the organisational theories are identified because they fail to recognise the practical issues highlighted above and managers would need to know the consequences before they choose to adopt the theories.

In the construction context, formal or informal prequalification is important as this would help to source for better qualified contractors and eliminate the weak contractors, according to Pesämaa et al., (2009). In procurement, there should be less emphasis placed on the lowest bid price, but more focus on soft parameters. An important implication here for construction industry stakeholders is therefore that they must improve their understanding of contractor selection procedures and evaluate tender bids based on multi-criteria system as explained above, instead of based on price alone. Further, from the literature, developers may benefit from building relational norms such as cooperative norms and trust norms along with the contractual requirements in their contractor relationships in order to attain better project outcomes. In the next Chapter 3, the Research Models and Hypotheses will be discussed.

Chapter 3 Research Model and Hypotheses

3.1 Introduction

The purpose of this chapter is to set out the research model, identification of variables both independent and dependent, and develop hypotheses for every variable to be measured. The review of empirical study constructs and presents the integrated model. The structure of this chapter is divided into six interrelated sections and the chapter summary. Section 3.2 - Research problem; Section 3.3 - Research model; Section 3.4 - Hypotheses; Section 3.5 - Measurement approach; Section 3.6 - Case studies on effects of developers' firm size; Section 3.7 - Summary.

Further, this chapter aims to establish support for empirical testing of the research model. Based on the literature, a research model was developed which contained six independent variables; price, trust and cooperative norms, finance, organisational expertise and past experience and three dependent variables; norms, prequalification and selection. The independent variables are derived from perceived selection criteria and the dependent variables are derived from norms, prequalification and selection as shown in Figure 3–1 - this study's conceptual framework (Section 3.1.1 justifies the choice of independent and dependent variables).

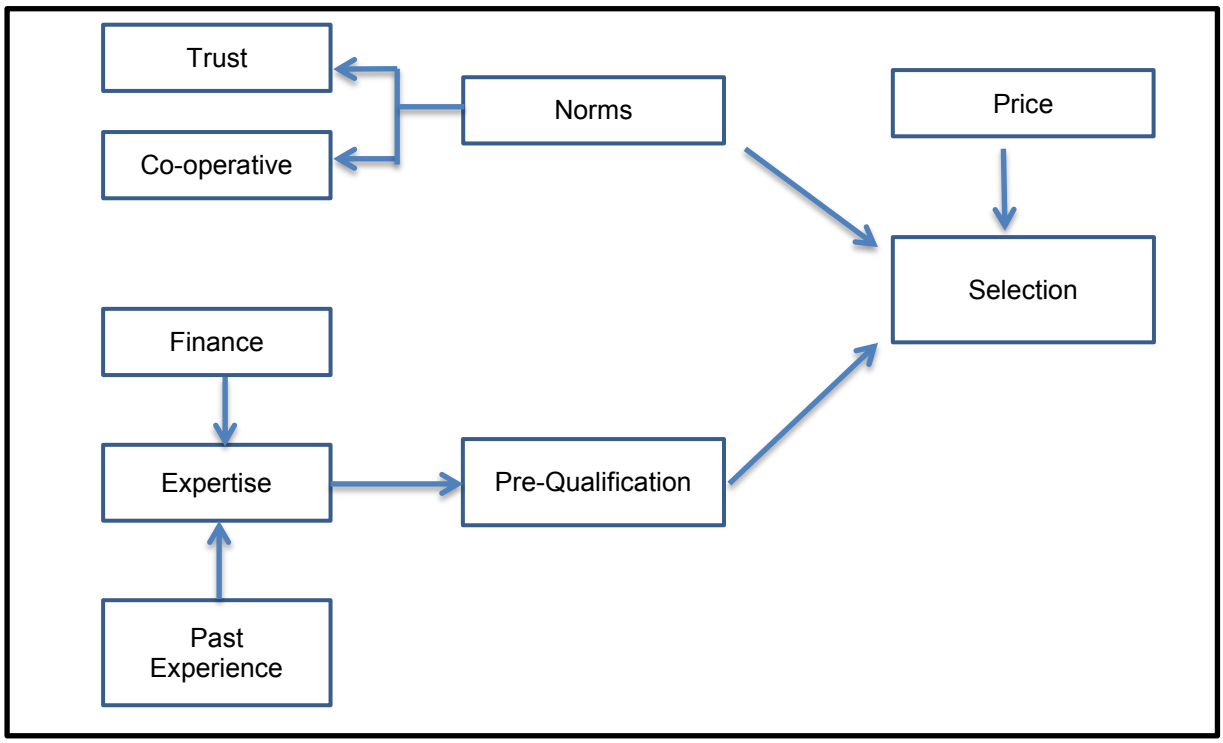


Figure 3-1 Conceptual Framework

The conceptual framework in Figure 3–1 shows the relationship between key variables identified from the literature. This framework is further elaborated in Section 3.3 – Research Model. Using the empirical data collected, testing and analysing of the evidence can be carried out to confirm or reject the theoretical conjecture or to develop a fuller or more refined theory (Remenyi et al., 2000) for which detailed reviews of findings are presented in Chapter 5 and Chapter 6. Therefore, according Remenyi et al. (2000), a generalization of the theory is possible if the empirical data or sample was representative of the broader population and the measuring instrument was valid and reliable. Further, the conceptual framework set up a 'waterfall' model (Remenyi et al., 2000) which shows the research process sequence after review of relevant literature and the research problem being dealt with.

3.1.1 Independent and Dependent Variables

This study focused on contractor selection criteria and the effect of these criteria on contractor selection. Therefore, the proposed independent variables are those variables that literature suggest could lead to successful selection of the most eligible contractor.

Published studies reveal that;

1. Price has an effect contractor selection. Several studies have researched the central effect of the tender price on contractor selection (Bradach, 1989; Sako, 1992; Waara and Brochner, 2006; Wong, 2001). With a lower price, raising the likelihood the contractor being awarded the job (Waara and Brochner, 2006). Further, based on Bradach et al study (1989), price, authority and norms form the basis of contract control mechanism. According to the authors, the UK construction industry has shown a tendency in the past, to award contracts based on comparison of tender price alone (Wong, 2001; Holt et al., 1995). Therefore, the selection is dependent on price variable.

2. Trust norms have an effect on contractor selection (Arranz and Arroyabe, 2012; Bradach, 1989; Das, 2001; Doney and Cannon, 1997). According to Bradach et al (1989), trust is a type of expectation that alleviates the fear that one's exchange partner will act opportunistically, while according to Zucker (1986), trust is a set of expectations shared by all those in an exchange, the higher the trust, the more likely the contractor will be selected. Therefore, selection is dependent on trust norms.

3. Cooperative norms have an effect on contractor selection (Das and Teng, 1998; Heide and Miner, 1992; Hill, 1990). Similar to trust norms, due to the uncertainties of the tasks and the opportunistic behaviour of contractors, developers need to have an adequate level of confidence in their exchange partners' cooperative behaviour (Das and Teng, 1998). Further, Das et al.'s study (1998) shows that partner cooperation can reduce the amount of uncertainty in the exchange and increase the predictability of partner performance. Therefore, selection is dependent on cooperative norms.
4. Contractor finance (cash-flow) has an effect on contractor expertise (Huang et al., 2013; Huang, 2009). According to Huang (2013), contractor prequalification must include the financial aspect of the construction firm. This helps to ensure that the selected contractor's organisation has the financial capability to complete the project. Therefore, contractor financial standing forms part of the contractor organisation's capabilities.
5. Past experience has an effect on contractor expertise (Holt et al., 1994; Wong et al., 2001; Singh and Tiong, 2006; Jafari, 2013). According to Singh's study (2006), a contractor that completed a past similar contract will be more likely to repeat the same performance for the next project they execute. Based on Jennings et al. (1998) price and company past experience on similar projects are important criteria in contractor selection. Therefore, the select of a contractor with similar past project experience is crucial for the next project outcome.
6. Organisation's expertise has a positive effect on prequalification (Hatush and Skitmore, 1997; Jennings and Holt, 1998; Plebankiewicz, 2009; Russell and Skibniewski, 1988). According to Singh and Tiong (2006), organisation expertise is important and Watt et al. (2010) state that organisation technical expertise is the most important criteria in the tender evaluation and contractor selection criteria according. Therefore, organisation expertise is an important criterion of judging contractor qualification and capabilities.

Hence, the prequalification of the contractor is dependent on contractor organisation expertise.

The above describes the six independent variables and justification as to choice of the independent variables for this study. Next, the dependent variables are discussed.

The three dependent variables are relational norms, contractor prequalification and selection.

- Norms in this study are defined as a second order construct (or higher order construct) consisting of trust and cooperative norms. The main reasons for inclusion of the higher order models or hierarchical component models (HCM) for this study are; firstly, to reduce the number of relationships in the structural model making the PLS path model more parsimonious (Hair et al., 2014), and secondly, the constructs are highly correlated as the correlations coefficient values are above 0.75 and second order construct can reduce collinearity issues and may solve discriminant validity problems (Hair et al., 2014).
- Contractor prequalification. In project tendering, a set of qualification criteria (such as financial standing, past experience and organisation's expertise) produced by project owners would be given to the tenderer to obtain information on their capabilities and also determine whether they fulfil the project owners' requirements. Therefore, contractor prequalification is dependent on the selection criteria given by project owners.
- Selection. The selection criterion is the outcome of the final decision on selection of the most eligible contractor and according to this study; it is dependent on price, relational norms and prequalification.

3.2 Research problem

An extensive body of literature underpins this study. Selection criteria such as price, trust, co-operative norms along with prequalification have impacted on contractor selection preference (Cai et al., 2011; Cai and Yang, 2008; Arranz and Arroyabe, 2012; Watt et al., 2010a; Watt et al., 2009; Heide et al., 1992; Blois, 2002; Meng, 2012; Meng, 2015). However, there is incomplete knowledge in the area of contractor selection criteria. The

main contribution that this study will bring to the literature is in understanding how these selection criteria affect contractor selection by developers in Malaysia. Nonetheless, prior to deriving these hypotheses, some overall research questions were developed from the literature and are repeated here for easy reference. (The detailed description of the research questions are provided in Chapter 1, Section 1.6).

Research question 1	how do relationships between developers and contractors affect the selection procedure?
Research question 2	how do the contractor's tender price, financial standing and expertise affect the selection procedure?
Research question 3	do housing developers in Malaysia carry out contractor prequalification as part of their contractor selection procedure?

In conclusion, the research problem is concerned with contractor selection problems and the effects of selection criteria such as price, prequalification and cooperative and trust norms on selection. These research questions develop the research focus and a research model emerges as shown in Figure 3–2. Therefore, this study will help to create new knowledge in the subject of contractor selection.

3.3 Research model

As discussed in Chapter 2, evidence of the decision to outsource is primarily a decision of cost - of obtaining the products and services cheaper than if the firm were to integrate the activity vertically - and to increase profitability (De Boer et al., 2001) and flexibilities in organizing firm resources (Yang et al., 2012). Further, in order for project clients to maximise the outsourcing benefits, a large pool of potential contractors are invited to compete in bidding for the project so that clients could obtain lowest possible price for the work. Hence, lowest price based procurement (see Chapter 2, Section 2.3.4.1) is the most common practice in the construction industry (Latham, 1994). However, to 'enjoy' the benefits of the economic 'rents' (Yang et al., 2012; Williamson, 1975), buyers or developers in this study, must know how to select the right contractor as "the economic man" such as contractors that make rational choices based on self-interest (Williamson, 1975), there is no promise of no shirking especially when the task is hard to monitor. The contractor selection by developers is thus crucial decision in ensuring that overall costs incurred in a contract are minimised

(Lingard et al., 1998) and give best value (Elyamany, 2014) and improve project outcomes (Watermeyer, 2012).

Following literature reviews on contractor selection, it was found that selection was dependent upon;

- **Trust Norms:** (Arranz and Arroyabe, 2012; Aulakh et al., 1996; Das, 2001; Doney and Cannon, 1997) (Kadefors, 2004). Trust is a set of expectations shared by all those in an exchange (Bradach and Eccles, 1989). For this study the concept of trust is derived from Bradach and Eccles (1989) study which includes diffuse social norms of obligation and cooperation and personal relationships that overlap with economic exchanges. According to Ganesan (1994), trust enable parties to focus on long-term benefits, enhancing competitiveness and reducing transaction costs (Noordewier et al., 1990). Bradach (1989) found that trust in interorganisational exchanges is an important deterrent to opportunistic behaviour and (Hill, 1990: 511) states that in a trust based approach "behavioural repertoires are biased toward cooperation rather than opportunism" and therefore, trust works as substitute for hierarchical governance (Aulakh et al., 1996). According to Bradach and Eccles (1989), trust complements the markets and hierarchies governance. When tasks are complicated and high uncertainties and high asset specificity, trust norms could achieve better performance (Meng, 2015). This trust relationship is essential in the construction industry as formal contracts are unable to describe all the contract requirements ex-ante due bounded rationality especially for complicated and high asset specificity projects. Therefore, the higher reliability and trust on the contractor, the more likely it is the contractor will be selected.
- **Cooperative Norms:** (Arranz and Arroyabe, 2012; Cannon et al., 2000; Tangpong et al., 2010; Poppo and Zenger, 2002; Eriksson and Laan, 2007; Eriksson and Pesämaa, 2011; Eriksson and Westerberg, 2011; Pesämaa et al., 2009; Cai and Yang, 2008; Heide et al., 1992). According Arranz and Arroyabe (2012), contracts, relational norms and trust act as complementary mechanisms in the governance of exchange relationship and cooperative behaviours which support relational norms and trust are more powerful in improving the performance of exploration projects. Similarly, Cai and Yang (2008) found that cooperative norms significantly impact supplier's performance and affects buyer's satisfaction while Solomon (1992) found that business competition requires cooperation. Whereas, Tangpong et al. (2010) indicated that relational norms and agent cooperativeness interact with each other in mitigating opportunism. Therefore,

cooperative behaviours such as information sharing, joint problem solving and conflict resolution that is embedded in the exchange relationship mediate interfirm conflicts, and promote the long term exchange relationship (Tangpong et al., 2010; Heide et al., 1992) and selection.

- **Price:** (Sako, 1992; Waara and Brochner, 2005; Wong, 2001; Wong et al., 2000; Eriksson and Laan, 2007) Price gives information on what to be delivered and the incentives to do it and is also associated with market relationships (Williamson, 1985). In the past traditional practice in construction industry lowest price wins were typical (Merna and Smith, 1990; Latham, 1994; Wong et al., 2000). According to Waara and Brochner (2006), construction industry and more especially the public sector has a long tradition of using the lowest bid as the award criterion. This study proposed price has an impact on selection where price is used by developers as the ultimate selection criteria.
- **Past experience:** (Watt et al., 2010a; Watt et al., 2009; Holt, 1998d; Mills, 2005 ; Ng and Skitmore, 1999; Russell and Skibniewski, 1988; Singh and Tiong, 2006; Alzahrani and Emsley, 2013; Doloi, 2009). Contractor's past experience is one of the major criteria in determining the successful outcome of a project. Past experience attribute has been selected by the respondents in studies by Singh and Tiong (2006), Alzahrani and Emsley (2013) and Watt et al (2010) on past performance. Particularly in Malaysia due to lack of competent contractors, lack of work experience is often one of the main causes of delays in construction industry (Shehu et al., 2014b). According to Alzahrani and Emsley (2013) past experience attributes such as type of project completed, past project size, length of time in business and experience in the region are critical to the success of construction project. This study proposes that past experience constitutes part of contractors' organisation's expertise.
- **Finance:** (Huang et al., 2013; Jennings and Holt, 1998; Mills, 2005 ; Russell and Skibniewski, 1988; Alzahrani and Emsley, 2013). Contractors' cash flow is very important for continuous work execution and usually requires the contractor to finance the work from the inception of the project before progress claims can be made and paid within the agreed time frame. Therefore, Merna and Smith (1990) quote financial stability as the top selection criterion; Holt (1994) quotes financial status as one of the selection criteria and according to Hatush and Skitmore (1997) the contractor's financial soundness is an important criteria in project delivery and therefore, contractor selection. Alzahrani and Emsley (2013) state that the contractor's past turnover, past credit facilities, bonding capacity and cash flow forecast are critical to the construction project's success. According to Huang et al. (2013) cash flows largely reflect a contractor's

capacity to meet its financial obligations and management of cash flow and credit liquidity reflect the construction firms' management ability (Huang et al., 2013). Therefore, this study proposes finance constitutes part of contractor organisation's expertise.

- **Contractor organisation's expertise:** (Aje, 2012; Holt, 1998d; Ng and Skitmore, 1999; Russell and Skibniewski, 1988; Singh and Tiong, 2006). Contractor organisation's expertise consists of organisation resources such as personnel experience, past project experience, and finance. According to Singh and Tiong (2006), the selection criteria such as company attributes, past performance, financial capability are top preferences in their survey on clients and contractors organisations. According to Alzahrani and Emsley (2013) other forms of expertise such as IT knowledge, knowledge of particular construction methods, work programming and experienced technical personnel are critical to construction project success. Merna and Smith (1990) quoted technical expertise and experience of similar project as the important attributes. Further according to Hatush and Skitmore (1997), contractor technical ability as one of the main selection criteria and Russel and Skibniewski (1998) study highlighted technical expertise and project specific criteria as the important contractors' attributes. Therefore, it is important that tenderers have the right organisational resources such as past project experience, financial and management capabilities and staff experience to reduce the risk and uncertainties on project delivery. This study proposes contractors' organisation's expertise has a positive impact on contractor selection.
- **Prequalification:** (Holt, 1998d; Jennings and Holt, 1998; Ng and Skitmore, 1999; Russell and Skibniewski, 1988; Watt et al., 2010a; Watt et al., 2009; Doloi, 2009; Alzahrani and Emsley, 2013; Crowley and Hancher, 1995; Ho et al., 2010; Merna and Smith, 1990; Wong, 2001). Aje (2012) found that the selection of a competent contractor through prequalification ensures effective delivery of the construction project. Russell et al (1997) opined prequalification helps overall success meeting goals and to ensure performance; whereas Jafari (2013) cited that prequalification helps to identify an array of eligible contractors and that the selection of qualified contractors could ensure the project objectives are achieved satisfactorily. Different researchers and different client organisations use varying prequalification criteria but according to Lam et al (2001) there are common characteristics in prequalification criteria used notwithstanding some variations in owners' objectives and project requirements to identify the suitability of contractors bidding for the project. This study proposes that prequalification has a positive impact on contractor selection.

The conceptual model is presented in Figure 3-1 and depicts the relationship between the variables under discussion. Section 3.3 above then presented the contractor selection criteria related to this study. Figure 3-2 shows the complete research model consisting of the research framework and the hypothesis. The following section will review the research questions in the form of hypotheses.

3.4 Hypotheses

From the three research questions, the research seek to establish the general research cogitation which will be reduced to a more specific, 'formal' set (Remenyi et al., 2000: 67) of specific and detailed research questions in the form of hypotheses. The term hypothesis is commonly used to mean a tentative explanation or subset of a theory that is taken to be true for the purpose of an argument, study or investigation and has the potential to be falsified (Remenyi et al., 2000). In order to support a theory or a hypothesis, a null hypothesis can be set up. Disproving the null hypothesis means that the hypothesis is supported and lack of evidence to support the hypothesis, denies what is being hypothesised (Remenyi et al., 2000); a null hypothesis. Therefore, a hypothesis will help to state the relationship of the constructs, for example, and it is necessary to see if the evidence supports it. According to Remenyi, It is also known as 'empirical generalisations' to test the possible relationship between two or more variables as shown in Figure 3–2.

Guided by literature, the theoretical foundation for the hypotheses is presented in this section. Based on the research frames offered by Watt et al (2010) on contractor selection criteria, Meng (2015) on trust norms, and Cai et al (2011) on cooperative norms; seven hypotheses are advanced;

H1: Norms is the second order construct with two sub-dimensions trust norms (H1a) and cooperative norms (H1b).

H2: Norms have a positive impact on contractor selection

H3: Price has a positive impact on contractor selection.

H4: Past experience has a positive impact on contractor expertise.

H5: Finance has a positive impact on contractor expertise.

H6: Contractor expertise has a positive impact on prequalification.

H7: Prequalification has a positive impact on contractor selection.

These hypotheses can be overlaid onto the conceptual model to create the research model used in this study as shown in Figure 3-2.

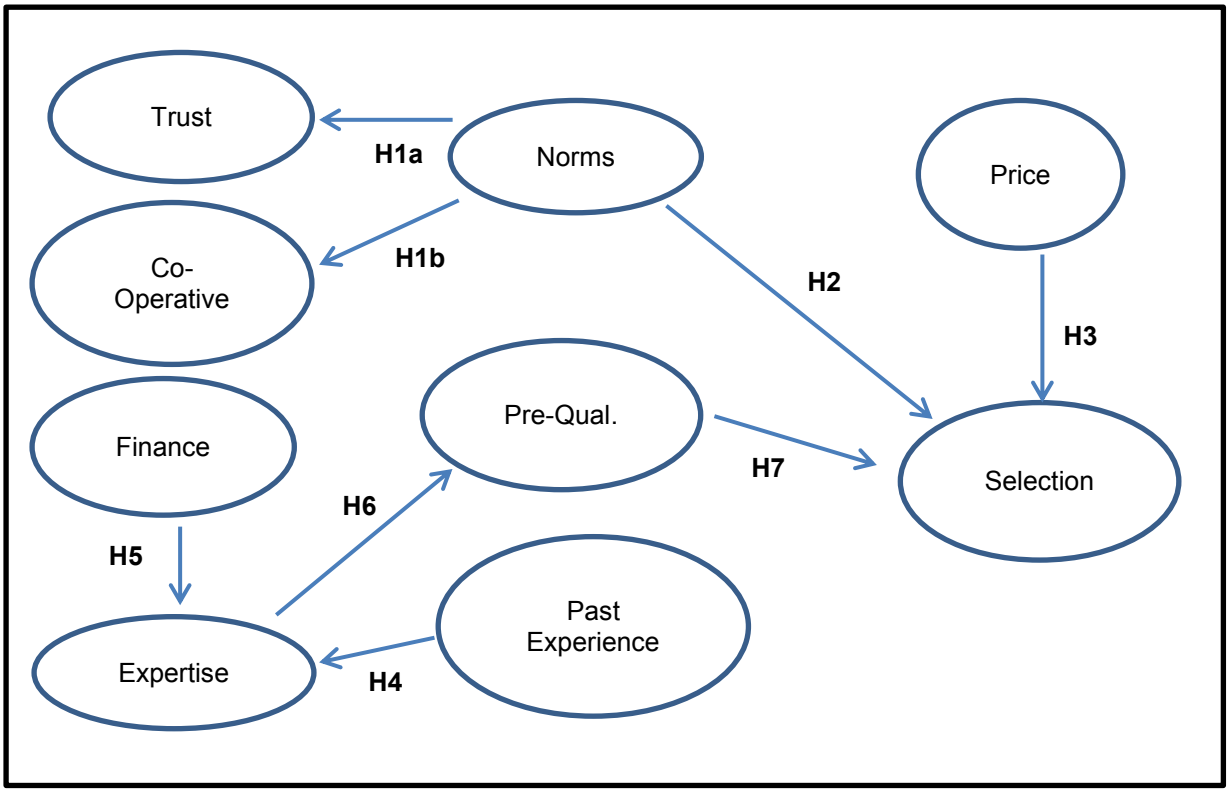


Figure 3-2 Research model

Unlike Figure 3–1, which shows the diagram based on theoretical conjecture, the research model as shown in Figure 3–2 sets out possible relationships between all the variables in the form of hypotheses statements. These hypotheses statements were used for statistical testing of the empirical data collected and each hypothesis will be considered in turn in the next section;

3.4.1 Second order constructs

Hierarchical component models (HCM) often involve testing second-order structures that contain two layers of constructs. According to Hair et al. (2014), by the inclusion of HCM in PLS-SEM, the researchers could reduce the number of relationships in the structural model, so doing helps to produce a more parsimonious model as well as reducing collinearity issues and finding additional information in the sub-dimensions.

For this study, HCM was established top-down in which the norms construct consists of two sub-dimensions trust norms and cooperative norms. Therefore,

H1: Norms are the second order construct with two sub-dimensions trust norms (H1a) and cooperative norms.(H1b).

This study aims to increase the understanding of multi-criteria contractor selection procedures and the effects of relational norms on contractor selection; literature suggests that trust and co-operation are critical to project success and further, relational norms promote efficient governance of construction projects and improve contractor performance (Artz and Norman, 1998; Poppo et al., 2014). Construction projects consist of complex procurement involving interdependences among many different technologies, sub-systems, actors and their activities (Eriksson and Lind, 2015) and according to Cai et al (2011) high asset specificity, incomplete contract and uncertainty give rise to problems of safeguarding supplier opportunism. Therefore, the industry needs to have a more cooperative relationship rather than adversarial and opportunistic behaviour to mitigate project delivery problems. According to transaction cost theory, traditional procurement focusing on competition is only suitable for less complex and repetitive projects with low uncertainties (Eriksson, 2008a; Williamson, 1979). An example of this type of construction is single family dwellings where simple and repetitive design and construction methods are used throughout the whole project. In with multi-family apartment blocks with modern facilities, the nature of construction works are generally more complex, and in high rise buildings with modern architectural features and therefore, increased uncertainty and other constraints such as pressure on time and budget which make the traditional procurement method unsuitable. With the higher level of complexity and uncertainty, information sharing and coordination is important, hence it is desirable to have a higher focus on cooperation than competition (Olsen et al., 2005; Caniëls et al., 2012; Cai et al., 2011; Eriksson and Westerberg, 2010). The governance modes for the latter would need to be based on more cooperative norms and trust (Dubois and Gadde, 2000; Eriksson and Westerberg, 2010). Further, relational norms that are based on trust foster a spirit of co-operation that can lower the cost of a transaction by reducing the extent of opportunism (Rokkan et al., 2003). With strong trust and cooperative norms, contractors may not act opportunistically even in a situation where the contract and / or monitoring is incomplete. Further, construction activities rely on a lot sharing of information and coordination from the developer to main contractor and to subcontractor to improve the performance of the supply chain activities.

However, traditionally, the nature of construction industry relationships is described as competitive, fragmented, and adversarial (Egan, 1998; Latham, 1994). These include adversarial relationships between clients and contractors, lack of adequate information exchanges and contracting styles (Kwawu and Hughes, 2005). This leads to performance

uncertainty, contractor commitment on the project and opportunistic behaviour (Williamson, 1979). Therefore, contractor procurement should base more on trust and cooperation where the legal contract cannot provide the safeguards against opportunism (Elfenbein and Zenger, 2013; Poppo and Zenger, 2002; Hadfield, 1990).

Further, trust can operate in the supply chain activities (as in the construction industry supply chain) as an informal governance mechanism that helps to facilitate coordination in the dyads (Bradach, 1989; Heide, 1994; Capaldo and Giannoccaro, 2015). In the high relational exchange such as trust and cooperation, there is flexibility to award projects to friendly contractors based on trust without formal prequalification especially when the project exhibits low uncertainty and less complicated work. This practice could help to reduce the contractor selection expenses and shorten the contractor selection time (Eriksson and Westerberg, 2010). However, there is a gap in the above literature which does not address the impact of norms on contractor selection by the housing developers. Therefore;

H2: Norms has a positive impact on contractor selection

3.4.2 Bid price

In order to assess the role of price on contractor selection procedures, the respondents were asked in the questionnaire whether; 1) price is the single most important criteria in the contractor selection process and; 2) their company always award project to the lowest tenderer; 3) compares tenderer prices with the lowest bidder; 4) puts pressure on the tenderer to lower their tender price; and 5) their company is bound to accept lowest tender bid. The questionnaire survey is designed to get in-depth knowledge of how developers deal with bid price and their attitude to lowest bid price selection. Construction industry literature is still dominated by the principle of acceptance of lowest price (Bradach, 1989; Wong, 2001; Wong et al., 2000; Waara and Brochner, 2006) especially in Malaysia. In the study by Shehu et al (2014) conducted in Malaysia, the majority of tender procedures are by the open tender method where the competitive fixed-price tender procedure is being used. Further, focus was given to the lowest price bidders as the lowest tender price gives better cost performance according to the study (Shehu et al., 2014a; Wong et al., 2000; Wong et al., 2001). In competitive tender procedures, often during the tender negotiation stage, developers will put pressure on tenderers to reduce their prices further in order to stay in the race. This practice of lowest price wins is also a known worldwide phenomenon especially in the public sector procurement according to Pesamaa and Eriksson (2011) in a study conducted in Sweden.

Nonetheless, in terms of tender strategy and - in order to increase the chance of success in winning bids and work, the contractor will use price strategy to win jobs (Fayek et al., 1999). Price is also associated with output control (Hennart, 1993) i.e. when the asset specificity is low and the client may not carry out close monitoring of the contractor's work except control of final output of what the contractor produces. In other words, for simple repetitive transactions, less complicated, low uncertainty works, selection based on price is recommended (Eriksson and Westerberg, 2011). However, the literature did not address the issue in housing development projects and how the bid price impacts selection of contractors for housing development projects of varied company size. Therefore,

H3: Price has a positive impact on contractor selection.

3.4.3 Past experience

In a UK study conducted by Holt et al. (1994), past experience was highly ranked on the UK practitioners' questionnaires. Each construction project is unique in design, is often one of its kind for a long period of time and it requires a different construction method, specification and degree of specialization (Behera et al., 2015). Those contractors with similar project experience will reduce the project learning curve upon award of the project, hence reduce uncertainties in terms of time and cost and increase the project success rate. Therefore, the size and type of the past projects completed by the bidders received a high score as many project clients have experienced problems stemming from employing contractors who had taken on a project that was too large for them to handle (Holt et al., 1994) or was outside their technical capability to execute the project. The ideal project size for tenderers should not be more than the contractor's maximum workload capacity. In another study by Watt et al (2010), past project performance is the most important criteria in the tender evaluation process in order to predict the future performance of the contractor; in other words, the contractor has the proven past project success record that clients are looking for. In this study, developers were asked if the tenderers must have a certain minimum of years of experience, if they had completed a similar size and type of project in the past and also good past project performance before the contractors are allow submitting their bids.

Therefore,

H4: Past experience has a positive impact on contractor expertise

3.4.4 Finance

According to Wong et al (2000), there is a call for change from the lowest price wins selection process to multi criteria selection (Wong et al., 2000), identified the top nine out of 37 project specific criteria including contractor financial arrangements and 'technical – economic' analysis which is part of contractor finance. According to Huang et al (2013) a contractor under financial constraints tends to fail to fulfil its obligation (i.e. interest payment or debt payment) or even collapse, likely incurring a delay or failure in its construction project. Therefore, contractors with healthy cash flow would be able to fund the construction works and help to ensure on-time project delivery.

Generally, company profitability, healthy bank balances, suppliers' credit terms and bank financial arrangements will form the financial standing of a construction company (Huang et al., 2013). According to Holt et al (1994), contractor financial stability is the most important criteria and this criterion could determine the success or failure of a project (Holt et al., 1994; Huang, 2011). Bank reference and turnover history are the two most important variables under this criterion. Further, it is also recognised that firms with good financial standing would have a better bank credit rating and therefore, a lower cost of debt meaning they can borrow more from bank facilities should they need it (Karampatsas et al., 2014). Further, a better rating with material suppliers will help the contractor to obtain longer payment terms and a larger credit limit. In general construction business, the profits margins are often relatively low (Jafari, 2013 ; Topcu, 2004) as compared with the high level of uncertainties during the course of the work (Morrell, 1987). Russell (1991) points out that more than 60% of construction contractor failures are due mainly to economic factors. As a result, contractors need to maintain high levels of working capital or to seek effective alternatives to reduce or even transfer risks. One alternative is to reserve a certain level of working capital to deal with the uncertainties (Chen and Chen, 2012).

Additionally, in Malaysia, the contractor's financial burden can be further aggravated by the delay of payments from their clients which is a common occurrence in the local construction industry, hence, the Security of Payment Act 2014. As the result, contractors need to source sufficient funds to meet the cost of regular expenditure such as business fixed costs including general overheads and salaries, subcontractors and material suppliers) in order to ensure continuance of work on site. Contractors that are unable to generate sufficient short term cash flow to pay for these expenses may face subcontractors slowing down work at the site and further the threat of project stoppages if the material suppliers unable to supply materials due to payment problems. The above evidence shows the importance of

contractor finance in relation to the progress of work on site and liquidity of the firm. Therefore, in order to ensure uninterrupted work progress, developers will be in favour of selecting contractors with strong financial standing in the contractors' evaluation exercise. Therefore,

H5: Finance has a positive impact on contractor expertise

3.4.5 Contractor expertise

In Watt et al.'s study (2010) contractor technical expertise is the second most important criteria after past project performance. Considerations of technical expertise include the contractor organisation's management expertise, number of years of experience, the number of qualified full-time technical staff such as project managers, engineers and quantity surveyors. These criteria show the organisations have the technical capability to handle the project they are tendering for. IT knowledge and construction industry board registration prove that the contractor is up to date with construction industry related management and technical software developments issues.

According to Watt et al (2010), for large projects, with a significant engineering component, clients expect a technically compliant solution from the contractor. The contractor's experienced technical personnel and work programming in delivering the project, coupled with good past performance and good finance management could reduce the risk and uncertainties associated with the project delivery. Therefore,

H6: Contractor expertise has a positive impact on contractor prequalification

3.4.6 Contractor prequalification

Tenderers should have the necessary expertise and skill to handle the job they tender for in order to be a qualified contender.

"*Prequalification is an effective system which allows clients to seek tenders from contractors…. of equivalent size, capability and experience*" (Latham, 1994).

Prequalification is defined by Moore (1985) as the screening of construction contractors by project owners or their representatives according to a predetermined set of criteria deemed necessary for successful project performance, in order to determine the contractor's competence or ability to participate in the project bid. Russell (1988) opines that the prequalification decision on contractors could determine the success or failure of the entire project. According to Palaneeswaran and Kumaraswamy (2001), contractor prequalification

is generally preferred by clients to minimise the risks of contractor failure and enhance the performance levels of the selected contractor. Whereas, Clough (1986) deduces that since prequalification means that a firm which intends to participate in the tendering needs to be qualified before it can be issued bidding documents or before it can submit a bid proposal, this could reduce the time of the client's evaluation team needs to identify unqualified tenderers (E. and Kumaraswamy, 2001). Apart from fulfilling the general criteria, clients generally would assign higher weightages to the criterion that is important to that particular project, therefore, prequalification can also assess the degree to which the contractor fulfils the criteria. Multi-criteria techniques are proposed by Huang (2011) in order to investigate the construction firms' backgrounds. Contractors' quality could be sourced through careful prequalification and evaluation of the contractor's past experience, technical expertise, financial standing, health and safety records, completion on time and quality of work completed (Doloi, 2009; Mills and Skitmore, 1998). By combining these attributes, the successful bidder will be the one with the highest value of the multiple attributes thus reducing the risk of project delivery problems. However, notwithstanding with the benefits of the prequalification exercise, there is gap in the literature which does not address the housing developers preference as to whether or not to carry out prequalification due reasons such as lowest price offered and/ or previous relationship with the contractor. Therefore,

H7: Contractor prequalification a has positive impact on contractor selection

3.5 Measurement approach

The measurement approach for each of the theoretical constructs in this study model is described and illustrated in Table 3-1

Table 3-1 Constructs and Items Summary

	Constructs		Item Ref Note 2	Questions
B1	**Pre-qualification** Note 1	1	-	My company always carries out formal prequalification before tender
		2	-	My company undertakes a standard prequalification form for every new project
		3	-	Formal prequalification is not an important criterion in the contractor selection process in our company
		4	-	Our company does not have the manpower to handle a formal prequalification exercise
		5	-	Our company is willing to work with existing contractors no matter what is the outcome

		6	PQ1	My company relies on formal prequalification to source qualified contractors for our project
		7	SEL1	My company believes that prequalification will help us to find the "best value" tenderer
		8	-	My company believe that prequalification is a purely subjective analysis
		9	-	The prequalification exercise would not produce the result it is intended to as the final selection is always dependent on the tender sum
B2	**Company Standing**	10	FIN1	The tenderer must have strong financial record such as paid-up capital, analysis of accounts and a positive annual income
		11	FIN2	The tenderer must have good credit rating such as bank finance facilities or arrangements and references
		12	FIN3	It is important the tenderer has a past turnover equal or higher than the project they are being asked to tender for
		13	FIN4	The tenderer must have good credit line with their suppliers
B3	**Tender Price**	14	P1	Price is the single most important criteria in the contractor selection process
		15	P2	My company always awards the project to the lowest tenderer
		16	P3	My company always compares tenderer price with the lowest bidder
		17	P4	My company always puts pressure on the tenderer to lower their tender price
		18	P5	My company is bound to accept lowest tender bid
B4	**Technical Expertise**	19	EP1	The tenderer must have a minimum of 5 years' experience in the business
		20	TE1	The tenderer must be a registered contractor with the Malaysian Construction Industry Development Board or the relevant board for the type of project tender
		21	EP2	It is important for the tenderer to have completed a similar size and type of project in the past
		22	EP3	My company always checks the tenderer's past project records such as project failures and schedule performance
		23	TE2	It is important the tenderer submits their quality control (QC) policy and audited work quality records
		24	TE3	It is important that the tenderer employs an in-house, full-time qualified project management team such as Project Manager, Engineers and Quantity Surveyors
		25	TE4	It is important that the contractor has the relevant IT knowledge such as electronic documents management systems, e-tendering capabilities, 'AUTOCAD' or equivalent software for information exchange
		26	TE5	It is important that the contractor submits the list of their subcontractors and suppliers

B5	**Client and Contractor Relationship**			**Trust Norms**
		27	TR1	We intend to do business with this contractor well into the future
		28	TR2	My company does not hesitate to do business with this contractor when the situation is vague
		29	TR3	It is important this contractor is trustworthy and fair in its negotiation with us
				Co-Operative Norms
		30	CO1	It is important there is a cooperative attitude between my firm and this contractor
		31	CO2	A formal selection process is not necessary due to our close relationship with this contractor
		32	CO3	Our relationship with this Contractor reflects a happy situation
		33	CO4	If there is disagreement our company always settles the dispute with this contractor without resort to litigation

**Note-1: - The Prequalification items were not use as independent variables. Prequalification is a pre-tender exercise to evaluate the quality of contractors / tenderers before they are allowed to submit tender bids.*
Note-2: - The item reference shows the actual items for the PLS-SEM measurement model.

The table 3-1 above shows the description of the questions and the items used in the model testing with 7-point Likert-type scale on the response.

- B1 – Contractor prequalification. This construct describes the use of prequalification in the contractor selection process. These items describe decisions such as on the importance of prequalification, manpower to handle prequalification, finding best value contractors (Walraven and B., 2009) and the effectiveness of prequalification method in the contractor selection. These prequalification criteria were adapted from the study Watt et al (2010).
- B2 – Company standing. This construct describes company financial standing especially in the domain of financial records, paid-up capital, credit rating and supplier credit line offered to contractors. The construct was adapted from Huang et al (2013) in which the prequalification of contractors' financial abilities is recommended.
- B3 – Tender price. This construct describes developers' attitudes to price and the selection of the lowest tender price.

- B4 – Technical expertise. These items define contractors' technical capabilities in business experience, past similar project, quality control, professional personnel and their relationship with subcontractors and suppliers. These items were adapted from Singh and Tiong (2006).
- B5 – Client and Contractor relationship. These items define close relationship, continuity of business and trustworthiness due to close relationship and amicable settlement of disagreement. These items used are based on the ones developed by Doney and Cannon (1997) and Wuyts and Geyskens (2005) modified to reflect this study particular context.

3.6 Case studies on the effect of developers' firm size

The respondents were stratified based on the firm turnover size; Case 1 Aggregate (Overall) firms; Case 2 – Small size firms; Case 3 – Medium size firms; and Case 4 – Large size firms and lastly, overall firms results. These hypotheses will be crossed validated with four case studies. This is carried out to determine if there is consistency between the constructs for different firms' size.

3.6.1 Characteristics of developer's firms

The characteristic and size of the firms are important in determining their contractor selection preference. Generally, from the questionnaire survey results, low-rise single family houses are for example, usually carried out by a large number of small developers as entry to the market is relatively easy with low capital investment as compared to the high-rise multi-family apartments projects which involve much higher capital investment and more complex construction methods to fulfil state of the art architectural challenges. These projects are usually undertaken by large developers with a bigger and more experienced pool of personnel. Further, the staff strength of the organisation will normally depend on the type of projects as well as number of project that the firm handles at any period of time. In small firms, for example, it is not uncommon that the companies are managed and operated by the business owners themselves with few administrative personnel in order to keep overhead costs low. Usually, such small firms would not have the manpower to conduct formal prequalification on every project as the prequalification exercise can be very time and resource consuming. Moreover the business owners of small firms would usually build a

direct relationship with their contractors or suppliers, hence, eliminating the needs for formal prequalification or formal contract as argued by Larson (1992) formal contracts are unnecessary if there is informal social control. If one party trusts the other, there is no need for contractually specifying actions. Therefore, relational governance lowers transaction costs and facilitates adaptive responses. Similarly, Macaulay (1963) contends that not only are contracts and contract law not needed in many situations, but their use may have, or may be thought to have undesirable consequences; detailed negotiated contracts can get in the way of creating good exchange relationships between business units". Macaulay suggests there is no use for elaborate contracts because they indicate a lack of trust and blunt the demands of friendship (Macaulay, 1963). Another study by Poppo and Zenger (2002) also found that relational governance and formal contracts can work as substitute, which operates through one of two mechanisms. Relational governance also lowers transaction costs because drafting a complex contract is costly, and parties undertake such a cost only when the consequences of a contractual breach are considerable (Poppo and Zenger, 2002).

Unlike small firms, large firms are usually more hierarchical and practiced in authority control processes in their organisation structure. With more experienced manpower they have sufficient knowledge to handle formal prequalification tasks. Further, for large firms, with higher value projects and higher capital investments they would have better budgets to employ a pool of technically qualified personnel and external consultants to provide their professional services in conducting the contractors' prequalification on every project. Apart from formal contractor prequalification, the consultants can assist in carrying out comparison of tenderers in order to obtain the best possible technical abilities, experience and price for that particular type of project on their client's behalf. Therefore, due to different objectives and project requirements and resources, the medium to small size firms do not carry out formal prequalification but reuse of existing contractors' services (Chen and Chen, 2012) hence, the variation in contractor selection method.

3.7 Summary

This chapter presented the research model, the hypotheses, and the case studies used in the study. The conceptual model was defined and hypotheses proposed based on findings from the literature. Hypothesis H1 is concerned with the higher order constructs; H2 is concerned with the present of trust and cooperative norms in the bilateral exchange; H3 is concerned with the effect of price on contractor selection; H4 is concerned with contractor past experience on contractor's expertise; H5 is concerned with the effect of contractor finance on contractor's expertise; H6 is concerned with the effect of contractor expertise on

contractor prequalification; H7 is concerned with the contractors' prequalification selection. Chapter 4 will focus on the research methodology used to carry out this study.

Chapter 4 Research Methodology

4.1 Introduction

This chapter describes the methodology used and the general research strategy outlined how this research was undertaken, often referred to as the researcher's "procedural framework" (Remenyi et al., 2000: 28). It identifies the methods utilise for data gathering, and data analysis in a particular procedure to produce results that are robust, reliable and replicable (Robson, 2002; Remenyi et al., 2000).

Hence, this chapter is divided into eight related sections. Section 4.2 describes what is meant by business research and sets out the research and philosophical background to this study by considering the ontological and the epistemological view of knowledge; Section 4.3 reviews the research problem; Section 4.4 describes the research ontology; Section 4.5 describes the research design; Section 4.6 describes the questionnaire design; Section 4.7 reviews the survey instrument and population; Section 4.8 presents data analysis methodology consideration and Section 4.9 provides a chapter summary.

4.2 What is business research?

Why do business research? Business research is usually carried out on topics relating to questions relevant to business and management by academic researchers. According to Bryman and Bell (2015), business research may be motivated by developments and changes in organisations and societies. Business research draws on social sciences for conceptual and theoretical inspiration and for guidance on the formulation of research topics and interpretation and derives implications from research findings. Remenyi (2000) cited that the need for research is related to the fact that there are many issues and subjects about which we have incomplete knowledge; the fast changing nature of the subjects means there are unanswered questions (Remenyi et al., 2000) or gaps in the subject area.

The aim of this study is to extend the theoretical and empirical works on interorganisational interaction in the areas of contractor selection, prequalification (Watt et al., 2010a) and relational norms. This empirical research "will allow knowledge gained through experience and the senses is acceptable, however, ideas must be subjected to the rigours of testing before they can considered knowledge" (Bryman and Bell, 2015: 22).

As shown in the Chapter 2 Literature Review, there is a gap in the literature in these area of contractor selection criteria, prequalification and the effects of developers and contractors relationships on contractor selection. Given the problem considered, what is the most suitable approach for this research project? The primary objective of this research is to

substantiate theory through an empirical investigation of hypothesised causal relationships in the interorganisational exchanges. Although according to the earlier research there is never a single, standard, correct method for carrying out research (Simon, 1969: 4; Remenyi et al., 2000), however, a systematic methodological approach will ensure the minimisation of errors arising from measurement, collection, analysis and inference.

4.3 The research focal point

A review of the literature (see Chapter 2) revealed that most construction works are outsourced. In order to outsource successfully, there must be an outsourcing or procurement strategy in place. The focal point of this study is of trying to better understand the contractor selection practices and the effects of selection criteria such as price, prequalification and cooperative and trust norms on the relationship between a client and their contractor, in order to achieve the desire project outcomes. The questions of specific interest are; 1) the effect of developers' and contractors relationships on selection; 2) how tender price, financial standing and contractor's organisation's expertise affect the selection and; 3) whether housing developers in Malaysia carry out prequalification exercise as part of the contractor procurement exercise.

As mentioned above, the procurement of suppliers such as contractors is both a very time and resource consuming process, with no guarantee of a successful outcome. For example, in order to obtain the most competitive price, developers may try to obtain a large number of contractors to participate in the tender, but developers may not get to enjoy any cost savings if project objectives such as time, cost, quality, health and safety, environment issues are not met and rectification work costs ensue. From the literature (see Chapter 2, Section 2.1), there are examples of problems associated with procurement weaknesses that can lead to cost and time overruns in the Malaysian context, such as the competitive price method mentioned above. Hence, there is a need to change and adopt broader contractor selection criteria instead of using traditional procurement based on price alone. According to the literature, a multi criteria selection coupled with relational contracting is of paramount importance to reduce the risk of cost, time overruns, and lacking cooperation and trust relationships. This study aims to make steps towards explaining how developers select their contractors in order to achieve the project objectives.

4.4 The research ontology

Having described the research focal points above, the research method will depend on the ontological approaches. There are two main ontological views in business and management

research; positivist and constructivist (Remenyi et al., 2000; Robson, 2002; Bryman and Bell, 2015). Positivist or positivism is an epistemological stance relating to the question of what should be regarded as acceptable knowledge in a discipline. The term positivism was invented by French philosopher August Comte in the nineteenth century (Chia, 1997). According to Comte (1868), knowledge develops from theological to a metaphysical and finally to a positivist stage in which non-observable entities and abstract principles are rejected in favour of the primacy of empirical observations (Chia, 1997). In positivism, the role of research is to test theories and to provide material for the development of laws (Bryman and Bell, 2015). In order to test theories, the researcher deduces hypotheses (propositions) in the theoretical domain. Further, the researcher task entails the collection of empirical data which are based on generalizable propositions that can be tested (Bryman and Bell, 2015). Therefore, guided by hypotheses, the data collection will help to develop the conceptual framework, and conclusions can then be drawn from the analysis about the structure and functioning of organisations and the behaviour of groups and individuals within them (Pugh 1983, CI Bryman and Bell, 2015). The conclusions we can draw from findings are to confirm or reject hypotheses proposed and as a result, to provide revision of theory itself. In the process called induction, the researcher infers the implications of the findings where the results are being compared and contrast with the existing theory. The outline of this deduction process is illustrated on Figure 4-1.

Therefore, with the intention of obtaining industry opinion, this study applies the positivist methodology with its focus on REHDA the organisation represents housing developers in Malaysia, on their contractor selection criteria preferences and their relationship with contractors. The positivist empirical work not only allows this research to gather developers' views from within in the industry, but also to build and extend the existing theories in the domain of contractor selection such as contractor selection criteria and the effects of relationship in the selection method.

Constructivist ontology (or phenomenological ontology) takes the philosophical stance that everything in our world is socially constructed and subjective means are the only applicable approach. The phenomenological school of thought started with the work of Franz Brentano (1838-1917) and was developed by Edmund Husserl (1859-1938) (Remenyi et al., 2000). This ontology can be interpreted as there is no external reality that is independent of human consciousness (Remenyi et al., 2000: 34-35). This phenomenological research does not readily contribute to generalisations and is therefore not suitable for studies that involve the gathering of data from industry such as the residential development industry in this study.

The above philosophical stances helps to set the framework which describes how the research to be conducted (Remenyi et al., 2000). This research applies positivist deductive methodology where the focus is on the organisation and its behaviour. The process of deduction then is to establish 1) the theory and what is known about the domain and the theoretical considerations within it, 2) the hypothesis (or hypotheses) generated in the subject area and contingent to empirical testing, 3) the specific way of collecting the data in relation to the hypotheses. 4) the data analysis and findings 5) the findings are either which are either confirm or reject the hypotheses and 6) whether the proven theory is extends or amends the existing theories (Bryman and Bell, 2015) in the induction process. The induction process will be explained in more detail in Section 4.4 Research Design.

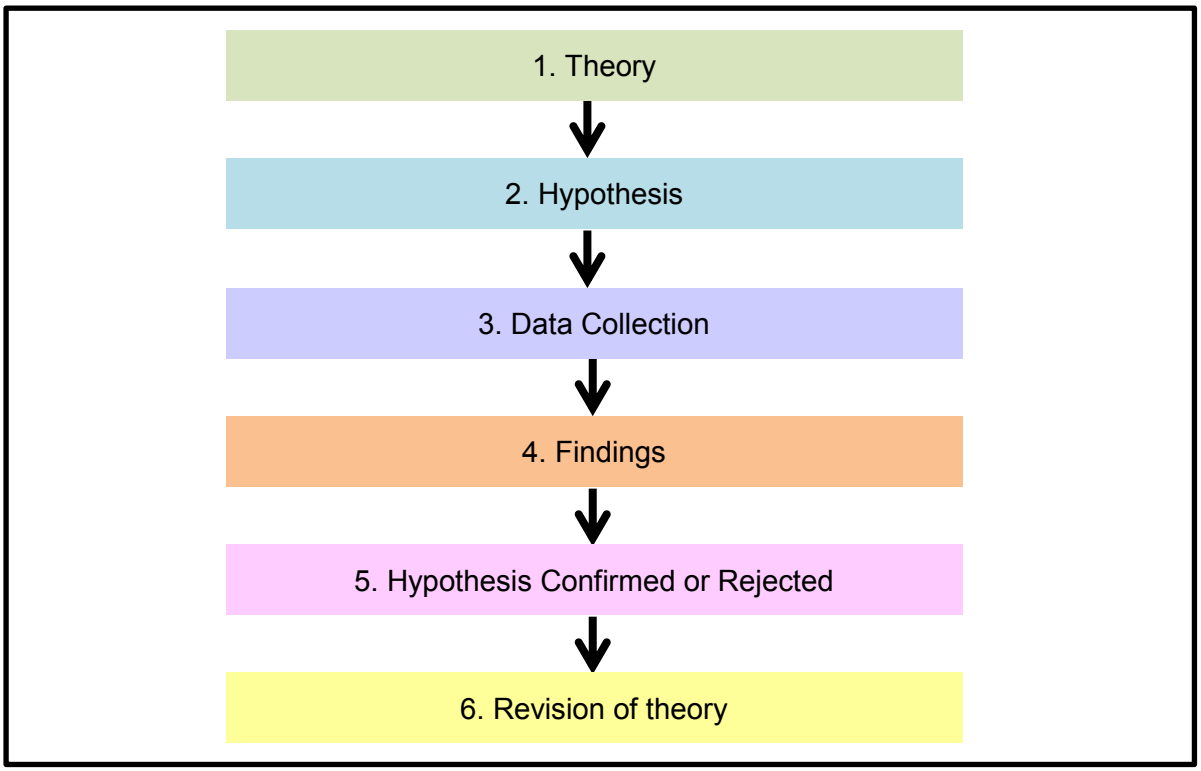


Figure 4-1 - Process of deduction according to a positivist approach (Bryman and Bell, 2015)

Underlying assumptions that the observer is independent of what is being researched are associated with the decision to apply positivist methodology to this study (Easterby-Smith et al., 2012). These researchers recommended that the choice of methodology required further consideration as shown in Table 4-1.

Table 4-1 Consequences of a Positivistic Research Approach, Easterby-Smith et al. (2008), p. 58

Element	Description
Value freedom	The choice of what to study and how to study it will be determined by objective criteria rather than by human beliefs and interests
Causality	The aim of the social sciences will be to identify causal explanations and fundamental laws that explain regularities in human social behaviour
Hypothetico-deductive	Science proceeds through a process of hypothesising fundamental laws and the deducing what kinds of observations will demonstrate the truth or falsity of these hypotheses
Operationalisation	Concepts are operationalized in a way that enables facts to be measured quantifiably
Reductivism	Problems as a whole are better understood if they are reduced to the simplest elements
Generalisation	To be able to generalize about regularities in human and social behaviour, it is necessary to select samples of sufficient size

Table 4-1 shows that; 1) value freedom - the respondents have to answer questions as presented to them rather than have an open choice of questions. For example, their responses show in a positivistic manner by the use of Likert-type scales; 2) causality **-** the presence of causality which this thesis has attempted reveal, show the linkages between causes or independent variables and effects on dependent variables; 3) hypothetico-deductive – the hypotheses for this research derives from the literature, and the relationship between effects being investigated are carried out using borrowed measurement instruments (questionnaire) (Remenyi et al., 2000), data collected will be analysed statistically in a deductive process that demonstrates the applicability of the hypotheses selected to test the sample; 4) operationalisation – the issue deals with how valid the result is and how well they can predict similar effects in corresponding behaviours in contexts that the researched; 5) reductivism – there is a need to specify how the data being collected in relation to the concepts and hypotheses (Bryman and Bell, 2015) and the social scientists to deduce a hypothesis and then translate it into operational terms; 6) generalisation – the generalisation is concerned with the applicability of the results or theories that were generated in one setting to other settings (Remenyi et al., 2000). The sample selection for this study demonstrates reasonable attempts to achieve a good sample of the population of developers in Malaysia. Therefore, the research design can be considered generalisable except for some minor unexplained variations in the analysis.

4.5 The research design

Having defined the research ontology, the next most important part of the research according to Oppenheim (1992) is the research design. The research design is the basic plan or strategy of research, which will make it possible for the researcher to draw general conclusions from it. Therefore, research design is concerned with how the research will be conducted (Remenyi et al., 2000) and that the problem is researchable. A good research design according to Oppenheim (1992) is that the design should make it possible to draw valid inferences from the data collected in terms of generalisation, association and causality . The method for data collection chosen for this study is the self-completion questionnaire technique (Remenyi et al., 2000; Oppenheim, 1992). Before the questionnaire was designed, elaborate literature reviews were carried out pertaining to the buyer and supplier relationship and selection researches subject domains were described in detail in Chapter 2 of this thesis. The research problem was examined using extensive literature review:- Literature reviews have been used frequently in construction management research to explain the phenomenon in the industry based on Holt study (2010) as illustrated in Figure 4-2. Further, Holt (2010) highlighted the research tools used to solve contractor selection problems and found that postal survey is one of most popular methods for data gathering for this type of study.

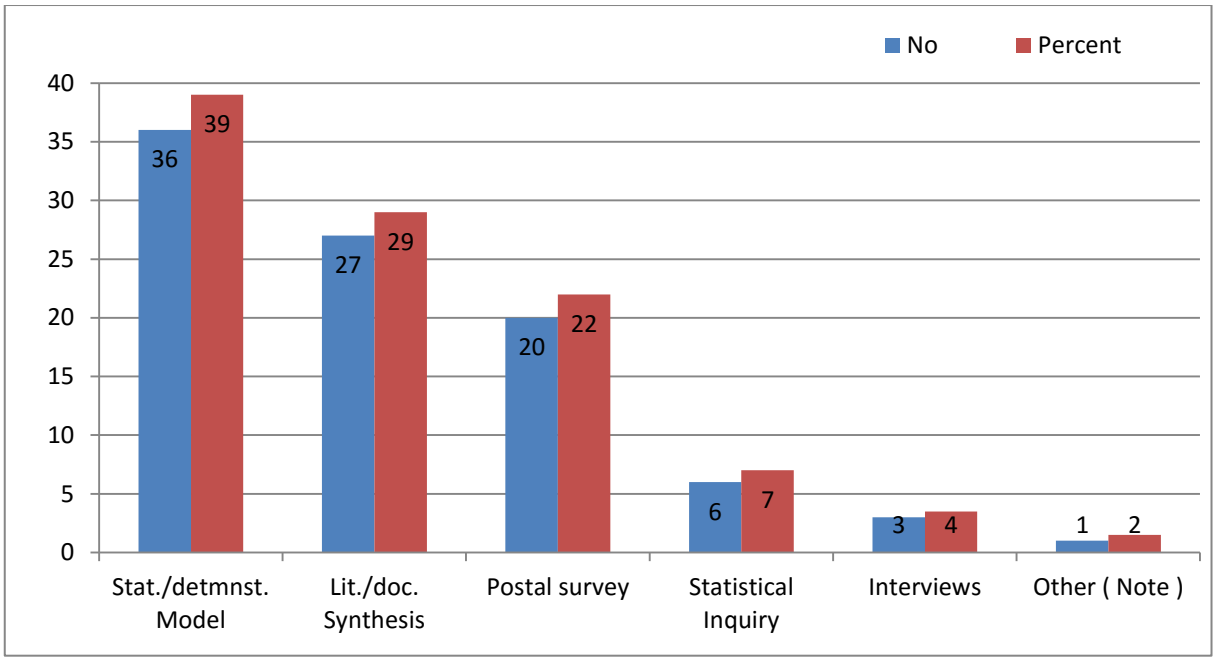


Figure 4-2 - Summary of methodology approaches employed for Contractor Selection (Holt, 2010)

His research showed that collecting data through postal survey was third most common method for contractor selection studies (see Figure 4-2) and the most used method to obtain primary empirical data for this type of study. Postal surveys allow the opportunity to obtain "a large sample and wide coverage" (Remenyi et al., 2000) and is hence, the most suitable method for this study as the samples are registered developers located across the whole country who are not efficiently reachable by other methods such as *interviews survey*. The postal survey is cheap to administer for large data collection such as this as compared with interviews, some of the questions require the respondent's time to fill in information which may not be readily available and this survey method allows respondents to complete the questionnaire in his or her own time without the influence of interviewer. This type of survey uses a set of standard questions to all respondents in order to generate standardized responses for the analysis and according to Robson (2002), the survey method "work best with standardized questions". Therefore, all respondents are presented with a set of carefully worded questions in order to obtain a high reliability response. More importantly, unlike interviews, surveys are a useful tool for gathering invaluable data from bigger sample size, the findings can be replicated and are easier to generalise and achieving industry-wide consensus on a topic such as the common selection criteria would be very difficult through interviews. The following sections discuss the questions design, the survey questionnaire, focus groups approaches, how to survey and the sample size consideration.

4.6 The questionnaire design

The literature pertaining to the buyer and supplier relationship were explored in detail before outline the research hypotheses. The hypotheses concept will then be translated into researchable entities as a set of questions, referred to as a questionnaire for this chapter. Each of the survey questions are examined based on the construction management literature and the list of variables to be measured. Research literature reviews have been used frequently in construction management to explain the phenomenon in the industry (Holt, 2010). The literature was identified via online searches and research databases with academic journals being given higher emphasis as they represent the most important wealth of literature available (Holt, 2010).

4.6.1 The survey questionnaire

The operationalisations of the key theoretical constructs are contractor bid price, contractor past project performance and technical expertise following the Watt et al (2010) approach

with modifications while the relational norms and trust norms followed Doney and Cannon (1997) and Wuyts and Geyskens (2005) approach with modifications.

The survey questionnaire (see Appendix A for full questionnaire) comprised of two main sections as explained in Chapter 3.

Section A of the survey sought nominal data, the respondents are first asked to describe their firms' background as a housing developer such as the length of establishment, annual turnover size, characteristics of their current, already completed as well as future projects, such as single family housing or multi-family high rise apartment projects. In this section, the organisational background information aims to obtain relevant detail of the developers firms assist in the data analyses.

The background enquiries are;

- To verify the company's average yearly turnover – This information helps to classify the company into respective group size either small, medium or large (Question 2)
- The years of company establishment and the number of year the company has been involved in house building projects. This provides information on the experience of the construction company and its experience in house building projects. (Question 3)

  For this study, the developers' firms' average length of establishment in years is shown in the Table 4-2 below;

Table 4-2 Year of company establishment

Developer Turnover Size	Mean	N	Std. Deviation
Small	19.33	64	9.580
Medium	15.34	38	7.889
Large	25.25	53	10.021
Total	20.37	155	10.064

Based on the size of company turnover, small firms have the mean age of establishment of 19.33 years as compared with the large firms age of establishment is 25.35. Therefore, on average, large firms are longer established than the small firms. As such, the companies will have better knowledge and experience on contractor selection and procuring contractor services.

- Developers' development project area or regional state – generally, the more states that the developer operates from, the more manpower and resources are located within the company. (Question 4)
- To establish the type of development project the company undertakes – this information show the type of project in which the company is involved whether low-rise single family dwellings (terraced, semi-detached or bungalows) apartment projects or both. The degree of complexity of the project such as those found in high rise multi-storey multi-family apartments would require a different contractor selection method. (Question 5)
- To establish if the company carries out prequalification in tendering exercises. (Question 6)
- The information on the number of housing units completed by the developer company shows its past experience and capability which could influence the way they select their main contractor.
- The frequency of prequalification – to confirm the company's contractor prequalification strategy either on every a project by project basis, annually, or never any prequalification of contractors for tender. (Question 8)
- The company's evaluation of past contractor performance. (Question 9)
- The company reports on the percentages of contractor they have worked with in the past who remain on their standing list of tenderers.
- The company's report on their next five years building programme. This question has two main aims. 1) to see if they are a rapid growing company which can attract construction companies who wish to participate in the company's projects; and 2) if they have building programme for the next five years, the company are most likely to retain competent contractors on the standing list and at the same time contractors will

generally more cooperative in order to remain on the company list of tenderers. (Question 11)

- The company indicates the number of qualified technical staff. This manpower information will show whether the company has the resources and experience to handle prequalification. (Question 12)
- Those companies with in house construction firms will have the option to either carry out the construction works in –house or to outsource. Again this is an important factor in deciding the make or buy option. With an in-house construction team projects will usually be awarded to the in-house team automatically thus avoiding the problems of outsourcing. (Question 13)
- To confirm the informant's job position in the company and to ensure the informant is the right person to answer the questionnaire and has sufficient knowledge of dealing with contractors. Question 15 and Question 16 confirms the number of years the informant has worked in the current company, this is important to establish the quality of the information given.
- To find out if the company faces any shortages of suitable construction company. If there is a severe shortage of certain category of contractors, a prequalification exercise will not be possible. (Question 17)

Other information gathered include the number of full time staff employed to determine staff strength and their capability to carry out a prequalification exercise.

In section B, a 33-item scale was developed in order to test the identified hypotheses. The most widely used approach for scaling responses is the Likert-type attitude scale (Earl, 1998), sometimes known as Likert scale; a numerical scale from 1 to 7 measuring the degree of agreement and disagreement as shown in Table 4-3.

Table 4-3 - The 7-Point Likert-type scale

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree

The Likert-type scale is a psychometric scale commonly involved in research that employs questionnaire (Earl, 1998). Based on 1 = strongly disagree, to 7 = strongly agreed used by Heidi and John (1992). The seven point psychometric scale is employed in order to gain deeper insight in phenomenon under evaluation. This scale was highly preferred by the focus group (see Section 4.6.2) due to the range of the scale (7-point) and the ease of use for this research.

Watt et al (2010) used four level scales to represent criteria (attributes) and defined levels. However, the literature showed that these were too few to comprehend all the important attributes for contractor selection. Therefore, a 7-point Likert scale was used and the interval data can then be subjected to univariate and multivariate statistical analysis (Bagozzi, 1994).

Section B questions are subdivided into five groups with 33 constructs in total:- Group 1) the importance of contractor prequalification (9 items), Group 2) the importance of the contractor's financial standing (4 items), Group 3) tender price (5 items), Group 4) technical expertise (8 items) and Group 5) the client/contractor relationship in the selection of contractor exercise (7 items).

The Group 5 questions directed respondents to select and report on one particular contractor relationship with whom the respondents' company has interacted with most recently. This procedure avoided potential selection bias and assured respondent familiarity with the supplier, an approach used in Cannon et al.'s study (2000).

The selection criteria were identified from the research undertaken by Watt et at (2010b) with some modifications, the questions of financial stability were adopted from El-Sawalhi (2007). The financial stability or standing question is an important criterion as contractor would normally be required to maintain sufficient working and operating capital during the initial stages of the projects.

In terms of stratifying the respondent firms, a similar approach was used by Jennings and Holt (1998) in a UK study. The developer firms sample in the study were stratified into three categories (large, medium and small) based on their annual turnovers. The reason for considering these respondents strata is for estimation as studies shown that different size firms would utilise different selection criteria in the contractor selection (Jennings and Holt, 1998; Macneil, 1980). Small developers are designated to those with a turnover of RM 3 million to RM 10 million, medium sized developers are those with a turnover RM 11 million to RM 30 million and large developers are those with turnovers above RM 30 million. These categories are based on the REHDA registration of developers' firms with some modifications.

4.6.2 Focus group approach

According to Remenyi et al (2000), it is necessary to conduct a pilot study using a focus group approach before administering a self-completion questionnaire. This can also refer to so-called feasibility studies which are a "small scale version or trial run done in preparation for the major study" (Polit et al 2001: 467) and pre-testing and trying out a particular instrument (Baker 1994: 182-3) to reduce risk of failure caused by the questions.

According to Peat et al (2002: 123), a pilot study could improve the internal validity of a questionnaire by;

- Administering the questionnaire to pilot subjects in exactly the same way as it will be administered in the main study
- Asking the subjects for feedback to identify ambiguities and difficult questions
- Recording the time taken to complete the questionnaire and deciding whether it is reasonable
- Discarding all unnecessary, difficult or ambiguous questions
- Assessing whether each question gives an adequate range of responses
- Establishing that replies can be interpreted in terms of the information that is required
- Checking that all questions are answered
- Re-wording or re-scaling any questions that are not answered as expected
- Shortening, revising and, if possible, piloting again

The first phase of pilot study carried out for this study is by using semi-structured interviews on focus groups consisting of general building contractors and developers selected through personal contacts. The general real estate developers (non-housing developers) were selected as this group would not be involved in the main study and yet they have sufficient knowledge on the nature of housing development's contractor selection. The focus groups discussion was led by the current study's researcher assisted by an observer and was guided by the research questions. The participants were asked 1) is the questionnaire clear? 2) will it offer value? 3) does the study make sense and will it encourage participants to answer all the questions? 4) are the questions a fair reflection of the industry sentiments? 5) is the format of the questionnaire clear and are the questionnaire administration techniques appropriate? Further, the participants were asked to complete the questionnaire and each

participant was given a copy of the respondents' results. Responses from attendees during the focus groups to the research design were positive.

This study survey questionnaire was then piloted. Firstly, on qualified groups of professional personnel volunteers from professional quantity surveyors firms who volunteered to participate after being contacted by phone and explained the purpose of the study. Quantity surveyors were selected for this role because of their active involvement in providing consultancy services to construction clients on procurement, contractor prequalification and familiar contractor selection procedure. Secondly, it was piloted with a group of senior managers of property development firms and construction firms from personal contacts. These groups served the important purpose of examining the relevance of the study from a practitioner's standpoint (Anderson et al., 2001). More specifically, the pilot survey is the first move to test the "gatekeepers" response on the content of the study that will offer tangible business value, i.e., it addresses a relevant business problem and will provide new insights about how these practitioners might react to the problem. That is to say it has face validity both from an academic perspective and a practitioner perspective (Hair et al., 2003) and internal validity (Peat et al 2002). Some minor amendments were carried to the questionnaire as a result of the pilot and the questionnaire and the data collection plan were then ready to progress forward to administer the main survey.

Further, this research reliability and validity of the findings were validated using the focus group approach (Remenyi et al., 2000) after the results of the questionnaire survey were summarised.

4.7 How to survey

4.7.1 The population

Having explained above the advantages and suitability of survey instrument as a tool for this study, the population for data gathering is discussed next.

For a survey to study the relationship between developers and contractors in the Malaysian context, the focus is on one side of the dyads; the developers or buyers , the survey populations is the housing developers association in Malaysia (REHDA) as this association represents all the active developers in Malaysia. The participants were contacted through the REHDA registered members as this provided a clearly defined population from which to survey. The registered companies were first contacted by telephone or email and asked if they or other suitable persons in their organisation were willing to participate in the survey.

There were a total of 760 firms (as of 2011), 545 hundred firms agreed to participate and the rest declined due to lack of time and / or no active current project cited. Given that the survey is on procurement and contractor selection, the respondents are mostly the business directors, owners, project managers, and others working on procurement. After three reminders, 130 responses were received and the final reminders yielded another 25 responses giving a total of 155 representative responses equivalent to a response rate of 28.4 percent which is generally considered as acceptable number of representative samples as recommended by Cohen (1988) (see Table 4.5 for sample size based on firms' size).

4.7.2 The population demographic

The locations of the respondents are shown on table 4-3 with the number of respondents by regional state, also illustrated on the map of Malaysia: Figure 4-3.

Table 4-4 - Number of respondents by State

State	No of Respondent
Perlis	6
Kedah	24
Penang	13
Perak	9
Selangor	22
Kuala Lumpur	25
N. Sembilan	8
Malacca	8
Johor	16
Pahang	9
Terengganu	6
Kelantan	9
Total	155

Peninsular Malaysia is divided into 11 states and the federal territory of Kuala Lumpur (including Putrajaya). In terms of construction activities in the Peninsula Malaysia, as shown on graph, the state of Selangor was the highest followed by Kuala Lumpur, Johor and Penang. For this survey, more responses were received from states with higher GDP due to their dynamic economic activities and housing project developments but the survey remains a representative sample of all developers' companies in Malaysia as developers responded in survey.

In states such as Perak, Kelantan and Pahang which occupy the interior of the country, where the majority of the land is still inhabitable, have no other major economic activities except for timber logging and farming. Hence, only small numbers of responses were collected from these areas.

Figure 4-3 Map of Malaysia and the location of the respondent represented by ●

Of the total 155 responses, 64 were from small firms, 38 from medium firms and 53 from large firms as shown in Table 4 – 5.

Table 4-5 The companies average yearly turnover in million Malaysia Ringgit. (Malaysia Ringgit 5 million = GBP 1 million)

Company Size	Number of firms	Average turnovers (In Million Malaysia ringgit)
Small	64	3 to 10
Medium	38	11 to 30
Large	53	Above 30

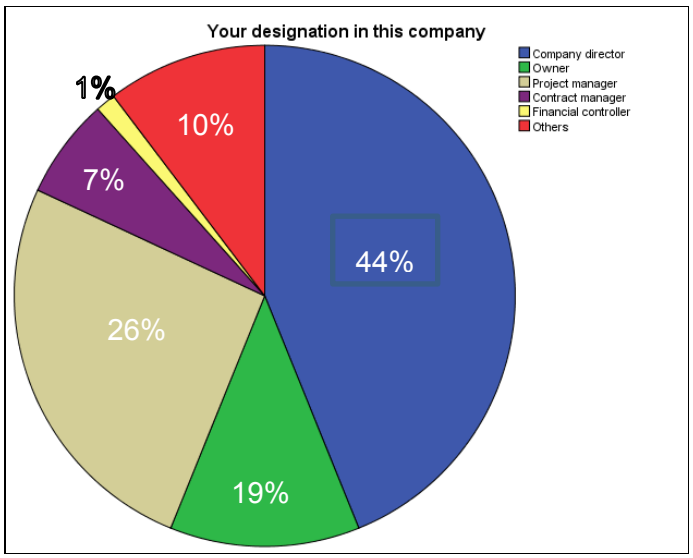


Figure 4-4 - The informants' information

4.7.3 The questionnaire survey informants

Figure 4-4 above shows that largest group of informants' at 44% are the company directors who are responsible for the appointment of contractors for company projects. This is followed by project managers at 26%. Interestingly, there is a high percentage of company owners involved in the selection of contractors. The majority of these owners are the founders of the companies and are still actively involved in the management and operation of the companies. The rest of the informants are contract managers, financial controllers, construction managers and so on.

4.7.4 Sample size consideration

In social research the correct sample size is a complex issue (Remenyi et al., 2000). According to Robson (2011) in the real world, researcher may not achieve the perfect sampling frames. In order to provide a reliable data, according to Remenyi, there are a number of considerations to obtain the quality of a sample size. These include the statistical determination of sample size, sample size to estimate population, sample size to estimate the mean, sample size to estimate a percentage and sample size correction factor (Remenyi et al., 2000: 196-198). Whereas, for PLS-SEM analysis method, according to Hair et al (2014), the rule of thumb is that the minimum sample size must be 10 times the maximum number of arrowheads pointing at a latent variable anywhere in the PLS path model. For the response size for 5% significant level is 147 with maximum number of arrows pointing at a construct is 5, the 155 obtained for this study is within the recommended sample size for a statistical power of 80% as shown on Table 4-5. Table 4-6 shows the minimum sample size requirements necessary to detect minimum R^2 values of 0.10, 0.25, 0.50, and 0.75 in any of the endogenous constructs in the structural model for significance levels of 1%, 5%, and 10%, assuming the commonly used level of statistical power of 80% (Hair et al., 2014). However, according to Oppenheim (1992) sample accuracy is more important than the sample size, therefore the researcher must collect precise samples to avoid sampling error. For this research, the representative sample was collected from the registered companies with association representing housing developers in Malaysia and no issue of sample error was found. This research yielded 155 responses and the type of company as per Table 4 – 6.

4.7.5 Type of Informants' company incorporation

The majority of the companies are private limited companies at 86.5 %, which are privately funded companies of various sizes and organisational expertise. This was followed by public listed companies at 13.5%. These public listed companies are large companies with access to public funds to finance their companies' operations with higher staff number and are usually financially much stronger than private limited companies.

Table 4-6 Type of company incorporation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private limited company	134	86.5	86.5	86.5
	Public listed company	21	13.5	13.5	100.0
	Total	155	100.0	100.0	

Table 4-7 - Sample Size Recommendation in PLS-SEM for a Statistical Power of 80%

Source: Cohen, J.A power primer. Psychological Bulletin, 112, 155-519, (1988)

Maximum Number of Arrows Pointing at a Construct	Significance Level											
	1%				5%				10%			
	Minimum R^2				Minimum R^2				Minimum R^2			
	0.10	0.25	0.5	0.75	0.10	0.25	0.5	0.75	0.10	0.25	0.5	0.75
2	158	75	47	38	110	52	33	26	88	41	26	21
3	176	84	53	42	124	59	38	30	100	48	30	25
4	191	91	58	46	137	65	42	33	111	53	34	27
5	205	98	62	50	147	70	45	36	120	58	37	30
6	217	103	66	53	157	75	48	39	128	62	40	32
7	228	109	69	56	166	80	51	41	136	66	42	35
8	238	114	73	59	174	84	54	44	143	69	45	37
9	247	119	76	62	181	88	57	46	150	73	47	39
10	256	123	79	64	189	91	59	48	156	76	49	41

Sample size @ 5 arrows pointing at a construct = 147 at 5% sig. level

4.8 Data analysis methodology

As mentioned in Section 4.4 above, in this quantitative research method, the questionnaire is design to collect quantitative data. According to Halfpenny (1996:5) "quantitative data is usually produced by coding some other data, which is reduced to a number by stripping off the context and removing content from it. Later, after manipulating the numbers, they are interpreted, that is, expanded by adding content and context which enable one to see through the numerical tokens back to the social world." Hence there is a need for statistical analysis. This section will explain the type of technique use for data processing and justifications, the reliability and validity considerations, the estimation procedures, the effects size and biases in the data processing.

Statistical analysis has been an essential tool for social science researchers (Holt 2010; Hair, Hult et al. 2014 (Remenyi et al., 2000) since 19th century (Stigler, 1986), to develop and confirm research findings. The major consideration in the selection of the appropriate statistical technique is the number of variables (Hair Jr et al., 2015). A univariate statistical technique involves only one variable, whereas a bivariate statistical technique involves two. In the past, researchers frequently relied on univariate and bivariate analysis to understand data and relationships but spurred by the advancement of computer software in the date analysis such as Partial Least Square (PLS) software, researchers can now perform more complex multivariate data analyses (Hair, Hult et al. 2014). Multivariate analysis involves the utilisation of statistical methods that simultaneously analyse multiple variables.

4.8.1 Partial Least Square – Structural Equation Modelling (PLS-SEM)

Partial Least Square (PLS) is a multivariate modelling technique used lately to explain causal relations and test the structural model (Hair et al., 2014). According to Richer et al (2015)PLS-SEM has been used in studies addressing management topics such as the sources of competitive advantage, business strategy, organizational culture, leadership, organizational learning, knowledge management, international management entrepreneurship and innovation, international business and cross cultural studies. PLS has been used for path modelling for contractor selection problems in studies by Liu et al.(2014b). PLS is especially useful for models that have higher order constructs (Lowry and Gaskin, 2014; Hair et al., 2014; Wong, 2013) as a method adopted for this research and also where the theoretical model involves both reflective and formative latent variables, measures of latent variables are non-metric, complex models lead to identification problems and research is at an early stage and is exploratory in nature (Hair Jr et al., 2015), to assess the

validity of the results (Hair et al., 2014; Chin, 1998; Lowry and Gaskin, 2014; Hulland, 1999; Sosik et al., 2009). Therefore, PLS-SEM method is adopted for this study.

PLS-SEM is also known as a second-generation technique, it is powerful software compared to other techniques such as regression or structural equation model (SEM). PLS-SEM is becoming popular in business and academic research because it offers a number of advantages. According to (Hair Jr et al., 2015), it can be used when:

- The theoretical model involves both reflective and formative latent variables (LV)
- Data are non-normally distributed
- Sample size is small. The rule of thumb is that the sample size should be 10 times the number of the indicators of the most complex formative
- LV or the largest number of antecedents (exogenous variables) leading to an endogenous variable
- Measures of latent variables (LVs) are non-metric
- There are missing values
- Complex models lead to identification problems
- Main interest is in prediction rather than theory testing
- Research is at an early stage and is exploratory in nature

Partial Least Squares (PLS) was used to test the high level research and lower level operational model structures and hypothesised causal pathways. Both the research and operational models demonstrated satisfactory R I and Goodness of Fit results and both model results were tested for reliability and validity with all constructs meeting widely accepted psychometric benchmarks. The findings from both models are reported and debated. An example on how to use PLS-SEM over CB-SEM (Covariance-Based SEM) is explained in detail in Table 4-8.

Table 4-8 - **Rules of Thumb for Selecting CB-SEM or PLS-SEM (Hair et al., 2011)**

Research Goals
• If the goal is predicting key target constructs or identifying key "driver" constructs, selects PLS-SEM
• If the goal is theory testing, theory confirmation, or comparison of alternative theories, select CB-SEM
• If the research is exploratory or an extension of an existing structural theory, select PLS-SEM
Measurement Model Specification
• If formative constructs are part of the structural model, select PLS-SEM Note that formative measures can also be used with CB-SEM but to do so requires accounting for relatively complex and limiting specification rules
• If error terms require additional specification, such as covariation, select CB-SEM
Structural Model
• If the structural model is complex (many constructs and many indicators), select PLS-SEM.
• If the model is non-recursive, select CB-SEM
Data Characteristics and Algorithm
• If your data meet the CB-SEM assumptions exactly, for example, with respect to the minimum sample size and the distributional assumptions, select CB-SEM; otherwise, PLS-SEM is a good approximation of CB-SEM results
• Sample size considerations If the sample size is relatively low, select PLS-SEM. With large data sets, CB-SEM and PLS-SEM results are similar, provided that a large number of indicator variables are used to measure the latent constructs (consistency at large)
• PLS-SEM minimum sample size should be equal to the larger of the following: (1) ten times the largest number of formative indicators used to measure one construct or (2) ten times the largest number of structural paths directed at a particular latent construct in the structural model
• If the data are to some extent non-normal, use PLS-SEM; otherwise, under normal data conditions, CB-SEM and PLS-SEM results are highly similar, with CB-SEM providing slightly more precise model estimates
• If CB-SEM requirements cannot be met (e.g., model specification, identification, non-convergence, data distributional assumptions), use PLS-SEM as a good approximation of CB-SEM results
• CB-SEM and PLS-SEM results should be similar. If not, check the model specification to ensure that CB-SEM was appropriately applied. If not, PLS-SEM results are a good approximation of CB-SEM results
Model Evaluation
• If you need to use latent variable scores in subsequent analyses, PLS-SEM is the best approach
• If your research requires a global goodness-of-fit criterion, then CB-SEM is the preferred approach
• If you need to test for measurement model invariance, use CB-SEM

In research, apart from finding the right analysis method, it is also necessary to ensure that the findings have adequate reliability and validity (Remenyi et al., 2000) that generalisation is possible. According to Oppenheim (1992) reliability is precondition to validity. Data can be influenced by errors, impurities, inconsistencies such as bias from respondents, data entry errors, coding errors and imprecise measurement. These measurement errors can cause the observed values to misrepresent the true values of the population.

4.8.2 Data collection and examination

To estimate the PLS-SEM, the questionnaire survey data were collected from REHDA members. The respondents rated the questions on 7-point Likert scale with higher scores denoting higher levels of agreement with a particular statement. Figure 4-4 shows an example of measurement models in PLS-SEM. In the example there are three constructs COMP, CUSL, and LIKE measured by multiple items. All three have reflective measurement models as indicated by arrows pointing from the construct to the indicators. For example, COMP is measured by means of the three reflective items comp_1, comp_2 and comp_3, all are related to the survey questions. Using the 7-point Likert scale, respondents had to indicate the degree to which they agree / disagree with each statement (Hair et al., 2014). This is further explained in Chapter 5 - Data Processing.

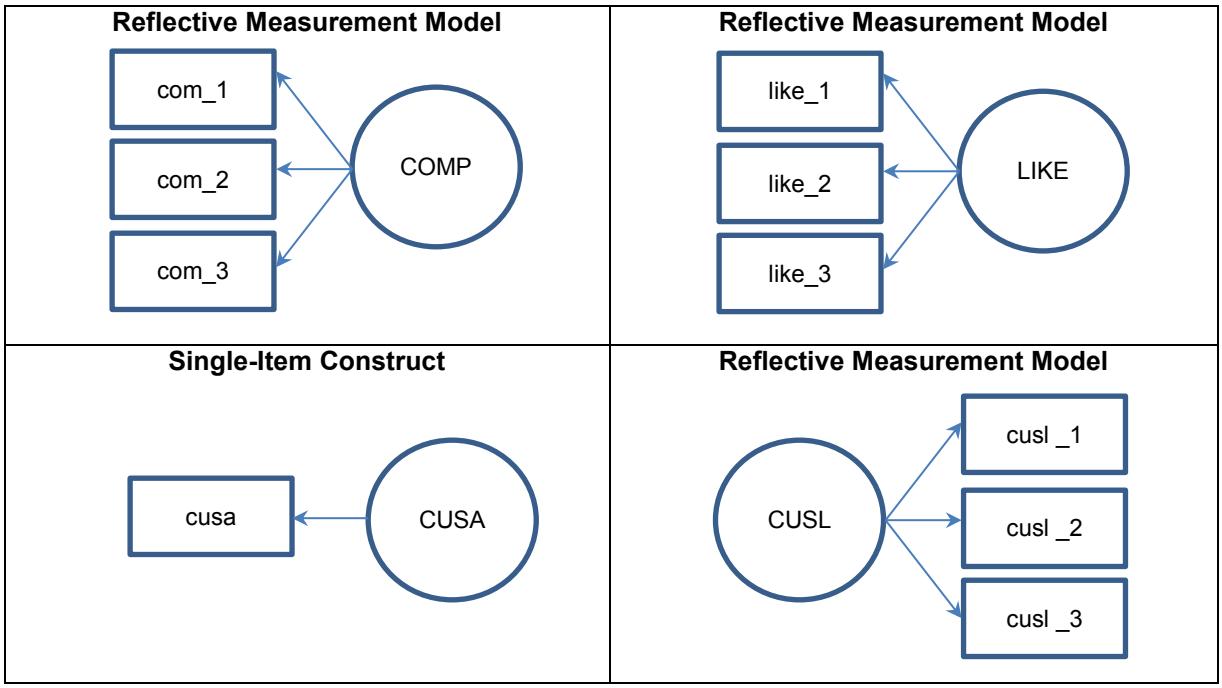


Figure 4-5 Types of Measurement Models in the PLS-SEM example Hair et al. (2014)

This research examines relationships between a few constructs within the measurement models this requires correlations techniques and simultaneous equations (Hair et al., 2006).

Further, multiple regression techniques are being utilized to analyse the structure of the model path consists of independent and dependent variables and the research called for relationship patterns between constructs in the contractor selection procedure.

Figure 4-5 represents a simple bivariate regression model in simple relationship model, the exogenous variables on the left (*Price)* influences endogenous variable *selection that* in turn influences the endogenous variable *best value.* Whereas Figure 4-6 combines the two models and gives a more comprehensive theory that explains and predicts search (Samouel and Hair, 2014). All variables that have arrows pointing to them are referred as endogenous variables, whereas all other variables are exogenous.

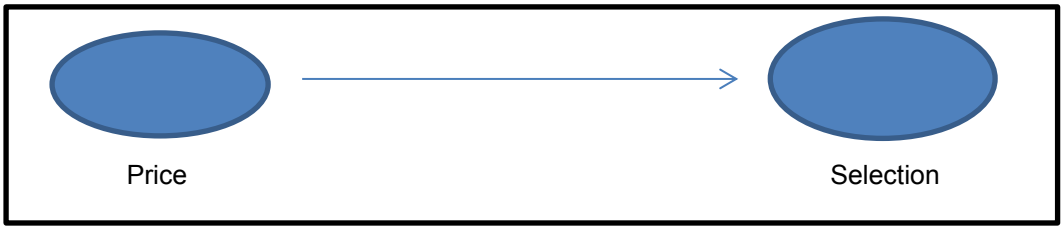


Figure 4-6 Simple Bivariate Regression Model

The estimation procedure enable researchers to capture the complex multivariate world (Hair et al., 2006) of business in a system of equations that allows the study of inter-relationships between one or more dependent and independent variables (Hair et al., 2006).

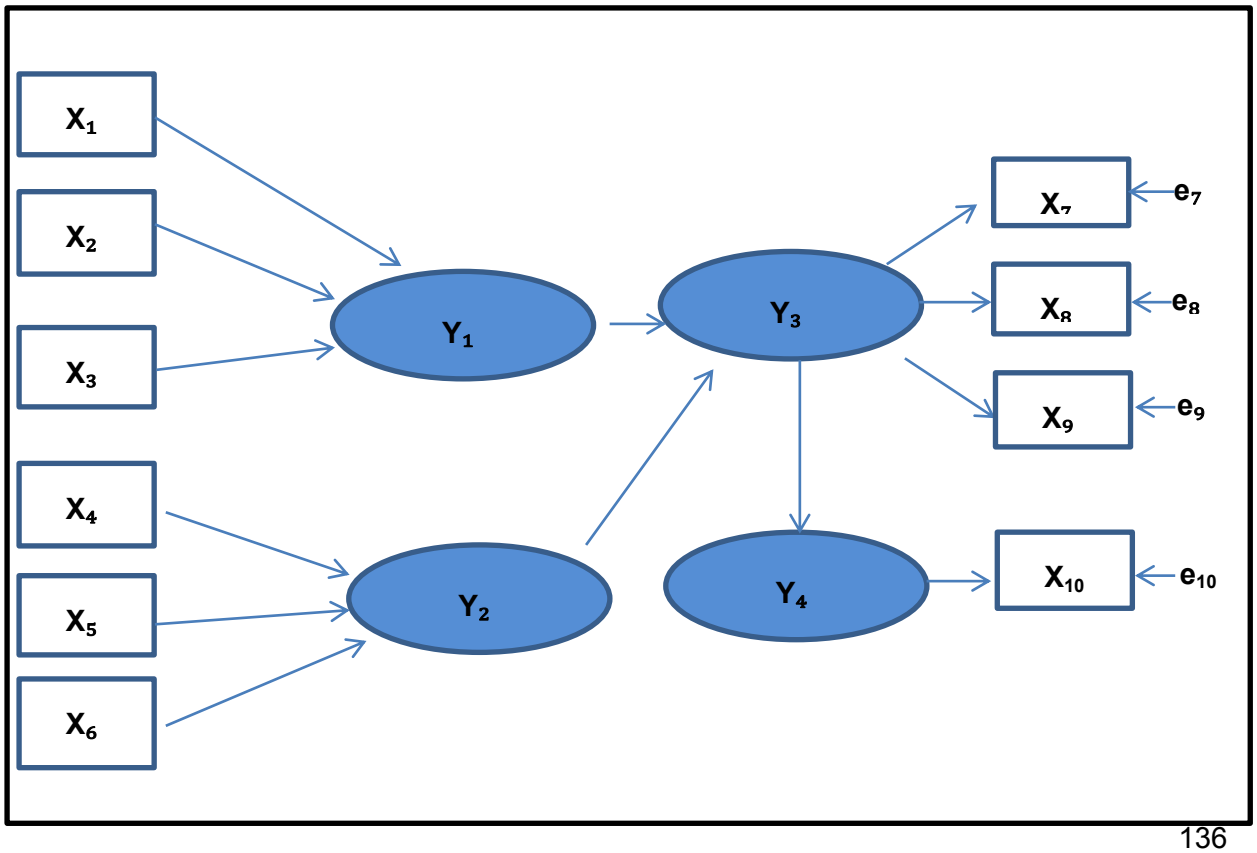


Figure 4-7 - Multivariate Regression Model

Figure 4-6 combines the two models and gives more comprehensive theory that explains and predicts search in the multivariate regression model (Hair Jr et al., 2015) Endogenous variables are where all variables have arrows pointing to them, whereas all other variables are exogenous. Where Y_1 and Y_2constructs are formative and Y_3 and Y_4 are reflective latent (i.e. Unobservable) variables.

4.8.3 The estimation procedures

In order to assess the reliability and validity of concepts, the estimation procedures are

a) Internal consistency (ρ_c) and Cronbach (α). Cronbach's alpha is the traditional criterion for internal consistency. Cronbach's alpha provides an estimate of the reliability based on the inter-correlations of the observed indicators variables. However, Cronbach's alpha assumes that all indicators are equally reliable whereas PLS-SEM prioritizes the indicators according to their individual reliability. Due to this limitation of Cronbach's alpha in the population, it is more appropriate to apply a technique referred to as composite reliability (p_c). This type of reliability takes into account the different outer loadings of the indicator variables and is calculated using the following formula:

$$\text{Reliability } (\rho c) = \frac{(\Sigma\lambda)^2}{(\Sigma\lambda)^2 + \Sigma\,(1-\lambda^2)}$$

N.B. λ are standardised loadings and ($1-\lambda^2$) = measurement error.

For calculating Cronbach Alpha, the formula is

$\alpha = (k/(k-1))(1-(\Sigma r\ ii/\ \Sigma r\ ij)$, generally Cronbach alpha of 0.7 is accepted as reliable.

b) Convergent validity (AVE) and discriminant validity. Convergent validity on the construct level is the average variance extracted (AVE). This is defined as the grand mean value of the squared loadings of the indicators associated with the construct (i.e. the sum of the squared loadings divided by the number of indicators). AVE value of 0.50 or higher indicates that on average, the construct explains more than half of the variance of its indicators, whereas if the AVE is less than 0.50, it indicates that on average, more error

remains in the items than the variance explained by the construct. Average variance extracted (AVE) was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). All composite reliabilities for multiple reflective indictors have to be more than 0.7 and if all values of AVE of these constructs were more than 0.5 suggesting acceptable convergent validity.

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. Discriminant validity implies that a construct is unique and captures phenomenon not represented by other constructs in the model. Generally, there are two methods to examine the validity:- 1. Cross loadings of the indicators; where an indicator's outer loading on the associated construct should be greater than all it's loading on other constructs (the presence of cross loading that exceed the indicator outer loadings represents a discriminant validity problem); and 2. The Fornell-Larker criterion is a second and more conservative approach to assessing discriminant validity. It compares the square root of the AVE values with the latent variable correlations (Hair et al., 2014). The logic of this method is based on the idea that a construct shares more variance with its associated indicators than with any other construct. AVE can be used to evaluate discriminant validity of the constructs. Fornell-Larcker (1981) stated that AVE of a LV should be greater than the correlation among the LVs to fully satisfy the requirements for discriminant validity.

c) To assess predictive power (R^2) and assess the predictive relevance (Q^2)

The interpretation is similar to that employed under traditional multiple regression analysis, i.e. it indicates the amount of variance explained by the model. Examination of the change in R2 can help to determine whether a LV has a substantial effect (significant) on a particular dependent LV.

This data investigation are also concerned with effect sizes, i.e., the level of effect that each construct and relationship has on the model. PLS explicitly supports effect sizes (Vinzi et al., 2010), and is effective with small sample sizes which occur when the data set is split into sub-samples of high and low effectiveness teams (Chin, 1998; Chin and Newsted, 1999). Finally, PLS supports multi-group analysis which supports comparisons between sub-samples, which are the basis for comparing how different group member perspective on importance of selection criteria.

Effect size,

$$f^2 = \frac{R^2_I - R^2_E}{1 - R^2_I}$$

Cohen, J.A power primer. Psychological Bulletin, 112, 155-519 recommends effect size 0.02 small; 0.15 medium; 0.35 large effects.

Generally, in PLS-SEM, indicators with outer loading between 0.40 – 0.70 shall be considered for removal from the scale, this should increase in the composite reliability (Hair et al., 2014). Further, they recommended that indicators with very weak outer loading i.e. below 0.40 should be eliminated from the scale (Hair et al., 2011).

d)In assessing the statistical significance of loadings, weights and pathways coefficient, the bootstrapping non parametric approaches are used (Hair et al., 2014: {Davison, 1997 #952)} to test coefficients for their significance. In this procedure, a large number of subsamples (using bootstrapping samples), for example 500 to 5000 samples, drawn from the original sample with the replacement (the drawn sample will return to the sampling population before the next observation is drawn. According to Hair et al (2014), the importance of bootstrapping procedures is that bootstrapping distribution can be viewed as a reasonable approximation of an estimated coefficient's distribution in the population.

4.8.4 Non-response and common method bias

The non-response bias within the sample was assessed using Armstrong and Overton (Armstrong and Overton, 1977) and compared early versus late response across various firms and respondent characteristics. The first 25% of responses were treated as early respondents and the last 25% as late respondents. Chi-square tests did not reveal any significant difference between the two groups. When comparing overall population with the final sample, no significant differences were found.

4.8.5 PLS-SEM bias

The error is present in the latent variable scores and ultimately reflected in the path coefficients that are estimated using these scores. The error in the latent variable scores thus induces a bias on the model estimates. The result is that the true path model relationships are frequently underestimated, this property (structural model relationships underestimated and measurement model relationship overestimated) is referred to as the PLS-SEM bias (Hair et al., 2014).

However, the PLS-SEM bias would only disappear if the number of indicators per latent variable increase to infinity which is not possible in an empirical survey. Further, according to Ringle et al. (2009), simulation studies show that the PLS-SEM bias is usually at low levels and is therefore of limited relevance in most empirical settings.

4.9 Summary

This chapter has discussed the research methods for this study. The themes of research philosophy, research approaches and research techniques and analyses were presented. The questionnaire design, sample, data analysis, and data examination are discussed. The hypotheses for this research are shown on the Figure 4-7. In order to accept the significant of the constructs, all the β (Beta) value must be higher than 1.96 for the hypotheses.

Further, for this research, the respondents are stratified into three categories of firms; small, medium and large (refer to Table 4 -5 for number of firms in each category). Therefore, four cases are being presented for cross validation i.e. Case 1: the overall aggregate analysis; Case 2 the small firms' analysis; Case 3 the medium firms' analysis and lastly Case 4 the large firm analysis. These analyses produce different results in selection attributes between the groups. This empirical study extends the both in the supplier selection theory and relational contracting theory: i.e. 1. There are difference selection criteria and effect sizes between the three categories firms. 2. Relational contracting is practice more frequently by small firms than the large firms. Chapter 5 presents the results of the data analysis for this study.

Chapter 5 Data Analysis

5.1 Introduction

Using SmartPLS 2.0 M3 (Operations Management and Organizations, University of Hamburg, Http://www.smartpls.de/), this study adopted the instrument of Partial Least Square Structural Equation Modelling (PLS-SEM) to test the proposed hypotheses. As previously mentioned in chapter 4, PLS-SEM is well suited for small data samples, and skewed distribution (Hulland, 1999; Hair et al., 2014; Wetzels et al., 2009), it incorporates several statistical techniques such as principal components analysis, multiple regression, multivariate analysis in variance, redundancy analysis and canonical correlation (Lowry and Gaskin, 2014) as compared with CB-SEM (full explanation provided in Table 4-8, in Chapter 4). Further, PLS-SEM is especially useful for models that have higher order constructs (Lowry and Gaskin, 2014; Hair et al., 2014) where the theoretical model involves both reflective and formative latent variables, where measures of latent variables are non-metric, complex models lead to identification problems and research is at an early stage and is exploratory in nature (Hair Jr et al., 2015). Therefore, it was appropriate to adopt the PLS-SEM method (Hair et al., 2014; Chin, 1998; Lowry and Gaskin, 2014; Hulland, 1999; Sosik et al., 2009) to assess the validity of this study's results.

In using PLS, according to Hair et al (2014), there are five essential steps in the assessment of data as shown in Table 5-1 below;

Table 5-1 Process for Data Analysis Using PLS-SEM (Hair et al., 2014)

Step 1	Specifying the Structural Model
Step 2	Specifying the Measurement Model
Step 3	Preparing & Examining Data
Step 4	Assessing the indicator loadings and significance - Squaring the individual indicator loadings - Measure reliability - Measure convergent validity - Measure Discriminant Validity
Step 5	Evaluating the Structural Model (Inner Model) - To examine whether empirical support exists for the specified hypotheses - To examine multiple regression R2 - To examine the effect side - To examine the predictive accuracy - Bootstrapping procedure -t-values

The structure of this chapter will follow the five-step process recommended by Hair et al (2014) starting with the assessment of structural models, measurement model and evaluation, preparing and examining data, assessing the indicator loadings and significance and evaluating the structural model.

In this study, PLS-SEM as illustrated in figure 5-1, structure X_1 and X_2 are referred to as exogenous variables whereas Y_1 and Y_2 are referred to as endogenous variables. The Y_1 and Y_2constructs are formative and Y_3 and Y_4 are reflective latent (i.e. unobservable) variables. There are measured by their indicators, the *xy* and *ys* respectively. The indicators are also referred to as items or manifest variables. It is recommended that constructs be measured by a minimum of three indicators. (Hair et al., 2006). The measurement models are the dotted line blue boxes on left and right side of the constructs as shown in Figure 5-1. The measurement models measure the relationship between the exogenous latent variables and the constructs, whereas the inner model or structural model illustrated by the square middle dotted red box measure the relationship between the constructs. The models are used to establish latent variables by certain indicator variables.

Measurement model/outer model of exogenous latent variables

Measurement model/outer model of endogenous latent variables

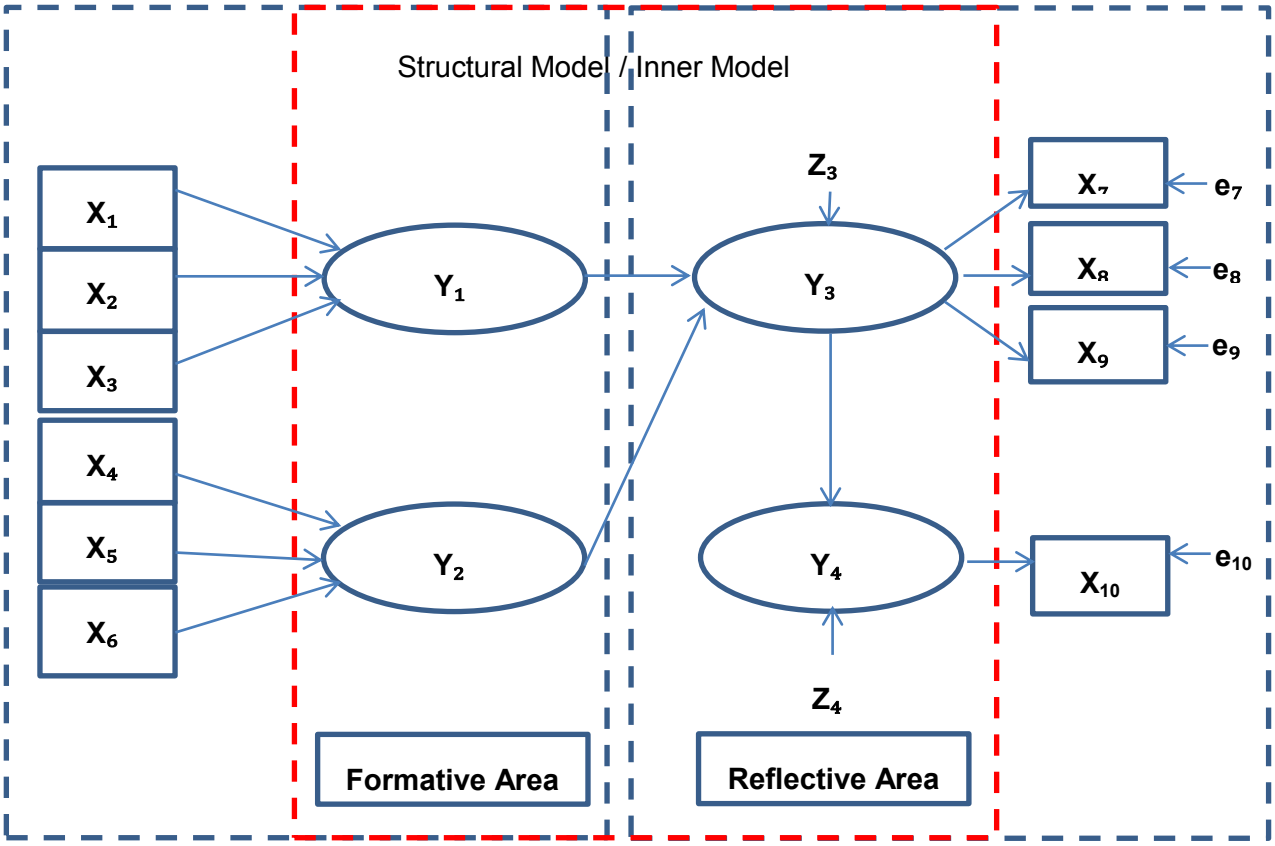


Figure 5-1- Measurement Model and Structural Model - Hair et al. (2014)

5.2 Measurement model

PLS-SEM as explained in Chapter 4 – Research Methodology, is a suitable statistical procedure for using multivariate modelling techniques to explain causal relations and to test the structural model. The measurement model was assessed in terms of reliability and validity. Cronbach's α was used to measure the internal consistency reliability (Hair et al., 2014; Chin, 1998; Bryman and Bell, 2015; Remenyi et al., 2000) and similarly, composite reliability (CR) was used to measure reliability of the constructs.

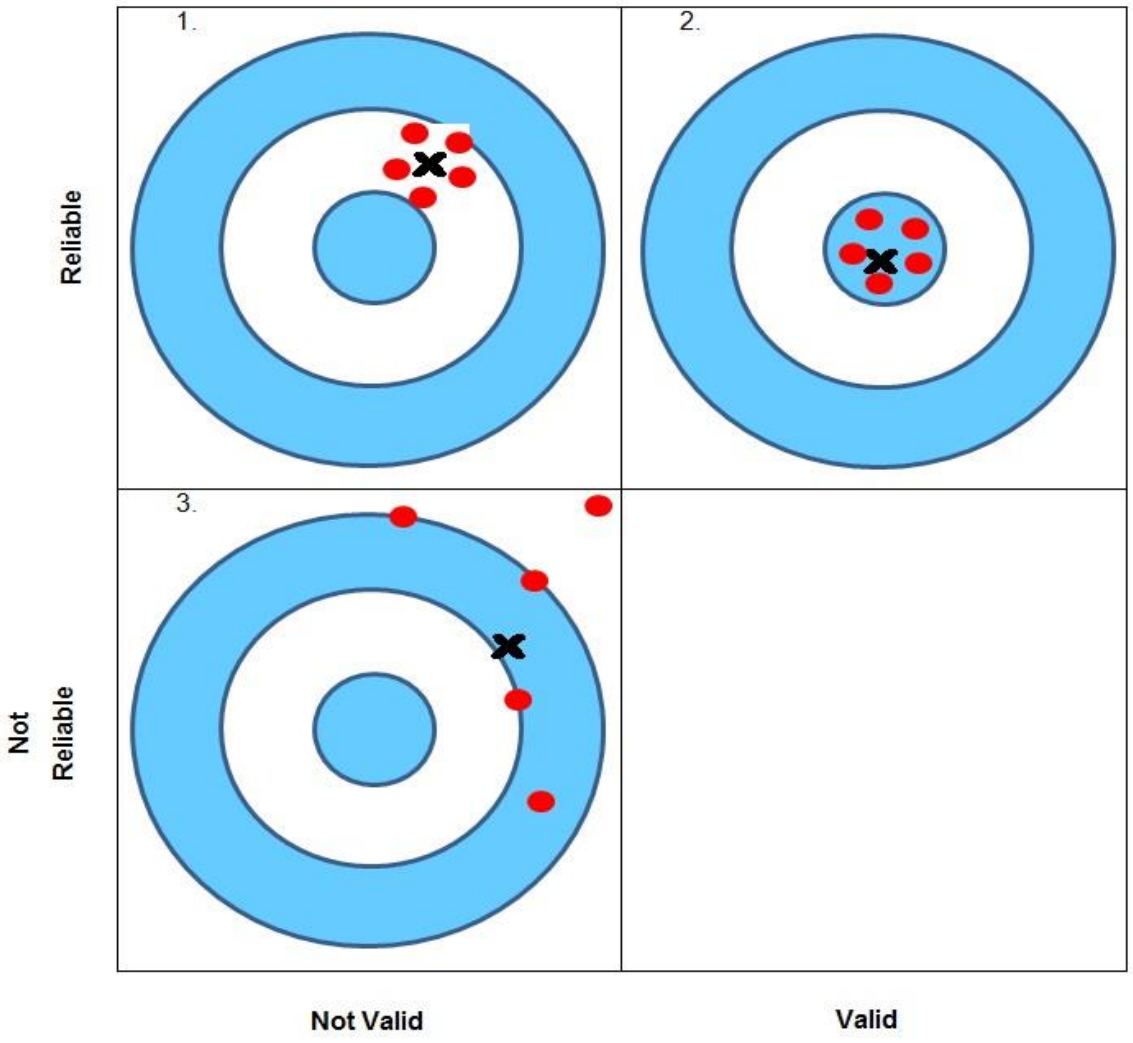


Figure 5-2 Comparing Reliability and Validity (Mooi & Sarstedt, 2011)

The Figure 5-2 above demonstrates the difference between reliability and validity by comparing a set of three targets and the average value of the red dots indicated by a cross. To measure true score, there are five measurements (indicated by five red circles) and repeated shot at a target.

The estimated average values of the red circles are indicated by a black cross. Validity is indicated when the cross is close to the bull's-eye at the target centre. The closer the average value (black cross in Figure 5-2) to the true score, the higher the validity. If several arrows are fired, reliability is the distance between the circles. If all the circles are close together, the measure is reliable, even though the circles are not necessary near the bull's-eye (Hair et al., 2014). However, the measurement can be reliable because the measurement dots are close together but not valid if the cross is not close to the bull's eye. The three scenarios shown in Figure 5-2 are explained below.

In box number 1, the scenario is reliable but not valid since the cross is out of the bulls-eye but reliable as the repeated measurements (red dots) are close together. In the box number 2, the scenario is both reliable and valid as the cross is in the bull's-eye and the repeated measurements (red dots) are close together. In the box 3 the scenario is neither valid nor reliable as the cross is outside the centre and the measurement dots are not close together. (Hair et al., 2014; Mooi and Sarstedt, 2011). Further, it is worth noting that if the measurements are not reliable, they cannot be valid.

5.2.1 PLS-SEM Measurement Models Evaluation

According to Hair et al (2014), model estimation delivers empirical measures of the relationship between the indicators and the constructs (measurement models) and between constructs (structural model). The empirical measures enable comparison of the theoretical established measurement and structural models with reality, where the reality is represented by the sample data. The evaluation of the measurement models for this study then follow the two-step process recommended by Hair et al (2014), also referred to as Step 4 and Step 5 in Table 5-1.

Step 4 evaluation of reflective measurement models (measurement model evaluation aimed to evaluate the consistency and validity of the manifest variables); to measure

- reliability – internal consistency (composite reliability and indicator reliability
- convergent validity – average variance extracted (AVE)
- discriminant Validity

Step 5 is an evaluation of the structural model to examine;

- multiple regression R^2
- effect side f^2
- predictive accuracy Q^2
- bootstrapping procedure -t-values

For this study, the results of measurement model evaluation is presented in Table 5-2 shown below:-

Table 5-2 - Results of Measurement Model Evaluation

	First Iteration				Final Iteration			
Outer Model (PLS Measurement Model)	**Loading**	**Ave**	**CR**	**Alpha**	**Loading**	**Ave**	**CR**	**Alpha**
TR 1	0.790	0.487	0.721	0.457	0.798	0.488	0.723	0.457
TR 2	0.365				0.377			
TR 3	0.840				0.829			
CO 1	0.885	0.524	0.731	0.525	0.843	0.651	0.848	0.732
CO 2	0.227				Omitted			
CO 3	0.858				0.78			
Norms 1	Added				0.795			
Fin 1	0.868	0.717	0.910	0.867	0.867	0.717	0.910	0.867
Fin 2	0.888				0.888			
Fin 3	0.744				0.745			
Fin 4	0.878				0.878			
TE 1	0.648	0.611	0.886	0.837	0.657	0.611	0.886	0.837
TE 2	0.816				0.815			
TE 3	0.772				0.766			
TE 4	0.894				0.894			
TE 5	0.758				0.758			
EP 1	0.586	0.563	0.789	0.664	0.587	0.563	0.790	0.664
EP 2	0.734				0.736			
EP 3	0.897				0.896			
P1	0.629	0.292	0.284	0.764	0.813	0.741	0.896	0.839
P2	0.554				0.848			
P3	-0.289				Omitted			
P4	-0.417				Omitted			
P5	0.707				0.919			

In the first iteration of Table 5-2, all constructs; TRUST NORMS (TR), COOPERATIVE NORMS (CO), FINANCE (FIN), TECHNICAL EXPERTISE (TE), EXPERIENCE (EP) AND PRICE (P) have achieved satisfactory measurement values except for four variables loadings; TR2, CO2, P3 and P4 and Price construct AVE which are below 0.5. The following final iteration has discarded three manifest variables (TR 2 was maintained since PLS-SEM measurement recommends a minimum of 3 variables); CO2 P3 and P4.

Once the final iteration completed, the Cooperative norm AVE has higher value from 0.524 increased to 0.651; CR has higher value from 0.731 increased to 0.848 and Alpha has increased from 0.525 to 0.732. Similarly with the omission of P3 and P4, AVE for the construct has higher value from 0.292 increased to 0.741; CR has higher value increased from 0.284 to 0.896; Alpha has higher value from 0.764 increased to 0.839.

5.2.2 Internal consistency reliability

Cronbach's alpha is the traditional criterion for internal consistency reliability. Cronbach's alpha provides an estimate of the reliability based on the inter-correlations of the observed indicators variables and assumes that all indicators are equally reliable whereas PLS-SEM prioritizes the indicators according to their individual reliability. Due to this limitation of Cronbach's alpha in the population, in the context of PLS-SEM it is more appropriate to apply a technique known as composite reliability (ρ_c) (Hair et al., 2014; Sosik et al., 2009; Chin, 1998). This type of reliability takes into account the different outer loadings of the indicator variables (Hair et al., 2011; Hulland, 1999; Sosik et al., 2009; Wetzels et al., 2009) and is calculated using the following formula:

$$\text{Reliability } (\rho c) = \frac{(\Sigma\lambda)^2}{(\Sigma\lambda)^2 + \Sigma\,(1-\lambda^2)}$$

N.B. λ are standardised loadings and $(1-\lambda^2)$ = measurement error.

5.2.3 Composite Reliabilities (ρ_C):

Based on Henseler et al. (2009, 300) study, "the composite reliability is a measure of internal consistency and must not be lower than 0.6". Hair et al. (2011a, 145) propose a clarification to this: "Composite reliability should be higher than 0.70 (in exploratory research, 0.60 to 0.70 is considered acceptable)". Generally, in PLS-SEM, indicators with outer loading between 0.40 – 0.70 should be considered for removal from the scale, this should increase in the composite reliability (Hair et al., 2014). Further, they recommended that indicators with very weak outer loading i.e. below 0.40 should be eliminated from the scale (Hair et al., 2011). Chin (1998, 325) suggests "that standardized loadings should be greater than .707". Henseler et al. (2009), while noting Chin (1998), also note Churchill (1979) who advocates eliminating reflective indicators if their outer standardised loadings are smaller than 0.4. Henseler et al. (2009, 299) suggest that "only if an indicator's reliability is low and eliminating this indicator goes along with a substantial increase of composite reliability, it makes sense to discard this indicator". Hair et al. (2011, 145) similarly note that "each indicator's absolute standardized loadings should be higher than 0.70.

5.2.4 Discriminant Validity

This analysis measures the extent to which a construct is truly distinct from other constructs by empirical standards (Hair et al., 2014; Hulland, 1999; Lowry and Gaskin, 2014; Sosik et al., 2009) and therefore, in determining discriminant validity it implies that a construct is unique and captures phenomena not represented by other constructs in the model. From the literature, they are two common ways of measuring the discriminant validity.

Firstly, assessing discriminant validity is by examining the cross loadings of the indicators. In particular, the indicator's outer loading on the associated construct should be higher than all of its loadings on other constructs. Therefore, the presence of cross loadings that exceed the indicators' outer loadings represents a discriminant validity problem (Hair et al., 2014; Hulland, 1999; Sosik et al., 2009; Chin, 1998; Hair et al., 2011).

Secondly, according to literature, there is a more conservative approach using **the Fornell-Larcker criterion** (Fornell and Larcker, 1981) where Average variance extracted (AVE) is used. AVE was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). This procedure compares the square root of the AVE values with the latent variable correlations, where the square root of each construct's AVE should be greater than its highest correlation with any other construct (Hair et al., 2014; Hair et al., 2011; Hulland, 1999; Sosik et al., 2009; Wetzels et al., 2009). This concept will be illustrated in the analyses later.

5.3 The conceptual framework

The conceptual framework below is presented to test the impact of selection criteria i.e. price, trust and cooperative norms, finance, past experience, contractor expertise and prequalification on contractor selection. As shown in Figure 5-3, the constructs path coefficients being tested are; between

- Trust and Norms with three items variable TR 1, TR2 and TR3
- Cooperative (Co-op) and Norms with three items indicators Co1, Co2 and Co3
- Norms and Selection – This is second order constructs for trust and cooperative norms. To test the higher order constructs, all the items for the two trusts and cooperative norms are analysed to evaluation path coefficients between the indicators and construct.

- Price and Selection with three items indicators P1, P2 and P5. P4 and P5 were dropped due to low manifest variables. In doing this the final model shows higher values on AVE, CR, and Alpha as explained in Section 5.2.1.
- Past experience (PE) and Expertise with three items indicators Ep1, Ep2 and Ep3
- Finance and Expertise with four items indicators FIN 1, FIN2, FIN3 and FIN4
- Expertise and Prequalification – Prequalification (PQ1) uses a single-item construct - *My company relies on formal prequalification to source qualified contractors for our project*. The single-item construct has been used due to practical considerations in an effort to decrease the overall number of items and the relationship between construct and single-item measure is always one in PLS-SEM (Hair et al., 2014).
- Prequalification (Pre-qual.) and Selection (SEL) –Selection uses single-item construct "m*y company believes that prequalification will help us to find the best value tenderer".* The single-item has been used for the reasons stated above and further selection items are considered to be highly homogeneous, therefore use of single-item constructs would not lose the predictive power. (A full set of questionnaire abbreviations can be found in Chapter 3; Table 3-1.

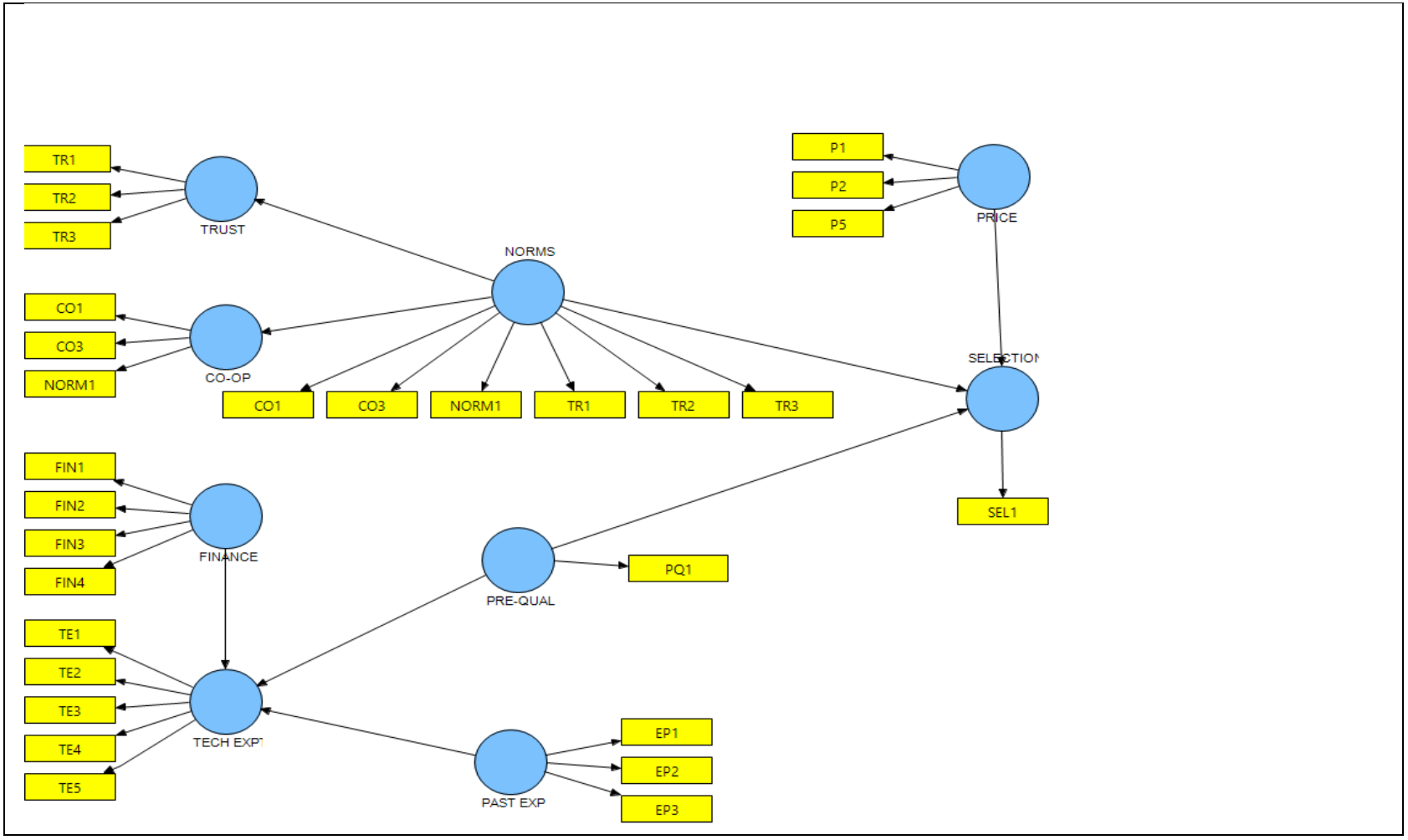


Figure 5-3 –PLS-SEM diagram on the conceptual framework.

5.4 Analysis of cases based on firm size.

The respondents are stratified into three groups, small, medium and large firms size groups and three case studies presented based the size including one aggregate model. With a total of four case studies; Case 1 – The overall aggregate results; Case 2 – The small firms results, Case 3 – The medium firms results and Case 4 – the large firms results.

The way the results are presented is firstly, a discussion on the measurement models on the items coefficient, whether the hypotheses are supported or otherwise and t-values. Secondly, the causal models on the constructs Cronbach's Alpha (α), Composite Reliability (ρ_c) and Average Variance Explain (AVE).

5.4.1 Case 1: Aggregate model

Table 5-3 Aggregate model coefficient and t-values

Outer Model (PLS Measurement Model)	Estimates	T-Values
Outer Weight / Loading Estimates		
Trust to TR 1 Intend to do business _ future	0.80	29.310
Trust to TR 2 Do business _ situation vague	0.38	2.831
Trust to TR 3 Trustworthy	0.83	26.269
Cooperation to CO1 Cooperative attitude	0.84	29.240
Cooperative to CO 3 Always settle dispute	0.78	18.833
Norms to Norms 1 Happy situation	0.80	30.896
Financial standing to Fin 1 Strong financial record	0.87	28.872
Financial standing to FIN 2 Good credit rating	0.89	26.552
Financial standing to FIN 3 Past turnover	0.74	16.425
Financial standing to FIN 4 Good credit line	0.88	30.398
Expertise to TE 1 Registered with Board	0.65	11.193

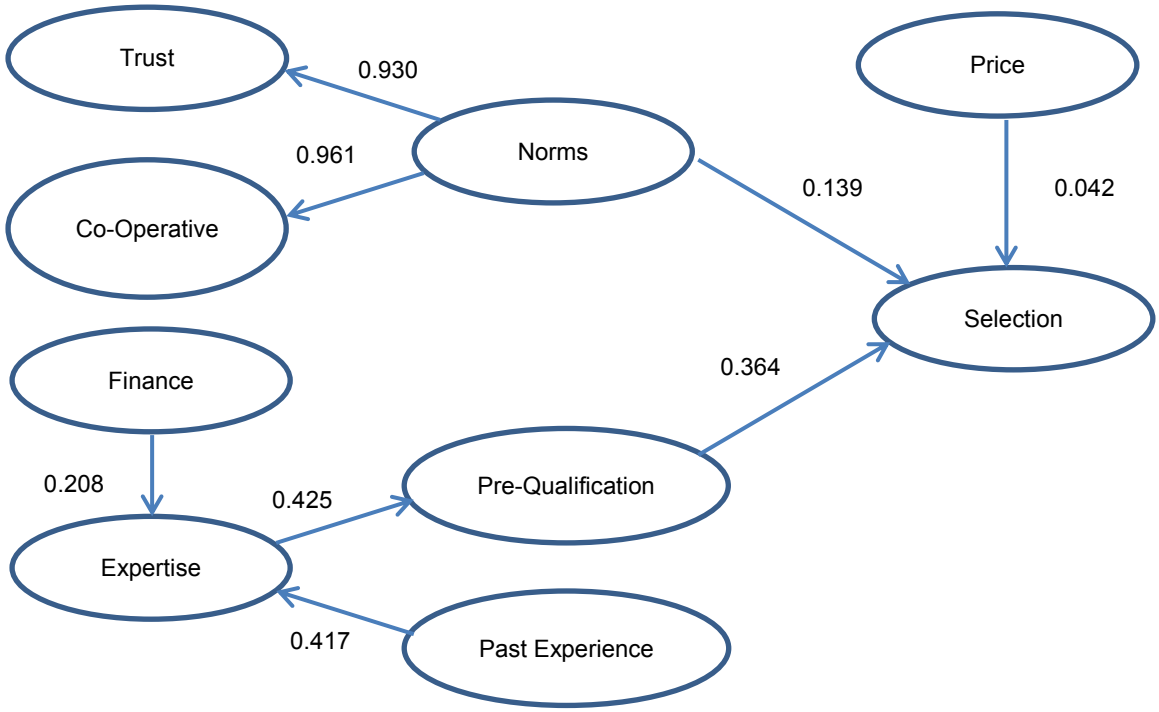
Expertise to TE 2 Quality control policy	0.82	28.691
Expertise to TE 3 In-house project management	0.77	19.252
Expertise to TE 4 IT knowledge	0.89	37.592
Expertise to TE 5 Subcontractor and suppliers	0.76	14.833
Past Experience to EP 1 Min. 5 years' experience	0.59	4.614
Past Experience to EP 2 Complete similar size project	0.73	20.094
Past Experience to EP 3 Past project record	0.90	21.622
Price to P1 Single most important criteria	0.81	4.187
Price to P2 Award to lowest tenderer	0.85	4.788
Price to P3 Accept lowest tender bid	0.92	5.483
Norms to CO 1 Cooperative attitude	0.82	25.093
Norms to CO 3 Always settle dispute	0.69	13.038
Norms to Norms 1 Happy situation	0.80	30.499
Norms to TR 1 Intend to do business _ future	0.71	20.260
Norms to TR 2 Do business _ situation vague	0.32	3.117
Norms to TE 3 In-house project management	0.81	29.717

All the outer loadings for the aggregate size are above the minimum threshold value of.708 except trust-tr2, *doing business when situation is vague* at 0.38; expertise-TE1, *register with board* at 0.65; past experience-EP1, *minimum 5years experience* at 0.59 and norms – CO3, *always settle dispute* at 0.69 and norm – TR2, *do business when situation is vague* at 0.32.

All the results show the theoretical *t* values above 1.96. Therefore, all constructs are significant at the level of 5% (i.e. $\alpha = 0.05$; two tail test) (Hair et al., 2014).

The empirical assessment of the hypotheses

Results are given in the Figure 5-4 and as discussed in the following section



Hypotheses	Relationship	Estimation	T-Values	Supported (s)/ Not Supported (NS)
H1a	N to T	0.930	110.108	S
H1b	N to CO	0.961	175.767	S
H2	N to S	0.139	1.591	S
H3	P to S	0.042	0.459	NS
H4	PE to E	0.417	4.805	S
H5	F to E	0.208	2.249	S
H6	E to PRE	0.425	5.607	S
H7	PRE to S	0.364	3.998	S

Figure 5-4 Aggregate model hypotheses

Aggregate model hypotheses

H1: Norms are the second order construct with two sub-dimensions: trust norms and cooperative norms. In Figure 5-4, norms had a significant positive effect on contractor selection; trust norms (*b*=0.930; *p*<0.01) and cooperative norms (b=0.961; p<0.01).

H2: Norms have a positive impact on contractor selection. Norms had a significant and positive impact on contractor selection (b= 0.139).

H3: Price has a positive impact on contractor selection. Price had no significant impact on selection (*b*= 0.042).

H4: Past experience has a positive impact on contractor expertise. Past experience had positive impact on contractor expertise (b=0.417).

H5: Finance has a positive impact on contractor expertise. Finance had positive impact on contractor expertise (b=0.208).

H6: Contractor expertise has positive impact on prequalification. Contractor expertise had positive impact on contractor prequalification (b=0.425).

H7: Prequalification has positive impact on contractor selection. Figure 5 – 4 demonstrates that contractor prequalification had a significant positive impact on contractor selection (*b*=0.364).

All the hypotheses are supported except H3 Price to Selection; not supported.

Reliability and convergent validity

Generally, Cronbach's $\alpha > 0.7$ is acceptable (some researchers use Cronbach's $\alpha > 0.6$). In this study, except for the Cronbach's α of trust and past experience at 0.457 and 0.664 respectively, the rest were more than 0.7, so reliability is acceptable.

Average variance extracted (AVE) was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). Table 5-3 show Cronbach's α, CR and AVE of the latent variables.

All composite reliabilities for multiple reflective indictors were more than 0.7 (ranging from 0.723 to 0.910), and all values of AVE of these constructs were more than 0.5 except trust construct at 0.488, suggesting acceptable convergent validity.

Table 5-4 Evidence of reliability and convergent validity

Constructs	CRONBACHS ALPHA	COMPOSITE RELIABILITY	AVE
TRUST	0.457	0.723	0.488
CO-OPERATIVE	0.732	0.848	0.651
PRICE	0.839	0.896	0.741
FINANCE	0.867	0.910	0.717
EXPERTISE	0.837	0.886	0.611
PAST EXPERIENCE	0.664	0.789	0.563

Discriminant validity was assessed by comparing the square root of AVE for each construct and the construct's correlations with others (Fornell and Larcker 1981). As shown in Table 5-4 All the square roots of AVEs in diagonals were higher than the correlations in the off-diagonals. This indicates acceptable discriminant validity except for the construct trust and cooperation because they are sub-dimension of norms. These constructs are correlated because they are 2nd order to norms. All other values are lower than the square root of AVE.

Table 5-5 Correlations of latent variables and evidence of discriminant validity (n = 155)

Constructs	1	2	3	4	5	6
TRUST	0.699	--	--	--	--	--
CO-OP	0.791	0.807	--	--	--	--
PRICE	0.123	0.129	0.861	--	--	--
FINANCE	0.441	0.309	0.158	0.847	--	--
EXPERTISE	0.130	0.118	0.061	0.404	0.782	--
PAST EXP	0.444	0.380	-0.085	0.470	0.515	0.750

The causal model

For aggregate model

All exogenous variables included R^2 = 13.1%

Excluding,

1. Price $R^2_{P\,ex}$ = 12.9%
2. Norms $R^2_{N\,ex}$ = 11.4%
3. P Qual. $R^2_{PQ\,ex}$ = 1.8%

Effect size,

$$f^2 = \frac{R^2_I - R^2_E}{100 - R^2_I}$$

Price = $\frac{13.1 - 12.9}{100 - 13.1}$ = 0.02 small effect size

Norms = $\frac{13.1 - 11.4}{100 - 13.1}$ = 0.02 small effect size

Pre-qual. = $\frac{13.1 - 1.8}{100 - 13.1}$ = 0.14 approx. medium effect size

The causal model effect values for aggregate model is presented in Figure 5-5

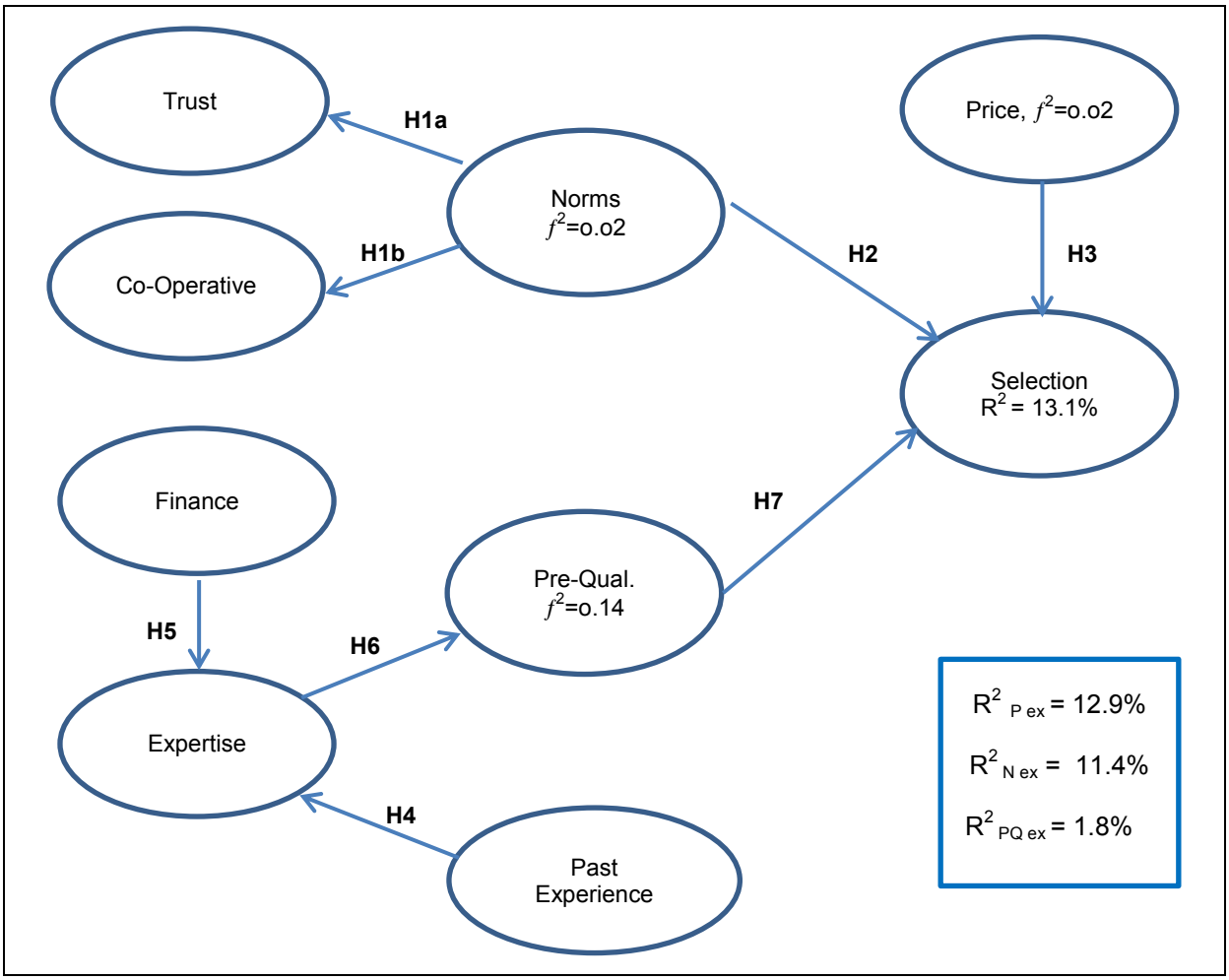


Figure 5-5 - Aggregate model: relationship of constructs

5.4.2 Case 2 - Small size firm model

Table 5-6 Small firms' coefficient and T – Values

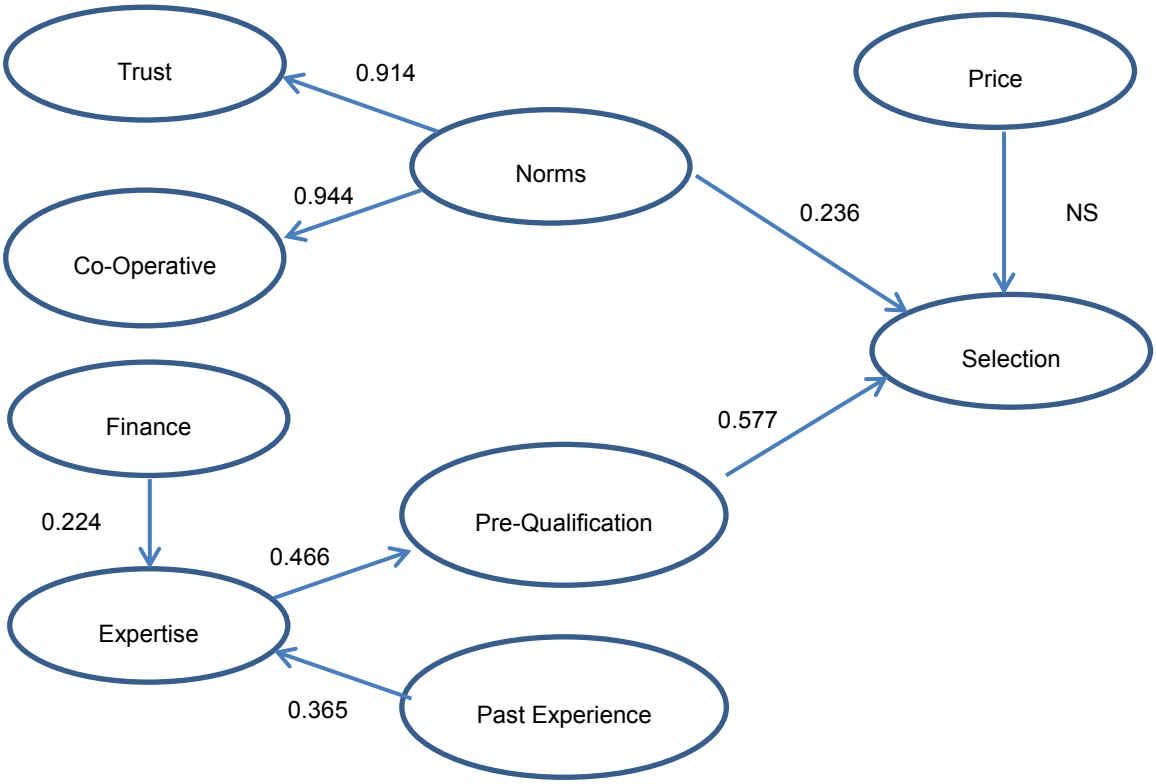
Outer Model (PLS Measurement Model)	Estimates	T-Values
Outer Weight / Loading Estimates		
Trust to TR 1 Intend to do business _ future	0.83	38.818
Trust to TR 2 Do business _ situation vague	0.38	2.714
Trust to TR 3 Trustworthy	0.80	16.067
Cooperation to CO1 Cooperative attitude	0.78	17.132
Cooperative to CO 3 Always settle dispute	0.80	21.126
Norms to Norms 1 Happy situation	0.76	22.802

Financial standing to Fin 1 Strong financial record	0.87	28.426
Financial standing to FIN 2 Good credit rating	0.82	10.714
Financial standing to FIN 3 Past turnover	0.67	7.687
Financial standing to FIN 4 Good credit line	0.85	13.342
Expertise to TE 1 Registered with Board	0.56	5.870
Expertise to TE 2 Quality control policy	0.80	17.613
Expertise to TE 3 In-house project management	0.73	11.517
Expertise to TE 4 IT knowledge	0.89	28.954
Expertise to TE 5 Subcontractor and suppliers	0.72	12.425
Past Experience to EP 1 Min. 5 years' experience	0.27	0.904
Past Experience to EP 2 Complete similar size project	0.98	1.586
Past Experience to EP 3 Past project record	0.26	7.179
Price to P1 Single most important criteria	0.90	5.265
Price to P2 Award to lowest tenderer	0.91	5.154
Price to P3 Accept lowest tender bid	0.90	5.182
Norms to CO 1 Cooperative attitude	0.75	13.811
Norms to CO 3 Always settle dispute	0.69	14.253
Norms to Norms 1 Happy situation	0.75	19.486
Norms to TR 1 Intend to do business _ future	0.72	24.494
Norms to TR 2 Do business _ situation vague	0.35	3.115
Norms to TE 3 In-house project management	0.77	17.553

All the outer loadings sizes for the small firm model are above the minimum threshold value of.708 except trust-tr2, *doing business when situation* is vague at 0.38; expertise-TE1, *register with board* at 0.56; past experience-EP1, *minimum 5years experience* at 0.27; past experience – EP1 *past project record* at 0.26; norms – CO3, *always settle dispute* at 0.69 and norm – TR2 *do business when situation is vague* at 0.35.

As for the theoretical *t* values, the entire size of the result is above 1.96 therefore it is significant at the significance level of 5% (i.e. $\alpha = 0.05$; two tail test) (Hair et al., 2014) except Past experience EP2 which has the *t* value of 1.586 - is lower than1.96 threshold level.

The results are given in the Figure 5-6 and as discussed in the following section



Hypotheses	Relationship	Estimation	T-Values	Supported (S) / Not Supported (NS)
H1a	N to T	0.914	77.827	S
H1b	N to COOP	0.944	115.277	S
H2	N to S	0.236	3.522	S
H3	P to S	-0.009	0.125	NS
H4	PE to E	0.365	3.093	S
H5	F to E	0.224	2.444	S
H6	E to PRE	0.466	6.606	S
H7	PRE to S	0.577	8.629	S

Figure 5-6 Small firm model and hypotheses

Small firms' hypotheses

H1: Norms is the second order construct with two sub-dimensions trust norms and cooperative norms. In Figure 5-6, norms also had a significant positive effect on contractor selection; trust norms (*b*=0.914; *p*<0.01) and cooperative norms (b=0.944; p<0.01).

H2: Norms has positive impact on contractor selection. Norms had a significant and positive impact on contractor selection (b= 0.236).

H3: Price has positive impact on contractor selection. Price had no significant impact selection (*b*= -0.009).

H4: Past experience has positive impact on contractor expertise. Past experience had positive impact contractor expertise (b=0.365).

H5: Finance has positive impact on contractor expertise. Finance had positive impact on contractor expertise (b=0.224).

H6: Contractor expertise has positive impact on prequalification. Contractor expertise had positive impact on contractor prequalification (b=0.466).

H7: Prequalification has positive impact on contractor selection. Figure 5-6 demonstrates that contractor prequalification had a significant positive impact on contractor selection (b=0.577).

All the hypotheses are supported except H3 price to selection not supported.

Reliability and convergent validity

Generally, Cronbach's $\alpha > 0.7$ is acceptable (some researchers use Cronbach's $\alpha > 0.6$). In this study as shown on Table 5-6, except for the Cronbach's α of trust, cooperative norms and past experience at 0.451, 0.671 and 0.601 respectively, the rest were more than 0.7, so reliability is acceptable.

Average variance extracted (AVE) was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). Table 5-6 shows Cronbach's α, CR and AVE of the latent variables.

All composite reliabilities for multiple reflective indictors were more than 0.7 (ranging from 0.645 to 0.939) except on past experience, and all values of AVE of these constructs were more than 0.5 except trust construct at 0.490 and past experience 0.434, the results suggest acceptable convergent validity.

Table 5-7 Evidence of reliability and convergent validity

Constructs	CRONBACHS ALPHA	COMPOSITE RELIABILITY	AVE
TRUST	0.451	0.835	0.490
CO-OPERATIVE	0.671	0.820	0.603
PRICE	0.889	0.939	0.813
FINANCE	0.823	0.880	0.650
EXPERTISE	0.795	0.860	0.557
PAST EXPERIENCE	0.601	0.645	0.434

Discriminant validity was assessed by comparing the square root of AVE for each construct and the construct's correlations with others (Fornell and Larcker 1981). Table 5-7 shows that all the square roots of AVEs in diagonals were more than the correlations in the off-diagonals, indicating acceptable discriminant validity except for the construct s trust and cooperation because they are sub-dimension of norms. These constructs are correlated because they are 2nd order to norms. All other values are lower than the square root of AVE.

Table 5-8 Correlations of latent variables and evidence of discriminant validity (n = 155)

Constructs	1	2	3	4	5	6
TRUST	0.700	--	--	--	--	--
CO-OP	0.791	0.777	--	--	--	--
PRICE	0.123	0.129	0.902	--	--	--
FINANCE	0.441	0.309	0.158	0.806	--	--
EXPERTISE	0.130	0.118	0.061	0.404	0.746	--
PAST EXP	0.444	0.380	-0.085	0.470	0.515	0.659

For small size firm model

All exogenous variables included $R^2 = 24.1\%$

Excluding,

1. Price $R^2_{P\,ex} = 31.5\%$
2. Norms $R^2_{N\,ex} = 26.4\%$
3. P Qual. $R^2_{PQ\,ex} = 7.99\%$

Effect size,

$$f^2 = \frac{R^2_I - R^2_E}{100 - R^2_I}$$

$$\text{Price} = \frac{31.6 - 31.5}{100 - 31.6} = \boxed{0.01}\ \text{No effect}$$

$$\text{Norms} = \frac{31.6 - 26.4}{100 - 31.6} = \boxed{0.08}\ \text{small effect size}$$

$$\text{Pre-qual.} = \frac{31.6 - 7.9}{100 - 31.6} = \boxed{0.14}\ \text{large effect size}$$

The causal model effect values for small firm model is presented in Figure 5-7

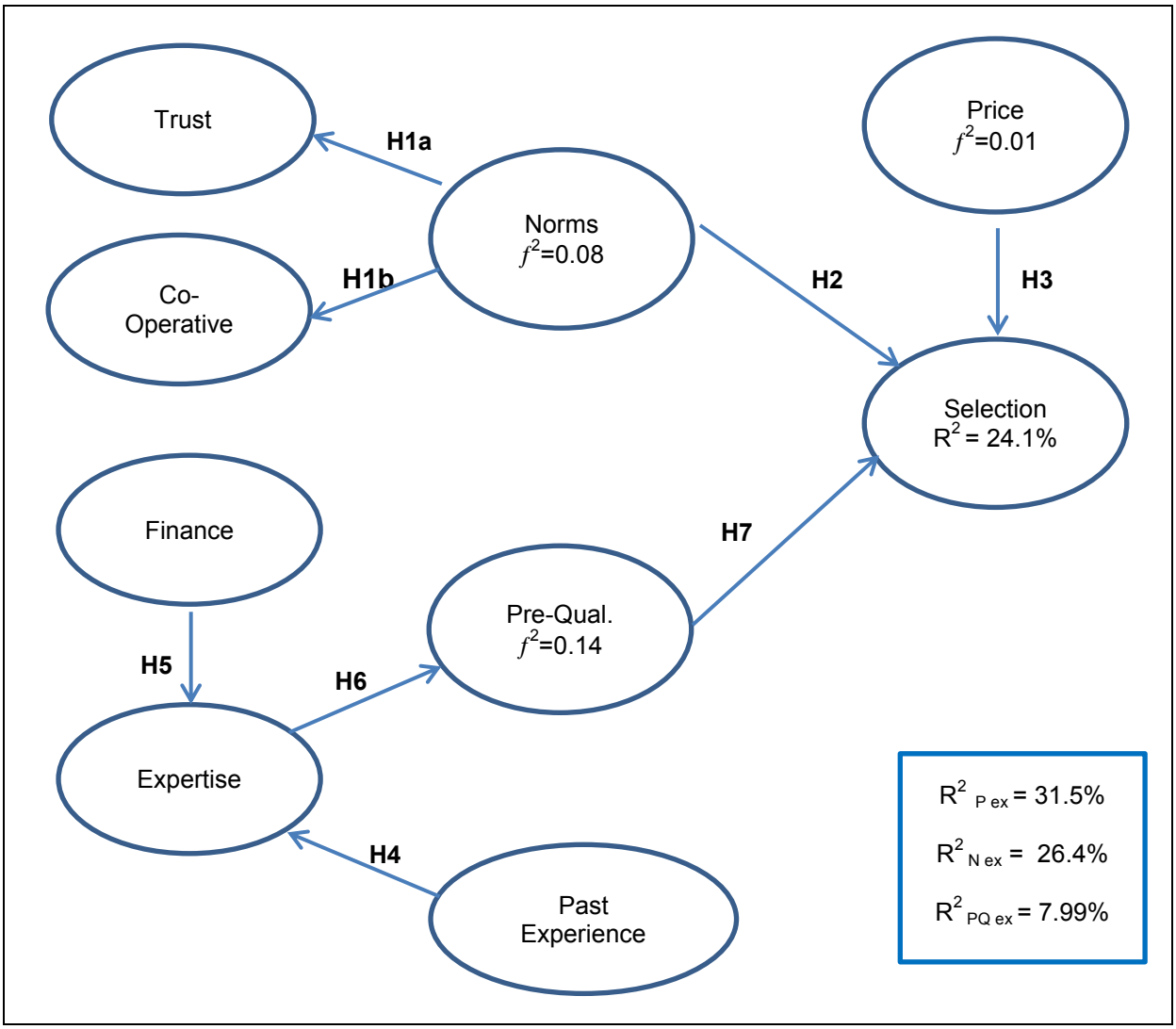


Figure 5-7 - Small firm model: relationship of constructs

5.4.3 Case 3 - Medium size firm model

Table 5-9 - Medium size firms' coefficient and T-Values

Outer Model (PLS measurement Model)	Estimates	T-Values
Outer Weight / loading Estimates		
Trust to TR 1 Intend to do business _ future	0.85	50.393
Trust to TR 2 Do business _ situation vague	0.36	2.276
Trust to TR 3 Trustworthy	0.82	26.826

Cooperation to CO1 Cooperative attitude	0.85	49.925
Cooperative to CO 3 Always settle dispute	0.63	7.471
Norms to Norms 1 Happy situation	0.84	27.322
Financial standing to Fin 1 Strong financial record	0.89	19.194
Financial standing to FIN 2 Good credit rating	0.92	60.655
Financial standing to FIN 3 Past turnover	0.73	15.015
Financial standing to FIN 4 Good credit line	0.85	17.600
Expertise to TE 1 Registered with Board	0.83	25.801
Expertise to TE 2 Quality control policy	0.90	62.802
Expertise to TE 3 In-house project management	0.78	15.284
Expertise to TE 4 IT knowledge	0.97	120.782
Expertise to TE 5 Subcontractor and suppliers	0.76	11.671
Past Experience to EP 1 Min. 5 years' experience	0.49	3.465
Past Experience to EP 2 Complete similar size project	0.92	3.682
Past Experience to EP 3 Past project record	0.36	26.639
Price to P1 Single most important criteria	0.78	6.850
Price to P2 Award to lowest tenderer	0.93	24.661
Price to P3 Accept lowest tender bid	0.72	4.274
Norms to CO 1 Cooperative attitude	0.84	55.267
Norms to CO 3 Always settle dispute	0.53	5.553
Norms to Norms 1 Happy situation	0.86	39.870
Norms to TR 1 Intend to do business _ future	0.83	38.284
Norms to TR 2 Do business _ situation vague	0.29	2.134
Norms to TE 3 In-house project management	0.82	33.877

All the outer loadings medium firm model is above the minimum threshold value of 0.708 except trust-TR2, *doing business when situation is vague* at 0.36; cooperative – CO3 *always settle dispute* at 0.63; past experience-EP1, *minimum 5years experience* at 0.49; past

experience – EP1 *past project record* at 0.36; norms – CO3, *always settle dispute* at 0.53 and norm – TR2 *do business when situation is vague* at 0.29.

As for the theoretical *t* values, the entire size of the result is above 1.96, therefore, it is significant at the significance level of 5% (i.e. α = 0.05; two tail test) (Hair et al., 2014).

The causal model effect values for medium firm model is presented in Figure 5-8 and is discussed in the following section:

Hypotheses	Relationship	Estimation	T-Values	Supported (S) / Not Supported (NS)
H1a	N to T	0.971	243.33	S
H1b	N to COOP	0.979	360.045	S
H2	N to S	0.271	2.450	S
H3	P to S	- 0.435	6.723	NS
H4	PE to E	0.549	3.898	S
H5	F to E	0.173	1.363	S
H6	E to PRE	0.537	7.936	S
H7	PRE to S	0.328	4.740	S

Figure 5-8 Medium size firm research model and hypotheses

Medium size firm hypotheses

H1: Norms is the second order construct with two sub-dimensions trust norms and cooperative norms. In Figure 5-8, norms also had a significant positive effect on contractor selection; trust norms (*b*=0.971) and cooperative norms (b=0.979).

H2: Norms has positive impact on contractor selection. Norms had a significant and positive impact on contractor selection (b= 0.271).

H3: Price has positive impact on contractor selection. Price had negative impact on selection (*b*= -0.435).

H4: Past experience has positive impact on contractor expertise. Past experience had positive impact on contractor expertise (b=0.549).

H5: Finance has positive impact on contractor expertise. Finance had positive impact on contractor expertise (b=0.173).

H6: Contractor expertise has positive impact on prequalification. Contractor expertise had positive impact on contractor prequalification (b=0.537).

H7: Prequalification has positive impact on contractor selection. Figure 5-8 demonstrates that contractor prequalification had a significant positive impact on contractor selection (*b*=0.328).

All the hypotheses are supported except the H3; price had no impact on selection.

Reliability and convergent validity

Generally, Cronbach's $\alpha > 0.7$ is acceptable (some researchers use Cronbach's $\alpha > 0.6$). In this study, except for the Cronbach's α of trust and cooperative norms and past experience at 0.501, 0.673 and 0.581 respectively, the rest were more than 0.7, so reliability is acceptable.

Average variance extracted (AVE) was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). Table 5-9 shows Cronbach's α, CR and AVE of the latent variables.

All composite reliabilities for multiple reflective indictors were more than 0.7 (ranging from 0.702 to 0.928), and all values of AVE of these constructs were more than 0.5 except for past experience which is slightly below 0.5 threshold at 0.46, suggesting acceptable convergent validity.

Table 5-10 Evidence of reliability and convergent validity

Constructs	CRONBACHS ALPHA	COMPOSITE RELIABILITY	AVE
TRUST	0.501	0.738	0.510
CO-OPERATIVE	0.673	0.818	0.604
PRICE	0.811	0.855	0.665
FINANCE	0.883	0.913	0.727
EXPERTISE	0.902	0.928	0.721
PAST EXPERIENCE	0.581	0.702	0.461

Discriminant validity was assessed by comparing the square root of AVE for each construct and the construct's correlations with others (Fornell and Larcker 1981). Table 5-10 shows that all the square roots of AVEs in diagonals were more than correlations in the off-diagonals, indicating acceptable discriminant validity except for the constructs trust and cooperation because they are sub-dimension of norms. These constructs are correlated because they are 2nd order to norms. All other values are lower than the square root of AVE.

Table 5-11 Correlations of latent variables and evidence of discriminant validity (n = 155)

Constructs	1	2	3	4	5	6
TRUST	0.714	--	--	--	--	--
CO-OP	0.791	0.777	--	--	--	--
PRICE	0.123	0.129	0.815	--	--	--
FINANCE	0.441	0.309	0.158	0.852	--	--
EXPERTISE	0.130	0.118	0.061	0.404	0.849	--
PAST EXP	0.444	0.380	-0.085	0.470	0.515	0.679

For Medium size firm model

All exogenous variables included R^2 = 22.8%

Excluding,

1. Price $R^2_{P\,ex}$ = 7.3%
2. Norms $R^2_{N\,ex}$ = 11.4%
3. P Qual. $R^2_{PQ\,ex}$ = 13.7%

Effect size,

$$\text{Price} = \frac{22.8 - 7.3}{100 - 22.8} = \boxed{0.20} \text{ medium effect size}$$

$$\text{Norms} = \frac{22.8 - 11.4}{100 - 22.8} = \boxed{0.15} \text{ medium effect size}$$

$$\text{Pre-Qual.} = \frac{22.8 - 13.7}{100 - 22.8} = \boxed{0.12} \text{ small effect size}$$

The causal model effect values is presented in Figure 5-9

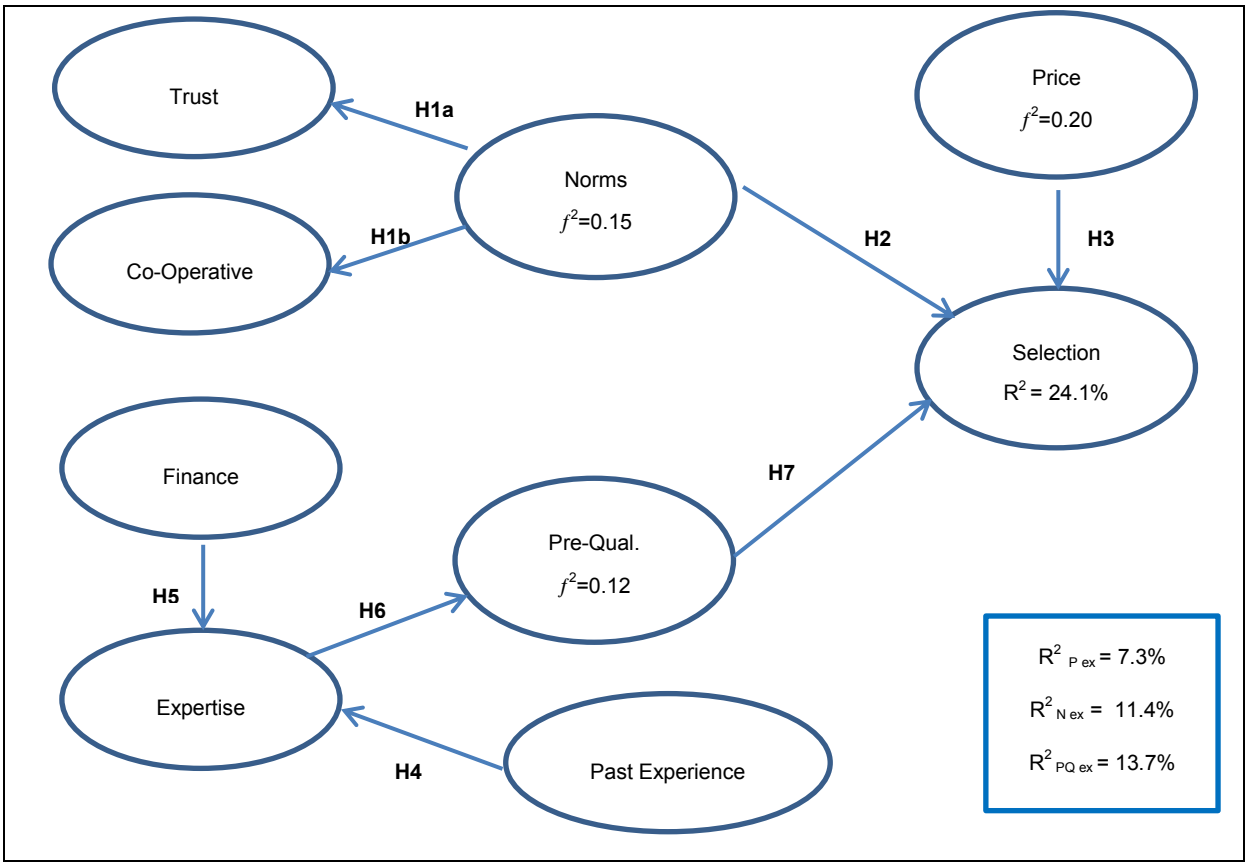


Figure 5-9 Medium size firms model: relationship of constructs

5.4.4 Case 4 - Large firm model

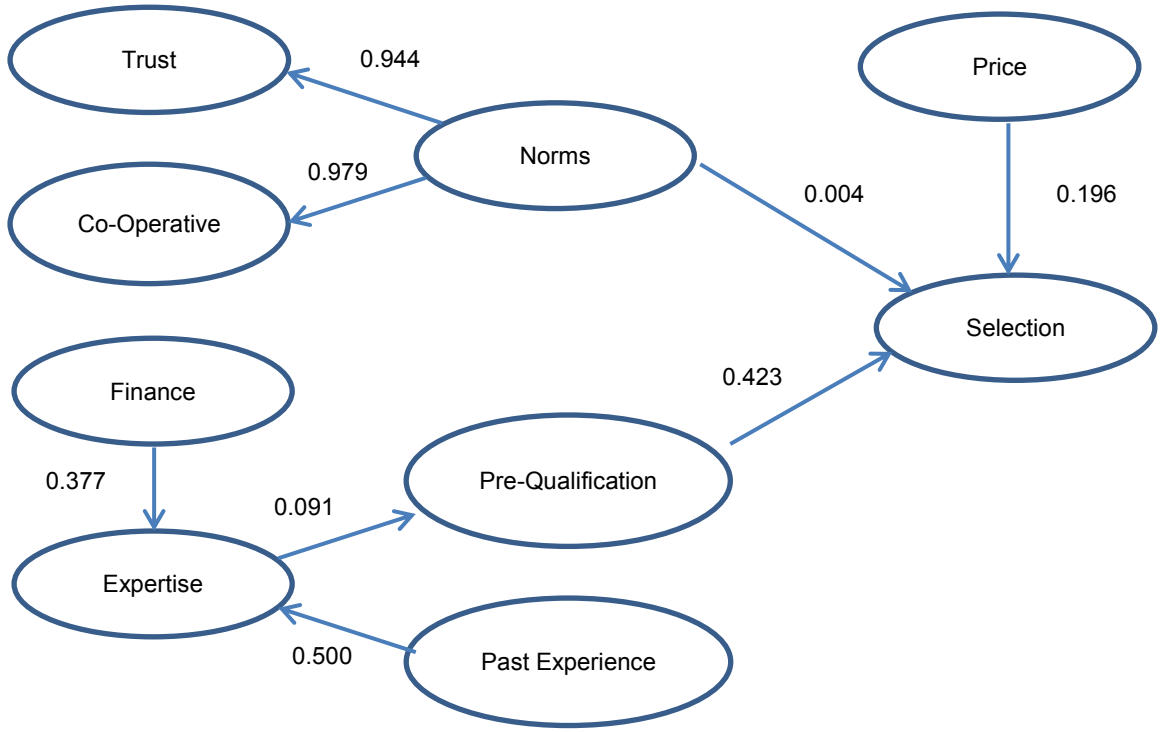
Table 5-12 - Large firms coefficient and T-Values

Outer Model (PLS measurement Model)	Estimates	T-Values
Outer Weight / loading Estimates		
Trust to TR 1 Intend to do business _ future	0.66	7.064
Trust to TR 2 Do business _ situation vague	0.37	2.468
Trust to TR 3 Trustworthy	0.89	57.362
Cooperation to CO1 Cooperative attitude	0.90	36.687
Cooperative to CO 3 Always settle dispute	0.83	22.129
Norms to Norms 1 Happy situation	0.84	38.204
Financial standing to Fin 1 Strong financial record	0.83	17.037
Financial standing to FIN 2 Good credit rating	0.92	38.283
Financial standing to FIN 3 Past turnover	0.83	26.814
Financial standing to FIN 4 Good credit line	0.90	86.134
Expertise to TE 1 Registered with Board	0.60	0.716
Expertise to TE 2 Quality control policy	0.71	8.745
Expertise to TE 3 In-house project management	0.84	31.303
Expertise to TE 4 IT knowledge	0.83	35.503
Expertise to TE 5 Subcontractor and suppliers	0.84	20.380
Past Experience to EP 1 Min. 5 years' experience	0.75	14.059
Past Experience to EP 2 Complete similar size project	0.89	33.255
Past Experience to EP 3 Past project record	0.03	30.516
Price to P1 Single most important criteria	0.71	4.741
Price to P2 Award to lowest tenderer	0.89	10.063
Price to P3 Accept lowest tender bid	0.87	11.462
Norms to CO 1 Cooperative attitude	0.84	38.792
Norms to CO 3 Always settle dispute	0.53	16.359
Norms to Norms 1 Happy situation	0.86	33.099
Norms to TR 1 Intend to do business _ future	0.83	6.686
Norms to TR 2 Do business _ situation vague	0.29	2.877
Norms to TE 3 In-house project management	0.82	52.076

All the outer loadings for the large firm model are above the minimum threshold value of 0.708 except; trust – TR1 *Intend to do business in future* 0.66; trust-TR2, *doing business when situation is vague* at 0.37; past experience-EP1, *minimum 5years experience* at 0.49; Expertise – TE1 *register with the board* at 0.60; past experience – EP1 past project record at 0.03; norms – CO3, *always settle dispute* at 0.53 and norm – TR2 *do business when situation is vague* at 0.29.

As for the theoretical *t* values, the entire size of the result is above 1.96, therefore, it is significant at the significance level of 5% (i.e. $\alpha = 0.05$; two tail test) (Hair et al., 2014) except expertise item TE1 which has the *t* value of 0.716 which is lower the 1.96 threshold level.

The causal model effect values for large firm model is presented in Figure 5-10



Hypotheses	Relationship	Estimation	T-Values	Supported (S)/ Not Supported (NS)
H1a	N to T	0.944	120.57	S
H1b	N to COOP	0.979	234.731	S
H2	N to S	0.004	0.059	NS
H3	P to S	0.196	2.621	S
H4	PE to E	0.500	7.849	S
H5	F to E	0.377	5.999	S
H6	E to PRE	0.091	0.863	NS
H7	PRE to S	0.423	7.248	S

Figure 5-10 - Large firm model and hypotheses

Large firms hypotheses

H1: Norms is the second order construct with two sub-dimensions trust norms and cooperative norms. In Figure 5-10, norms also had a significant positive effect on contractor selection; trust norms (*b*=0.944) and cooperative norms (b=0.979).

H2: Norms has positive impact on contractor selection. Norms had no significant impact on contractor selection (b= 0.004).

H3: Price has positive impact on contractor selection. Price had significant and positive impact on selection (*b*= 0.198).

H4: Past experience has positive impact on contractor expertise. Past experience had positive impact on contractor expertise (b=0.500).

H5: Finance has positive impact on contractor expertise. Finance had positive impact on contractor expertise (b=0.377).

H6: Contractor expertise has positive impact on prequalification. Contractor expertise had no positive impact on contractor prequalification (b=0.091).

H7: Prequalification has positive impact on contractor selection. Figure 5-10 demonstrates that contractor prequalification had a significant positive impact on contractor selection (*b*=0.328).

All hypotheses are supported except H2 Norms to Selection and H6 Expertise to Prequalification on contractor selection.

Reliability and Convergent validity

Generally, Cronbach's $\alpha > 0.7$ is acceptable (some researchers use Cronbach's $\alpha > 0.6$). In this study, except for the Cronbach's α of trust at 0.370, the rest were more than 0.7, so reliability is acceptable.

Average variance extracted (AVE) was used to estimate the convergent validity (Chin, 1998; Wetzels et al., 2009). Table 5-12 shows Cronbach's α, CR and AVE of the latent variables.

All composite reliabilities for multiple reflective indictors were more than 0.7 (ranging from 0.692 to 0.927), and all values of AVE of these constructs were more than 0.5 except trust construct at 0.455, suggesting acceptable convergent validity.

Table 5-13 - Evidence of reliability and convergent validity

Constructs	CRONBACHS ALPHA	COMPOSITE RELIABILITY	AVE
TRUST	0.370	0.692	0.455
CO-OPERATIVE	0.816	0.891	0.732
PRICE	0.791	0.863	0.680
FINANCE	0.897	0.927	0.762
EXPERTISE	0.821	0.877	0.590
PAST EXPERIENCE	0.778	0.870	0.691

Discriminant validity was assessed by comparing the square root of AVE for each construct and the construct's correlations with others (Fornell and Larcker 1981). Table 5-13 shows that all the square roots of AVEs in diagonals were more than the correlations in the off-diagonals, indicating acceptable discriminant validity except for the construct s trust and cooperation because they are sub-dimension of norms. These constructs are correlated because they are 2nd order to norms. All other values are lower than the square root of AVE.

Table 5-14 - Correlations of latent variables and evidence of discriminant validity (n = 155)

Constructs	1	2	3	4	5	6
TRUST	0.675	--	--	--	--	--
CO-OP	0.791	0.856	--	--	--	--
PRICE	0.123	0.129	0.825	--	--	--
FINANCE	0.441	0.309	0.158	0.873	--	--
EXPERTISE	0.130	0.118	0.061	0.404	0.768	--
PAST EXP	0.444	0.380	-0.085	0.470	0.515	0.831

For Large size firm model

All exogenous variables included R^2 = 24.1%

Excluding,

1. Price $R^2_{P\,ex}$ = 20.6%
2. Norms $R^2_{N\,ex}$ = 20.6%
3. P Qual. $R^2_{PQ\,ex}$ = 3.2%

Effect size,

$$f^2 = \frac{R^2_I - R^2_E}{100 - R^2_I}$$

$$\text{Price} = \frac{24.1 - 20.6}{100 - 24.1} = \boxed{0.05}\text{ small effect size}$$

$$\text{Norms} = \frac{24.1 - 24.1}{100 - 24.1} = \boxed{0.0}\text{ no effect}$$

$$\text{Pre-qual.} = \frac{24.1 - 3.2}{100 - 24.1} = \boxed{0.27}\text{ medium small effect size}$$

The causal model effect values for large firm is presented in Figure 5-11

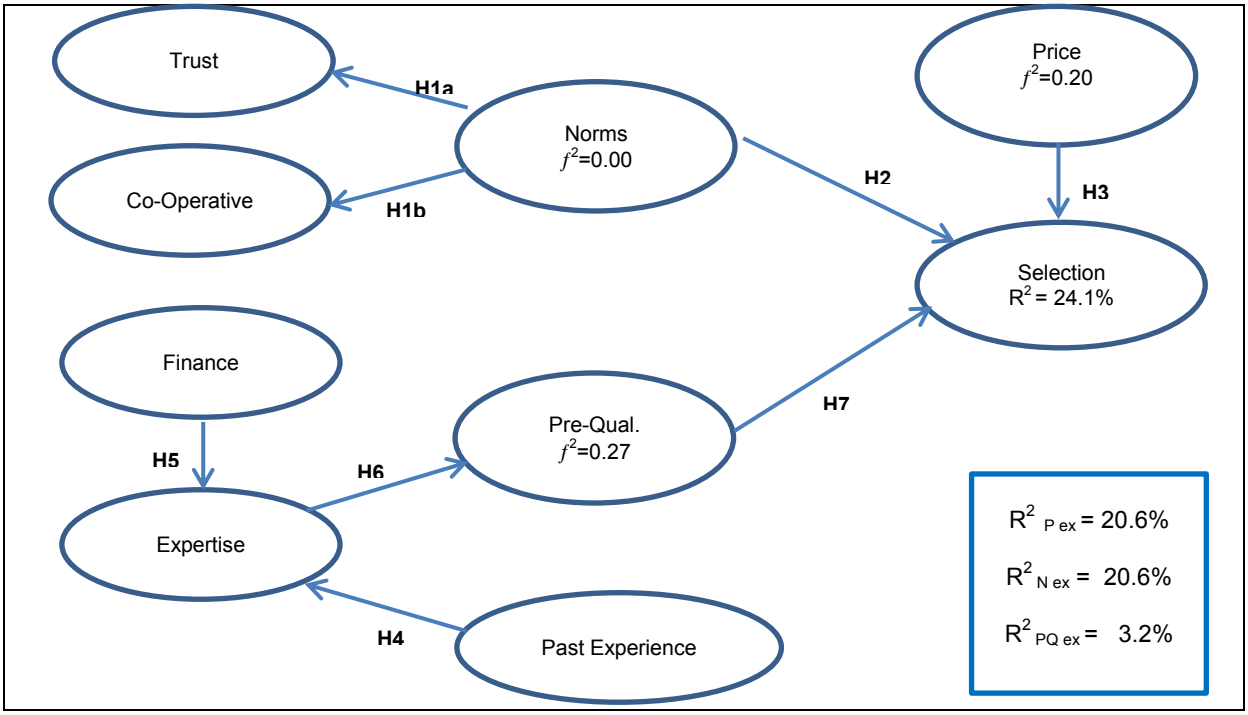


Figure 5-11 - Large firm model: relationship of constructs

5.5 Summary

From the results, the prequalification is an important criterion for contractor selection. All the three groups of firms rated this criterion highly. The aggregate firm model has shown a medium effect size with the small firm showing a large effect size.

The small firm group shows the biggest variability in the effect sizes for example on price, there is no effect of price on selection, small effect size on norms with most of the

respondents prefer to prequalify their contractors before their contractors are given a chance to submit their bids. Although the small size firm believes prequalification would help them to find the right contractors, this group of developers frequently reuse contractor with whom their company has past experience.

For the medium size firm, the effect sizes for price and norms are medium effect and small effect on pre-qualification.

For the large firms, price has a small effect whereas the norm has no effect and prequalification has medium effects. The majority of them would carry out prequalification to source for contractors each time they have a new project. This can be interpreted as that for the large firm, their relationship with contractors is not important as they continue to source for better qualified contractors for every project. Further for those developers with high end complex residential projects, they would require contractors with different expertise to execute the construction works. Therefore, relationship may not play an important role in the contractor selection.

These phenomena will be explained in more detail in the Chapter 6 – Interpretation of findings and implications.

Chapter 6 Interpretation of Findings

6.1 Introduction

Chapter 5 introduced the results of the measurement model (measurement model evaluation presented in Table 5.1) and the causal model effect sizes for price, norms and prequalification variables. This chapter will provide further analysis of the results presented in the previous chapter; provide an interpretation of the findings and consider their significance for each of the small, medium and large firms' cases. Thus, it will integrate the findings based on the hypotheses proposed. Section 6.2 explains the results on hypotheses significance and the interpretations. Section 6.3 describes the theoretical and managerial implications.

6.2 Hypotheses significance and interpretation

In assessing PLS_SEM results, after running the algorithm in PLS-SEM, estimates are obtained for the structural model relationship – the path coefficient. Path coefficients represent the hypothesised relationships among the constructs and have standardised values between -1 and +1. Estimated path coefficients close to +1 represent strong positive relationships (vice versa for negative values) that are almost always statistically significant (Hair et al., 2014) and the closer the estimated coefficients are to 0, the weaker the relationships and very low values close to 0 are usually nonsignificant.

However, whether a coefficient is significant ultimately depends on its standard error *(standard error is the standard deviation of the sampling distribution of that statistic and it is important to show how much sampling fluctuation a statistic has)* that is obtained by means of bootstrapping. Bootstrapping is a resampling technique that draws a large number of subsamples from the original data (with replacement) and estimates models for each subsample. It is used to determine standard errors of coefficient estimates to assess the coefficient's statistical significance. The bootstrapping standard error allows computing the empirical *t- value* resembling larger sampling size due to the resampling technique.

For this research, the developers were separated into four cases based on their turnover in order to facilitate comparisons of differences and preferences in contractor selection between the firms' sizes. Hence, Case 1 – The aggregate model for the composite result; Case 2 – Small firms: The small size firms are those with a turnover from RM 3 million to RM 10 million (RM 5.5 million is equivalent to GBP 1 million); Case 3 – Medium size firms: Medium size

firms are those with a turnover of RM 11 million to RM 30 million. Case 4 – Large firms: Large firms are those with a turnover exceed RM 30 million. The case model estimation values (path coefficient), T-values and the significance of the hypotheses in the order of aggregate, small, medium and large firms' results is presented on Table 6-1.

Table 6-1 - Summary of hypotheses path coefficient and T-values for all firms' size

		Aggregate (Overall)			Small Firms			Medium			Large Firms		
Hypotheses		A	B		A	B		A	B		A	B	
H1a	N to T	0.930	110.108	S	0.914	77.827	S	0.971	243.33	S	0.944	120.57	S
H1b	N to CO	0.961	175.767	S	0.944	115.277	S	0.979	360.045	S	0.979	234.731	S
H2	N to S	0.139	1.591	S	0.236	3.522	S	0.271	2.450	S	0.004	0.059	NS
H3	P to S	0.042	0.459	NS	- 0.009	0.125	NS	- 0.435	6.723	NS	0.196	2.621	S
H4	PE to E	0.417	4.805	S	0.365	3.093	S	0.549	3.898	S	0.500	7.849	S
H5	F to E	0.208	2.249	S	0.224	2.444	S	0.173	1.363	S	0.377	5.999	S
H6	E to PRE	0.425	5.607	S	0.466	6.606	S	0.537	7.936	S	0.091	0.863	NS
H7	PRE to S	0.364	3.998	S	0.577	8.629	S	0.328	4.740	S	0.423	7.248	S

Note : A – Path coefficient (Estimation) B – T-values S – Supported NS – Not Significant

H1a - Norms are the second order construct to trust norms - (N to T)
H1b - Norms are the second order construct to cooperative norms - (N to COOP)
H2 - Norms have a positive impact on contractor selection - (N to S)
H3 - Price has a positive impact on contractor selection - (P to S)
H4 - Past experience has a positive impact on expertise - (PE to E)
H5 - Finance has a positive impact on expertise - (F to E)
H6 - Contractor expertise has a positive impact on prequalification - (E to PRE)
H7 - Prequalification has a positive impact on contractor selection - (PRE to S)

6.2.1 *Norms are the second order construct with two sub-dimensions cooperative norms (H1a) and trust norms (H1b).*

As shown in Table 6 – 1, norms had a significant positive effect on contractor selection with two sub-dimensions; trust norms and cooperative norms. As perceived in the studies by Heide and John (1992), Zaheer and Venkatraman (1995)and Noordeweir *et*. *al*. (1990), relational norms were assessed as a second-order construct whose first-order dimensions are *flexibility*, *information exchange* and *solidarity*. The results for the individual case are;

- **Aggregate model:** For Norms to Trust PLS-SEM path coefficient is 0.930 and t-value of 110.108 and Norms to Cooperative norms PLS-SEM path coefficient is 0.961 and t-value of 175.767 for aggregate model and the second-order confirmatory factor confirms highly significant first-order (λij) and second-order (γij) loadings with t-values for both that are higher than the significant value of 1.96.
- **Small firms' model:** For Norms to Trust PLS-SEM estimation is 0.914 and t-value is 77.827 and Norms to Cooperative norms PLS-SEM estimation is 0.944 and t-value is 115.277 for small firms' model. The second-order confirmatory factor confirms highly significant first-order (λij) and second-order (γij) loadings with t-values for both which are higher than the significant value of 1.96.
- **Medium firms' model:** For Norms to Trust PLS-SEM estimation is 0.971 and t-value is 243.33 and Norms to Cooperative norms PLS-SEM estimation is 0.979 and t-value is 360.045 for medium firms' model. The second-order confirmatory factor model confirms highly significant first-order (λij) and second-order (γij) loadings with t-values for both that are higher than the significant value of 1.96.
- **Large firms' model:** For Norms to Trust PLS-SEM estimation 0.944 and t-value of 120.57 and Norms to Cooperative norms PLS-SEM estimation of 0.979 and t-value of 234.731 for large firms' model and the second-order confirmatory factor model confirms highly significant first-order (λij) and second-order (γij) loadings with t-values for both which are higher than the significant value of 1.96.

6.2.2 Norms have a positive impact on contractor selection – H2

As shown in Table 6 – 1, norms have a significant positive effect on contractor selection except for large firms – where the effect is nonsignificant.

- **Aggregate model:** For Norms to Selection PLS-SEM path coefficient value of 0.139 is significant but t-value of 1.591 is lower than the significant value of 1.96.
- **Small firms' model:** For Norms to Selection PLS-SEM path coefficient value of 0.236 is significant and t-value of 3.522 is higher than the significant value of 1.96.
- **Medium firms' model:** For Norms to Selection PLS-SEM path coefficient value of 0.271 and t-value is 2.450 is higher than the significant value of 1.96.
- **Large firms' model:** For Norms to Selection PLS-SEM path coefficient value of 0.004 is insignificant and t-value of 0.059 is also not significant Hence, Norms construct has no significant relationship to Selection

These results show that Norms have significant values for small firms and medium size firms but nonsignificant for large firm category. Therefore, the hypothesis for relationship between Norms and Selection for large firms is *not supported.* The relationship construct is not a significant construct in contractor selection for the large developers firms. According to the questionnaire survey, large developers prequalify tenderers on every project in an attempt to source for better-qualified contractors and competitive price (price construct to be explained later). Prior management literature shows that norms have significant impact on supplier selection (Doney and Cannon, 1997; Kannan, 2006; Spekman, 1988) and as buyers develop closer collaborative ties with their suppliers, the buyers will use fewer suppliers as well as sharing more long term information with their suppliers (Spekman et al, 1988). The literature found that the interorganisational relationship would not work if there is a low level of trust and a constant fear of supplier non-performance as found in competitive price bids. Further, in order to improve transaction outcomes, trust norms are concerned with expectancy that the one who is trusted will abstain from opportunistic behaviours (Laan et al., 2012b), and also trustworthiness reduces transaction costs and is correlated with greater information sharing (Dyer and Chu, 2003). According to Jap and Anderson (2003), trust is likely to enhance interorganisational exchange performance. Therefore, the higher the trust, the higher the chance the contractor will be selected.

Spekman's study (1988) cited that closer and more collaborative ties can lead to fewer suppliers being selected. The results from this research extends Spekman's study in that although maintaining good relationship and closer ties with buyers (developers) may help tenderers to win jobs, the tenderer must nevertheless first have the relevant qualification to execute the work. These large developers for example would choose to prequalify the bidders on every project instead of automatically reusing contractors on their standing lists. Hence, closer ties alone would not help the contractor to secure projects. The contractors must possess the relevant project experience and organisation's expertise such as commitment to quality and innovation for state-of-the-art development projects.

In contrast, for the small and medium size firms, relational contracting (based on relational norms) plays an important role in their procurement procedure, because, based on the questionnaire survey; firstly; the small and medium firms' projects are mainly single family housing projects using repetitive design and standardised construction methods by relational contracting (as explained in Chapter 2, Section 2.6), this helps to lower contracting expenses such as drafting, procuring and monitoring contractor performance because contracts can remain incomplete without risking opportunistic behavior (Macaulay, 1963). Secondly, due to the trust and cooperative relationships between the developers and their contractors, relational contracting will help to provide a better project outcome as there are many non-legal sanctions that make it expedient for organisations to fulfil commitments without the need of formal prequalification. This confirms Eriksson study's (2010), that for standard and repetitive project transactions, a straight reuse of contractors is possible.

6.2.3 Price has a positive impact on contractor selection – H3

As shown in Table 6 – 1; price had no significant effect on contractor selection for small and medium but showing an exception to the trend for large firms.

- **Aggregate model:** For Price to Selection PLS-SEM path coefficient value of 0.042 is not significant and t-value of 0.459 is lower than the significant value of 1.96.
- **Small firms' model:** For Price to Selection PLS-SEM path coefficient value of -0.009 is not significant and t-value of 0.125 is lower than the significant value of 1.96.

- **Medium firms' model:** For Price to Selection PLS-SEM path coefficient value of negative 0.435 is significant and t-value is 6.723 is higher than the significant value of 1.96.
- **Large firms' model:** For Price to Selection PLS-SEM path coefficient value of 0.196 is significant and t-values of 2.621 is higher than the significant value of 1.96

This construct had no significant relationship to selection of contractor except for the large firms. As explained in Section 6.2.2, small and medium firms, generally, procuring contractor services for repetitive works, opt to use relational contracting due to the trust and cooperative relationship they enjoy with their contractors. The selection criteria therefore are less price centric and tend reappoint existing contractors based on their past experience and relationship. According to Macaulay's study (1963), this procurement method can lower the cost of contracting expenses with better project outcomes.

According to the studies, traditionally, contractor selection has been mainly based on bid price. i.e., the lowest-price wins practices found in the UK and elsewhere (Wong et al., 2000; Waara and Brochner, 2006). Similarly, as shown in literature in the Malaysian context, bid price is generally the most important selection criterion in tender bid evaluation (Shehu et al., 2014b). However, in contrast, based on another UK study by Wong et al (2001), the construction clients ranked price criteria low as compared to other criteria such as project experience, completion on time, site organisation, financial capacity, training and skill levels of craftsmen and the quality achieved on similar works. Moreover, the lowest price tender cannot guarantee to yield the lowest overall project cost and therefore, it may not in developers' best interest to pursue lowest price competitive price practices.

For the small and medium size firms' results, this study confirms earlier studies that generally, contractor selection is based on value instead on price criterion (Wong et al., 2000; Bradach, 1989; Waara and Brochner, 2005; Elyamany, 2014). The respondents in the survey were concerned that the contractor may not able to deliver with the low priced tender, and if too much emphasis is placed on the price criterion, tenderer would be put under tremendous pressure to reduce tender price and may try to recover the costs and profit elsewhere in the contract after being awarded the project. Therefore, respondents opted for multi-criteria selection methods to gain better overall value or best value (Elyamany, 2014; Palaneewaran et al., 2012). This study also concurs with the works of Elyamany (2014)

which opines that a low bid is a false economy and initial savings from the price-based competition tender are cancelled by additional long-term costs.

Large firms, who carry out contractor prequalification on every project, would use price criterion among the qualified contractors to select the most competitive bidder. The developers here use prequalification to source for multiple bids from qualified contractors, to be assured of a competitive price. Despite the evidence of relational contracting success, they are reluctant to abandon the traditional habits of lowest price practice to obtain higher corporate profit instead of the total purchasing performance.

6.2.4 Past experience has a positive impact on expertise – H4

As shown in Table 6 – 1: Past experience had a significant positive effect on contractor expertise and is significant for all-firm models.

- **Aggregate model:** Past experience to Contractor expertise PLS-SEM path coefficient value of 0.417 is significant and t-value of 4.805 is higher than the significant value of 1.96.
- **Small firms' model:** Past experience to Contractor expertise PLS-SEM path coefficient value of 0.365 is significant and t-value of 3.093 is higher than the significant value of 1.96.
- **Medium firms' model:** Past experience to Contractor expertise PLS-SEM path coefficient value of 0.549 is significant and t-value is 3.898 is higher than the significant value of 1.96.
- **Large firms' model:** Past experience to Contractor expertise PLS-SEM path coefficient value of 0.500 is significant and t-values of 7.849 is significant

Hypothesis 4 posits that contractor past project experience will have a positive effect on the organisation's expertise. Hence, a contractor who has successfully completed similar projects in the past is more likely to deliver similar performance on the next project (Holt, 1998b; Holt et al., 1994). This study's findings support Watt et al (2010) in which contractor past project performance is ranked as the number one criteria. Therefore, contractors with a proven record of accomplishment can reduce the risk of non-delivery. For large projects, with higher construction constraints such as quality, time, budget and innovation, the main

contractor's experience will play a pivotal role in ensuring the success of the project where they are expected to be involves in the management and coordination of various parties' works such as planning and scheduling works and meeting all the project's requirements. According to Tiong and Singh (2006), other contractors' qualities such as the contractor's ability in handling regulatory requirements, troubleshooting site problems and efficiently managing of subcontractors' works are the essential contractor expertise in order to achieve desirable project outcomes. According to the studies, project failures were frequently ascribed to contractors not possessing the relevant working experience.

6.2.5 Financial standing has a positive impact on expertise – H5

As shown in Table 6 – 1: financial standing had a significant positive effect on contractor expertise and is significant for all-firm models.

- **Aggregate model:** financial standing had a significant positive effect on Contractor Expertise PLS-SEM path coefficient value of 0.208 is a significant and t-value of 2.249 is higher than the significant value of 1.96.
- **Small firms' model:** financial standing had a significant positive effect on Contractor expertise PLS-SEM path coefficient value of 0.224 is significant and t-value of 2.444 is higher than the significant value of 1.96.
- **Medium firms' model:** financial standing had a significant positive effect on Contractor expertise PLS-SEM path coefficient value of 0.173 and t-value is 1.363 is lower than the significant value of 1.96.
- **Large firms' model:** financial standing had a significant positive effect on Contractor expertise PLS-SEM path coefficient value of 0.377 is significant and t-values of 5.999 is significant

In the construction industry, projects' contractors are usually expected to finance a portion of the work before they can get reimbursed through the progressive payments for the work done. Lack of project funding by the contractor has been blamed as one of major causes of project delays (Frimpong et al., 2003). Therefore, developers need to ensure that the contractors tendering for their project would have sufficient working capital should they be awarded this new project. The results of this study show that all the developers concede that

contractors' financial standing is important and has a positive effect. Further, according to Huang (2013), contractors often operate on lower profit margins to secure contracts due to intense competition, which puts them under tremendous financial risk should they not be able to deliver the project on time.

Further, contractor's financial source generally can be found from three main sources suppliers' credit, banks' facilities and company working capital from previous projects retained profits. Contractors in the construction industry, rely heavily on their suppliers and subcontractors to provide credit terms as the main source of temporary project finance, with payments terms ranging from one to six months. The credit terms and credit limit are largely dependent on the contractor's reputation and maintenance of good accounts with them. Bank loan facilities are another way of securing short-term loans for project finance but these facilities attract financial charges. Working capital is the contractor's own capital from past retained profit that can provide short term project funding until the contractor can submit its progress claims for the work done. Short term cash flow is required for projects to cover site expenses and various subcontractor and suppliers payments (Huang et al., 2013).

In addition, according to Huang et al (2013), bank loan facilities could put a contractor under financial constraints due to interest payment or debt payment can lead to collapse of the company and thereby likely incur a delay or failure in its construction project.

The above demonstrates the importance of the contractor having good financial standing to prevent delay or failure of the projects and has a positive effect on contractors' expertise.

6.2.6 Contractor expertise has a positive impact on prequalification – H6

As shown in Table 6 – 1: contractor expertise had a significant positive effect on prequalification and is significant for all-firm models with the exception of large firms.

- **Aggregate model:** contractor expertise had a significant positive effect on Prequalification PLS-SEM path coefficient value of 0.425 is significant and t-value of 5.607 is higher than the significant value of 1.96.
- **Small firms' model:** contractor expertise had a significant positive effect on Prequalification PLS-SEM path coefficient value of 0.466 is significant and t-value of 6.606 is higher than the significant value of 1.96.

- **Medium firms' model:** contractor expertise had a significant positive effect on Prequalification PLS-SEM path coefficient value of 0.537 and t-value 7.936 is higher than the significant value of 1.96.
- **Large firms' model:** contractor expertise had a significant positive effect on Prequalification PLS-SEM path coefficient value of 0.091 is not significant and t-value of 0.863 is not significant as it is lower than the significant value of 1.96.

H6 posits that contractor expertise had positive impact on contractor prequalification. The expertise is important because the organisation resources such as past project experience, company financial management and personnel experience such as project managers, engineers and quantity surveyors are part of the firms' management expertise. The tenderer would need to demonstrate that they have the organisational expertise to manage and perform all the activities necessary for the project. The results show that contractor expertise is an important criteria in the contractor selection (Mahdi et al., 2002). According to Watt et al (2010), the requisite contractor expertise will help to first, reduce risk of not meeting clients' expectations and secondly, technically compliant solutions are significant criteria in helping to reduce mistakes during construction and in achieving project objectives and stated outcomes. Inadequate contractor competence would cause ineffective planning, and poor site management (Eriksson and Pesämaa, 2013; Kadefors, 2005; Stump and Heide, 1996). According to De Hoog's study (1990), small firms lack such expertise to compete against well-funded and better resourced big firms. Therefore, in order for tenderers to qualify for the projects they seek, they must acquire the relevant expertise to handle the project.

As for the large firms, since prequalification was in any case carried on every project, the qualified contractors would therefore be assumed to have complied with the expertise required for the project, which may explain why no significant relationship was found.

6.2.7 Prequalification has positive impact on contractor selection – H7

As shown in Table 6 – 1: prequalification had a significant positive effect on Selection and is significant for all-firm models.

- **Aggregate model:** prequalification had a significant positive effect on Selection. PLS-SEM path coefficient value of 0.364 is significant and t-value of 3.998 is higher than the significant value of 1.96.

- **Small firms' model:** prequalification had a significant positive effect on Selection. PLS-SEM path coefficient value of 0.577 is significant and t-value of 8.629 is higher than the significant value of 1.96.
- **Medium firms' model:** prequalification had a significant positive effect on Prequalification. PLS-SEM path coefficient value of 0.328 and t-value is 4.740 is lower than the significant value of 1.96.
- **Large firms' model:** prequalification had a significant positive effect on Prequalification. PLS-SEM path coefficient value of 0.423 is significant and t-value of 7.248 is significant

Based on the questionnaire survey, the highest number of projects where prequalification preceded was those reported by large firms. This is in line with Liu et al.'s study (2014) which cited that modern projects require 'complicated technologies' and complicated construction methods and therefore the contractors' prequalification plays an important role in sourcing for the right contractor to meet the project's requirements.

The questionnaire survey results also show that small firms do not practice formal prequalification, a phenomenon that perhaps due to the size and type of projects. For example, small developers firms usually carry out small, less complex and repetitive projects where bid price is generally sufficient criterion for selection (Eriksson and Westerberg, 2010; Eriksson, 2006) and also according Macaulay (1963), relational contracting is an effective way in constraining opportunism and according to Gulati (1995) a history of exchange between two firms is often used as a proxy of trust – in which trust is presumed to develop over time. Therefore, repeated use of existing contractors who they trust (as explained in Section 6.2.2) reduces the need for prequalification. Further, the prequalification exercise is both time and cost consuming and will add to tendering time and transaction costs. Moreover, many of these small and medium size firms do not have the resources to handle the prequalification.

As for the large firms, the qualifications of contractors are important to ensure the project's requirements are met, which results in prequalification of every project there is for tender. This result is consistent with Eriksson's study (2008a), where for less complex and simple work contracts can be awarded using price mechanism while as Pesamaa (2009) cite that for more complex and technical challenging works, evaluation of task attributes by clients during

pre-contract stage is important. Further, for the large firms, having obtained the qualified contractors bids from the multiple tender bids, developers can then use competitive price award strategy to lower the construction costs.

6.3 Implications

6.3.1 Theoretical implications

This study contributes to the literature in a number of ways. First, although the price construct has been associated with greater opportunism, the results show that medium size firms report medium effect size and the large firms' model show a small effects size on price to selection whereas, the small firms' model shows no effect size. This phenomenon implies that for medium and large size firms, price remains an important criterion in seeking competitive bids from larger pools of qualified tenderers despite what was prescribed in the literature about the potential benefit of using multi-criteria selection criteria. As for the small firms, the contractor selection tends towards the use of relational contracting as price criterion shows no effect. This finding adds to the existing literature by Watt et al. (2010) where according to the authors, tendered price was found to be not an important tender evaluation criterion. This study however, finds that tender price is an important factor having first prequalified the tenderers and then uses a competitive price bid technique among the qualified candidates.

Second, informal contracts such as relational contracting are favoured by the small and medium size firms, showing small and medium size effects, respectively. The questionnaire survey shows that these two categories of developers, tend to reuse contractors from their standing list more often than the large firms (see Table 7-9 in Chapter 7). Whereas, for the large firms, prequalification method are preferred as the results show that norms have no effect on selection. The hypothesis b*ased on Cannon et al.'s study (2000), it states that "H4: When an exchange involves few relationship-specific adaptations and in characterised by a low level of transactional uncertainty, increases in the relational content (i.e., cooperative norms) of the governance structure will not necessarily lead to enhanced performance on the part of an exchange partner" (page 184).* This study extends Cannon et al.'s research, that by using relational contracting (cooperative and trust norms), small and medium size firms (involve in a low level of transactional uncertainty) report higher satisfaction on contractor performance as compared with large firms using formal contracts, involved in low level of transactional uncertainty (due to simpler construct method for the single-family residential

housing for example) are reporting higher satisfaction on contractor performance as compared with large firms using formal contracts

Third, although there is ambiguity on the effectiveness of price and relational contracting criteria as the results provide a mixed perspective, the prequalification criterion was nevertheless established as the most important selection criterion by all three groups. The results show that prequalification has positive impact on selection for all developers groups. The small firms' results show large effect size, the medium size firms show small effect size and the large firms show medium effect size. According to this perspective, all the developers participating in the questionnaire survey believe that prequalification can help them to source for a better contractor, despite the fact that small and medium size firms do not often practice prequalification, as explained in Chapter 7; Section 7.1.3 (The table is repeated here for easy reference). As shown in the table, the large firms are almost twice as likely as compared with the small and medium size firms to exercise prequalification in their contractor selection procedure.

Developer Turnover Size	Mean	N	Std. Deviation
Small	2.30	64	1.743
Medium	2.92	38	1.761
Large	4.23	53	1.281
Total	3.11	155	1.804

This study has tested the contractor selection methods/criteria amongst REHDA members, where in the past criteria such as price and developer/contractor relationships were seemingly the dominant criteria in contractor selection. However, the results of this study underline the importance of contractor prequalification on selection while the selection based on price and relationship remained ambiguous which will be explained in more detail in Chapter 7. In Watt et al.'s study (2010) tender evaluation and contractor selection was proposed as a single stage selection process; i.e., evaluation of tenders based on general criteria as well as price criteria concurrently. This study found that prequalification is an important criterion in contractor evaluation especially amongst the large firms who would prequalify contractors on every project, subsequently, the price criteria in the bidding is also important among the qualified contractors. Therefore, this study proposed a two-stage contractor selection process as shown in the Figure 6-1- A Two Stage Selection Process

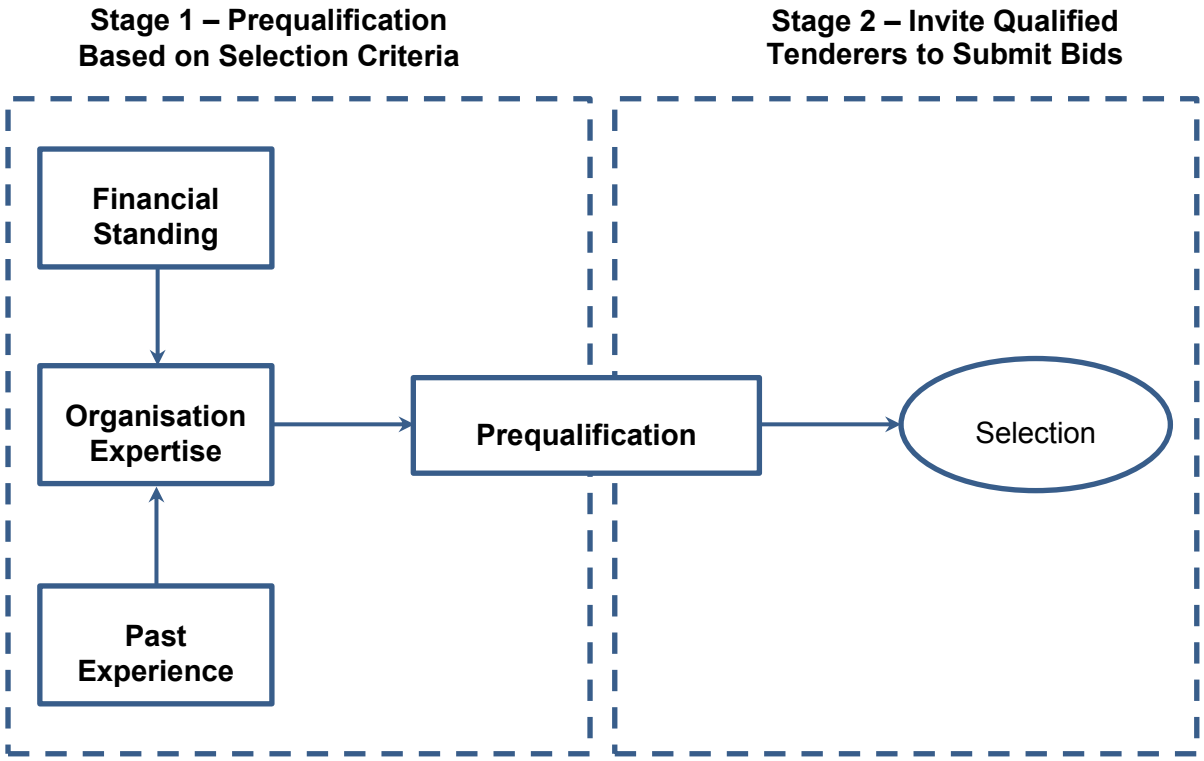


Figure 6-1- A Two Stage Selection Process

The tenderers are first subjected to prequalification procedure using selection criteria such as financial standing, past experience and organisation expertise; then should the tenderers fulfil the requirements they would be invited to submit their bid price. This two-stage prequalification method can prevent unqualified contractors bidding alongside with the qualified ones (Jafari, 2013). Further, it simplifies the assessment process where application of weights is possible for each of the criteria according to client and project requirements (Dulmin, 2003).

6.3.2 Managerial implications

The results have important implications for the management of interorganisational relationships. First, multi-criteria prequalification appears to be the more effective way of sourcing for a better contractor (Wong, 2001; Wong et al., 2000; Jennings and Holt, 1998). Despite the many positive aspects of relational contracts, they are not able to fulfil the needs of large developers firms who need to procure higher calibre contractors for more complex and technically challenging construction works. This concurs with Watt et al.'s study (2010) which shows the relative importance of technical expertise in the tender evaluation.

Second, relational contracts undoubtedly play an important role and are an effective safeguard in many situations largely reliant on social sanctioning for its safeguarding effect coupled with promise of future work if they perform well in the current project. Relational contracts can help to curb opportunism when there are ambiguities in the contracts. As shown on Table 7-8 which is repeated here for easy reference, despite the frequent prequalification of contractor carried out by large firms, the performance of large firms' contractors are lower than that of the small and medium size firms. For the small firms the past contractor performance mean is 3.84 and compared with the large firms' mean of 3.72 which is lower than the small firms mean.

Developer Turnover Size		Frequency of prequalification	Past contractor performance
	Mean	2.30	3.84
Small	N	64	64
	Std. Deviation	1.743	.597
	Mean	2.92	3.61
Medium	N	38	38
	Std. Deviation	1.761	.755
	Mean	4.23	3.64
Large	N	53	53
	Std. Deviation	1.281	.762
	Mean	3.11	3.72
Total	N	155	155
	Std. Deviation	1.804	.700

This is an important perspective as the small and medium size firms do not have the resources for detailed contract drafting and monitoring of performance and so select a contractor they can trust and share close ties (Wuyts and Geyskens, 2005) in order to obtain better performance. Therefore, relationship can significantly influence the selection decision.

Third, the price criterion has its limit when there are uncertainties (due to the nature of project) and ambiguities in contracts (due to limited human rationality). In the construction industry, the design bid and build procurement procedure has resulted in created the so-called arm's length relationship - without trust or collaborative relationship; where the parties to transaction are "self-interested" as prescribed by TCE (Williamson, 1985). The price construct cannot reduce or act as a safeguard against opportunism in that contracting relationship. Therefore, bid price is the best choice particularly for the small repetitive project projects selection (with fewer uncertainties and ambiguities in the works) where the developers could save time, and resources using a 'simpler' selection method, However, for more complex projects, tenderers must first be prequalified using the criteria relevant to the

particular project. Large firms with the resources whether in-house or external consultants to administer the prequalification procedure will prequalify contractors on every project as shown above. From the pool of qualified contractors, the bidders are subjected to further price competition in order to secure the best contractor. This method can help developers to obtain the most competitive price among the qualified contractors.

Finally, from the results show that managers will have to decide on which of the particular criteria is more suitable for their projects needs whether by way of prequalification, relational or price, each of which has specific advantages and disadvantages and are not simply substitutes for the other. One important proposition from this conclusion is that price and relationship constructs may not be the universally accepted criteria that have been hitherto assumed.

6.3.3 The construction industry practice in Malaysia

A common theme emerges from the construction management literature that construction clients in Malaysia still rely heavily on traditional competitive open bids without formal prequalification. This method allows a large number of bidders to participate in the tender exercise. Shehu et al (2014) a survey on 150 quantity surveying firms in Malaysia, of the 358 projects surveyed, 176 cases open tenders procurement route in contrast to 64 cases of negotiated tenders and 118 cases of selective tender method. This shows a huge preference for the open tender method.

Elsewhere, the open method is preferred because of its simplicity and transparent evaluation method and public accountability especially with the government sectors contracts (Eriksson, 2008a; Waara and Brochner, 2006). In this traditional design-bid-build (DBB) fixed-price contracts the construction clients will produce a set of tender document with the help of their consultants. Due to the high number of tenderers invited under this method, it ensures that developers will get the best possible bid price among the tenderers and possibly a lower contract price as compared with other methods. Therefore, the price criterion is most commonly used in the selection of contractors.

However, the construction industry in Malaysia has suffered its fair share of construction related problems due to adversarial arm's length procurement methods as discussed in Chapter 2 (Abdul Rahman et al., 2013; Frimpong et al., 2003; Shehu et al., 2014a; Abdul-Rahman et al., 2006; Al-Tmeemy et al., 2011; Chan, 2009; Sambasivan and Soon, 2007; Ye and Rahman, 2010). Therefore, the construction industry in Malaysia should look into ways of improving selection practices by integrating multi-criteria selection which can help to

source better qualified contractors, which in turn could help improve project outcomes. Furthermore, as the managers are used to their entrenched procurement practices, they should look into upgrading their procurement procedures. For example, according to Shehu et al (2014) construction clients in Malaysia are still prefer the traditional procurement method where the lowest bid wins against other methods (as shown in Table 6-3).

Table 6-2 Procurement Method – Shehu et al (2014)

Traditional	Design and Build	Project Management
291	58	9

As explained earlier, the lowest fixed price award has been linked to poor performance (Eriksson and Westerberg, 2010). According to these authors, the traditional fixed price procurement method without multi-criteria prequalification would not help construction clients avoid procuring nonqualified contractors, eventually leading to undesirable performance.

6.4 Summary

The above Section 6.2 described the hypotheses and its interpretation for the small, medium and large firms' model and the aggregate model. Section 6.3 then describes the theoretical and management implications. It also describes the current procurement practices in Malaysia and the recommendations for the construction industry in Malaysia.

Further, in order to achieve successful governance of construction projects, a holistic and systematic approach to contractor selection and procurement procedure is required (Cox and Thompson, 1997). Therefore, from this study's findings, it could help developers to study more carefully their project needs and to avoid any pitfalls occurring at the tendering stages.

According to the pilot study with professional quantity surveyors, in the Malaysian construction industry, there was infrequent use of prequalification as well as no standard format of prequalification in use in the industry. From the evidence of this study, housing developers in Malaysia are encouraged to use more 'soft parameter' in contractor prequalification and selection procedures. Developers are proposed as a change client in the appointment of contractors for their projects (Egan 1998). The final chapter 7 discuss conclusion to the findings presented followed by discussion of limitations and future research opportunities

Chapter 7 Conclusion, Limitations and future research

7.1 Introduction

In this concluding chapter, the research questions are discussed and empirical evidence is offered. The conclusions to the findings are presented followed by a discussion of limitations and future research opportunities.

7.2 Conclusion

This study set out to examine the contractor selection practices of developers (REHDA members) in Malaysia, the effects of developer and contractor relationships and prequalification on contractor selection. The literature review was presented in Chapter 2, particularly on the theoretical framework of TCE that deals with make or buy issues in interorganisation exchanges; it has revealed the gap in information found in the domain of contractor selection. Chapter 3 presented the research model and hypotheses, the independent and dependent variables and the measurement approach for data collection. Chapter 4 presented the justification of a business research, the research questions design, survey methodology and data analysis methodology. In chapter 5 presented the data analysis, PLS-SEM measurement models, testing of empirical results collected for statistical significant and therefore proposed empirically substantiate the existing theories were presented. Chapter 6 discussed interpretations of findings based the hypotheses proposed and theoretical and managerial contributions introduced.

Given the importance of outsourcing and the extensive use of market resources in the construction industry (discussed in Chapter 2, Section 2.4.2), contractor selection continues to be an area of significant importance the buying organisations such as housing developers and has a crucial influence in the project outcomes. According to studies, the circumstances for making judgements about contractors and their ability to perform is complex, comprising high levels of ambiguity and uncertainty (Hatush and Skitmore, 1998; Ng and Skitmore, 1999; Watt et al., 2009). In view of the complexities surrounding contractor selection, and the choice of selection criteria available, how then do developers choose their contractor and what is the correlation between the criteria used? Which criteria influence choice? To answer these questions, this study examines three research questions: 1) how do the relationships between developers and contractors affect the selection procedure? 2) how do the contractor's tender price, financial standing and expertise affect the selection procedure?

3) do housing developers in Malaysia carry out contractor prequalification as part of their contractor selection procedure?

Research question 1 – How do the relationships between developers and contractors affect the selection procedure?

Based on the questionnaire survey, of the 122 participants who completed the question on Item 10 of Section A; *What percentages of your contractors have been on your standing list;* the results show that a high percentage of small developers' firms' engage their contractors for the longer term. As presented in Table 7-1, 54% of the small firms retained their contractors on the standing list for more than 10 years as compared with the figures for medium size firms - 47% and large firms - 42%. In contrast, 58% of the large firms would retain their contractors' services for less than 5 years; 35% for medium size firms and 36% for small firms. This is attributed by their frequent prequalification and selection exercise to source for new contractors.

Table 7-1 Percentage of contractor remain on the standing list based on turnovers

Developer Turnover Size		Standing list less than 5yr	Standing list >5<10yr	Standing List more than 10yr
Small	Mean	.36	.45	.54
	N	45	42	53
Medium	Mean	.35	.52	.47
	N	28	26	31
Large	Mean	.58	.45	.21
	N	48	38	38
Total	Mean	.45	.4651	.42
	N	121	106	122

These results indicate that;

1. Many of these small firms build long term relationships with their contractors as they do not source for new contractors frequently. The small firms usually re-appoint the contractors with whom they have past collaborations for their new projects, they recognised the benefits of this collaboration relationship which is essential to the success of construction projects (Heide and Miner, 1992). Further this result was confirmed in Chapter 6, Section 6.2.2 reported that relational norms have a significant positive impact on contractor selection particularly for small firms. Therefore, for the

small developers, the better their relationship with the contractor, the more likely it is that the contractor will be selected.

2. The results show that for the big firms, relational norms are not a significant factor in contractor selection as they will seek new contractors through frequent prequalification. Here, the developers would have no opportunity to build long term relationship with these contractors as trust and cooperation would need time to develop. Hence, their relationship is based on a formal contract without the relational influence.

The above shows different approaches used by two groups of developers on their selection practices. Based on the questionnaire survey, 54% of the small firms surveyed tended to simply reuse their existing contractors compared with only 21% of the large firms stating that the contractors would stay on their standing lists for more than 10 years.

Next, the impact of their selection preference is reviewed. In order to gauge their contractor performance, the developers' were asked to rate their past contractors performance from low to high using 1 to indicate low level performance 3 to indicate average performance and 5 to indicate high level performance as detailed in the questionnaire survey Item 9 of Section A. Table 7-2 shows that;

Table 7-2 Survey of developer size and past contractor performance

Developer Turnover Size	Mean	N
Small	3.84	64
Medium	3.61	38
Large	3.64	53
Total	3.72	155

- From 64 small developer firms, the reported performance levels of: 5=excellence performance; 46=above average performance; 11=average performance and 2=below average. This provides the mean of 3.84 performance level.

- From 38 medium size developer firms the reported performance levels of: 2=excellence performance, 28=above average performance; 9=average performance; 4=below average performance. This provides the mean of 3.61 performance level.

- From 53 large size developer firms the reported performance levels of: 5=excellence performance; 28=above average performance; 16=average performance and 4=below average performance. This provides the mean of 3.64 performance level.

Generally, the above results show that the small firms' contractors perform better than the big firms'. On average, the small firms' rating is higher at 3.84 against 3.64 for large firms. These small firms' contractors would work more diligently knowing that if they perform well, they are more likely to be reused for the next project. This concurs with the theory of the "shadow of the future" whereby for repeated or high frequency exchanges, the supplier will perform better in the belief that it can help them obtain future job (Heide and Miner, 1992) and will refrain acting opportunistically, as the result - better performance.

Further, based on evaluation on the cooperative attitude between developers and contractors, the survey results show that the small and medium size developers firms enjoys higher cooperation, close and happy relationships. They are also more likely to settle disputes without going into litigation as shown in Table 7-3

Table 7-3 Cooperative norms items based on developer's turnover

Developer Turnover Size		Cooperative attitude	Selection based on close relationship	Happy relationship	Disagreement settled without litigation
Small	Mean	6.27	4.77	5.45	5.75
	N	64	64	64	64
	Std. Deviation	.859	1.806	1.259	1.208
Medium	Mean	6.34	3.79	5.42	5.74
	N	38	38	38	38
	Std. Deviation	.669	1.877	1.266	1.349
Large	Mean	6.06	4.30	5.26	5.34
	N	53	53	53	53
	Std. Deviation	1.045	1.436	1.077	1.568
Total	Mean	6.21	4.37	5.38	5.61
	N	155	155	155	155
	Std. Deviation	.890	1.740	1.197	1.379

In contrast, for the large firms' contractors, their future work with the company is not an automatic succession regardless of performance, and most likely the clients will appoint contractors based on competitive price bids among the qualified contractors for the next project. This uncertainty can 'trigger' opportunistic behaviour among their contractors who may opt for short term gains as there is no guarantee of future benefit. Hence, the lower work performance reported by large firms.

In summary, the above results show that the small firms' contractor performed better than the large firms' contractor on average at 3.84 and 3.64 respectively. This findings support the literature that relational contracting can produce better project outcomes (Carson et al., 2006; Kwawu and Hughes, 2005) than price criterion. For the large firms despite their frequent prequalification and new contractor selections based on competitive bidding, their contractors' performances rating are below the small firms' level. Therefore, in order to improve project outcomes, the large firms would need to use more relational contracting in the contract award instead of awarding projects on the basis of competitive price as discussed in Chapter 6, Section 6.2.3. To improve performance then, the firms can choose to reuse past contractors that have demonstrated good performance regardless of whether they are the cheapest tenderers as developers should focus on the overall value of the tender instead of just the price (Wong et al., 2001). So doing this can help to build a better longer term relationship with the contractor and embrace more trust and a cooperative environment (Eriksson and Pesämaa, 2013; Spekman, 1985). For closer collaboration according to Eriksson (Eriksson, 2007b), there must be incentives in place for such collaboration. The incentive for contractors here is that they can expect to secure future work with the developers if they perform well.

Research question 2 How do the contractor's tender price, financial standing and expertise affect the selection procedure?

- **Tender Price**

From the recent study Jaafar and Nuruddin (2012) on the Malaysian construction industry, a majority of the contract awards are still based on 'Lump Sum Drawing Specification' – which is traditional competitive tender price based procurement route (see Table 7-4).

Table 7-4 Procurement methods used by public and private clients sector in Malaysia - *Jaafar & Nuruddin (2012*)

Procurement system		Public sector	Ranking	Private sector	Ranking	Total percentage
Traditional System	LSDS	50.7%	1	42.6%	1	93.3%
	LSBQ	34.2%	2	25.0%	5	59.2%
	LSABQ	20.5%	4	38.2%	2	58.7%
	Cost Plus	1.4%	9	2.9%	10	4.3%
Design and Build	Package Deals	2.7%	8	7.4%	8	10.1%
	Turnkey	23.3%	3	26.5%	4	49.8%
	D&B	16.4%	5	35.3%	3	51.7%
Management	Management Contracting	6.8%	7	19.1%	7	25.9%
	Construction Management	8.2%	6	22.1%	6	30.2%
Relational system	Private Finance Initiative (PFI)	1.4%	9	2.9%	10	4.3%
	Public-private Partnership (PPPs)	2.7%	8	4.4%	9	7.1%
	BOT (Build, Operate and Transfer)	2.7%	8	1.5%	11	4.2%
	Cost Plus	1.4%	9	2.9%	10	4.3%

Note: LSDS = lump sum drawing and specification; LSBQ = lump sum with bill of quantities; LSABQ = lump sum with approximate bills of quantities; cost plus = total cost of the construction work plus any expenses incurred to complete the works.

In the traditional system using competitive price the lowest tender will be awarded the job. This has been the most popular procurement route as compared with the relational system which is rarely used in either public or private contracts. However, according to Wong et al (1999), the selection of the tenderer should be based on value instead of lowest price win principle.

Based on the questionnaire survey, there is high a percentage of respondents in favour of selecting contractor based on lowest price basis. As shown in Section B of questionnaire item 15, by using a Likert-type scale from *strongly disagree (1) to strongly agree (7);* most of the respondents indicated their *agreement rating from (5) to strong agreement rating (7)* on the Likert scale; tender price remains the most important contractor selection criteria, as shown in Table 7-5.

Table 7-5 – Selection based on tender price

Likert Scale	Frequency	Percent	Valid Percent	Cumulative Percent
1	9	5.8	5.8	5.8
2	12	7.7	7.7	13.5
3	11	7.1	7.1	20.6
4	24	15.5	15.5	36.1
5	**43**	**27.7**	**27.7**	**63.9**
6	**25**	**16.1**	**16.1**	**80.0**
7	**31**	**20.0**	**20.0**	**100.0**
Total	155	100.0	100.0	

Further, using the analysis presented in Chapter 6 Section 6.2.3 – tender price has a positive impact on contractor selection for the large firms has a negative impact for medium size group and has no significant impact for the small firms. As explained in Section 7.2.1, large firms prefer to prequalify their tenderers on project basis and then these qualified tenderers are subjected to price competition to produce the most competitive tender on a price basis. Hence the tender price criterion is important for large developers. For the small and medium size developers, tender price is not an important criterion in the selection of contractors.
However, according to (Eriksson and Pesämaa, 2007) price criterion can be used for repetitive and simple works where relational dimension would be not help to improve performance.

- **Financial standing**

Contractors' financial standing or cash-flow is one of the most important factors in ensuring the uninterrupted progress of work on site. As such, all the respondents for the questionnaire survey rated this criterion highly as shown on Table – 7-6. All the four indicators have the mean score of above 5 from the highest score of 7. In the construction industry, contractors are expected to finance the projects up to the point of receiving payments from their clients. They can finance the job from their own reserved funds, bank

facilities and also most commonly their supplier credit terms. Therefore, it is in the interest of the developers to ensure that their select contractors have sufficient financial standing to ensure smooth flowing of work progress at site.

Table 7-6: Respondents rating on financial standing construct

Developer Turnover Size		Company financial record	Good Credit rating	Past turnovers	Supplier credit line
Small	**Mean**	**5.80**	**5.63**	**5.31**	**5.67**
	N	64	64	64	64
	Std. Deviation	1.011	.968	1.111	1.040
Medium	**Mean**	**5.66**	**5.61**	**5.18**	**5.55**
	N	38	38	38	38
	Std. Deviation	1.279	1.242	1.468	1.408
Large	**Mean**	**5.94**	**5.75**	**5.38**	**5.68**
	N	53	53	53	53
	Std. Deviation	.818	1.054	1.096	1.123
Total	Mean	5.81	5.66	5.30	5.65
	N	155	155	155	155
	Std. Deviation	1.024	1.065	1.197	1.161

Based on the analysis presented in Chapter 6, this construct has a positive effect on contractor selection for all the developers' group. Hence, the better the contractor's financial standing, the higher the likelihood of being selected for the project.

- **Expertise**

Similar to the financial standing construct, the expertise construct is high rated by the respondents as shown in Table 7-7. All the indicators scored highly with mean scores are either close to five or above five. This result is in-line with Watt et al.'s study (2010) which cites that contractor expertise will help meet the clients' requirements and also use technically compliant solutions to help to reduce mistakes. Further, according to Watt' et al.'s study, contractor expertise and past project performance are the two most important criteria in selection criteria.

Table 7-7 – Responses on contractors' expertise construct

Developer Turnover Size		CIDB registration	Quality control policy	Full time technical staff	Submit list of subcontractor and supplier
Small	Mean	5.28	4.64	4.89	4.89
	N	64	64	64	64
Medium	Mean	5.87	5.32	5.68	5.29
	N	38	38	38	38
Large	Mean	5.68	5.11	5.40	5.02
	N	53	53	53	53
Total	Mean	5.56	4.97	5.26	5.03
	N	155	155	155	155

Chapter 6, Section 6.2.6 shows that contractor expertise had a significant positive effect on prequalification and is significant for all-firm models with the exception of large firms. As such it is important for a contractor wishing to tender, to demonstrate that the company has the necessary expertise to manage and execute the works according to the project requirements.

For the large firms, the expertise criterion is not important as the qualified contractors would be assumed to have the expertise required according to project requirements.

In summary, this study found that contractor selection should use the multi-criteria selection approach. The traditional single criterion approach based on lowest tender price is inadequate to ensure better project outcomes and encourage opportunism, hence, ex-post variation claims (since tender information incomplete (Winch, 1989; Williamson, 1979)) become common occurrences and costly mistakes are made due to the contractors lack of project experience and relevant expertise. Further, insufficient contractors' resources such as financial capability is one of the major causes of project delays as reported in many studies as shown in Chapter 2; Table 2-1.

Research question 3 – Do housing developers in Malaysia carry out contractor prequalification as part of their contractor selection procedure?

As discussed in Chapter 2, contractors play an important role in construction projects and the prequalification of contractors serves to ensure that only suitably qualified contractors are

selected to bid for the works. El-Swalhi et al. (2007) cites that the selection of qualified contractor can ensure the project goals can be achieved satisfactorily.

In practice, prequalification is where a large number of contractors are invited to submit the information required by the procuring client, from which shortlist of contractors is drawn up, based on a set of predetermined criteria. This is called the prequalification stage. In the second stage, the contractors, as shortlisted from the first stage, are invited to tender and the best tender bid is selected to carry out the project according to the contractors technical ability and price submission.

From the questionnaire survey carried for this study, respondents from firms have revealed a range of preferences regarding contractor prequalification. The majority of the large firms would carry out a prequalification exercise on every project in order to source better qualified and best value contractors:- As large developers are frequently involved in more complex projects (as explained in Chapter 2, Section 2.8), the firms need to source qualified contractors based on project requirements, hence the prequalification. Competitive bids are then sought from this pool of qualified contractors.

However, the small developers firms do not frequently carry out the exercise frequently and some developers have never used formal prequalification. The frequency of contractor prequalification is shown in Table 7-8. It shows that large firms carry out prequalification most frequently. The frequency mean for the large developers is 4.23 times and compared with small firms 2.30 times.

Table 7-8 Frequency of contractor prequalification

Developer Turnover Size	Mean	N	Std. Deviation
Small	**2.30**	**64**	**1.743**
Medium	2.92	38	1.761
Large	**4.23**	**53**	**1.281**
Total	3.11	155	1.804

The lower frequency amongst small and medium size firms is explained by the fact that they tend to reuse their existing contractors on their standing lists through their ongoing collaboration relationships as shown in Table 7-1. Further formal prequalification is deemed unnecessary as their contractors on the standing list can perform satisfactorily (refer to Table 7-2). Further, based on the questionnaire survey, the small and medium size firms have less technical staff (refer to Table 7-9) and most of the firms are still managed and operated by the business owners. Faced with resource constraints and sometimes infrequent projects,

the small to medium size firms would not carry out formal prequalification and would be most likely opt for a straight reuse of the existing contractors through their on-going relationship with these firms.

Another reason could be due to type and size of the projects the firms undertake. For smaller contracts, for example according to Eriksson et al.'s study (2008a) no formal prequalification is necessary for repetitive and low uncertainty projects and this saves time and costs and warrants reuse of existing contractors.

Table 7-9 Average number of technical staff employed by developers of different turnover size

Developer Turnover Size		Number of Technical staff	Always prequalify on tender
	Mean	5.09	3.64
Small	N	64	64
	Std. Deviation	3.46	2.45
	Mean	8.50	4.71
Medium	N	38	38
	Std. Deviation	4.85	2.53
	Mean	12.57	5.08
Large	N	53	53
	Std. Deviation	6.27	1.70
	Mean	8.48	4.39
Total	N	155	155
	Std. Deviation	5.86	2.32

In summary, based on the questionnaire survey, developers in Malaysia do carry out prequalification as part of their contractor selection procedure. Further large firms prequalified their contractor more often than small and medium size firms. The results of this study show large developers frequently prequalify their contractors in order to source for better contractors according to their requirements such as time, quality and then lower the cost by using competitive tender among the qualified contractors. In contrast small and medium size developers are less likely to prequalify their contractors, opting to reuse their existing contractors' services, and in-so-doing achieving better results in contractors' performance. It is important that developers produce their own set of project decision criteria so that measurement and judgement of potential contractors' capabilities is based on decision criteria tailored to the project needs. Researchers have identified many different criteria also known as pre-qualification criteria. Different developer groups may use different prequalification criteria but it is important that they know the demand of their need and know

how these various contractor selection criteria can affect the project objectives (Hatush and Skitmore, 1997).

7.3 Limitation of this research

This study like all studies is characterised by a number of limitations. First, this study does not include the contractors' perceptions. This limitation was understood from the outset of the study and the resources and the time available would only allow for developers' perceptions to be surveyed. In order to have a more complete understanding of the selection criteria, prequalification and developers and contractors relationships, the instruments developed, tested and used for this research may be used in further research addressing developers and contractors' perceptions.

Second limitation is that the focus of this thesis is on contractor selection criteria and the impact of prequalification, price and relational norms on contractor selection process, but not on whether the process used yields a better result or goodness process, nor the impact on actual project delivery outcomes.

Third limitation in questionnaire B5 question design, the questionnaire directed these informants to select and report on a particular contractor relationship. Informants were asked to "choose one particular contractor that their company has interacted with most recently" with which they were involved. This procedure avoided potential selection bias and at the same time assured the informant's familiarity with the contractor. This method of questionnaire design was used by Laan et al (2012b) where the client's organisation were directed to one contractor's organisation relationship (Page 823) in the exchange dyads, and also used in Cannon et al.'s study (2000) where one latest supplier approach was utilised. This underpinning assumption might skew the results as one company relationship will be indicative of all relationships.

Fourth, further, there are issues with sample size and sample homogeneity. Firstly although the sample of 155 firms representing developers' organisations are a sufficient sample size in this study domain, this sample is too small to support a claim for universal generalisability. Secondly, the universal generalisability is further limited by the study's design sample's intentional homogeneity character i.e. limited to development organisations based in Malaysia. This is to help to deliver 'homogeneous' data results good for interpretation. Therefore, by selecting a homogeneity of firms, this study has better control of variables which are not the focus of this study and to support the best possible conditions for theory testing. Thus, this intentional design has necessarily excluded a mixture of firms from other

types of companies and from different countries and cultures and thereby reducing any claims for generalisability.

Fifth, this study limitation focuses on the study's structural model. Despite the model's R^2 being robust, indicating that independent latent variables satisfactorily explain dependent variables; the statistical significance of relationships on some of the variables are weak and less than predicted. The relationship between the prequalification construct and selection are much lower expected. The results and findings have a p-value range above $p<0.1$. Although this level of reporting is not acceptable, it can be explained by the study group variation, it would have been desirable to have more relationships exhibiting a $p<0.01$ significance. Therefore, the generalisability claim of this study it limited.

However, in general, the study's results can be claimed to be making steps towards explaining how developers select their contractors and the impact of prequalification, price and relational norms on contractor selection process. The results can be deemed to be contributing to the discussion regarding contractor selection criteria.

7.4 Future research

This section discusses the opportunities for further research. As research of this kind challenges the generalisability and to add contributions to both theory and practice, future research opportunities are perceived as follows:-

7.4.1 On selection criteria

In order to contribute towards generalisability, future studies could firstly, utilise the current study's selection criteria (price, company standing, technical expertise, and client and contractor relationship) by (Bryde and Robinson, 2005; Holt, 1998d) expanding selection criteria from the contractor's perspective, the study could then compare and contrast the selection criteria from both developers and contractors' perspectives.

Secondly, future studies could include criteria such as health and safety on site and environmental impacts and health issues as these are not yet important agendas among construction industry practitioners in Malaysia. As a developing country, Malaysian house prices are considerably cheaper in most areas as compared with Singapore and the construction industry is still utilising lower end technologies and lower priced construction materials. As a result, this could lower safety aspects on site as safer construction methods are associated with higher construction costs (Liu et al., 2014a). The future research could then help to bring more prominence to contemporary safety issues faced by the construction

industry in the developed markets. These could bring standard in the Malaysia's construction industry standards closer to those in industrialised economies'.

Thirdly, a potential contribution in the area of relational theory, future studies can consider the incorporation of Asian cultural dimension of 'guanxi' (relationship) in the theory. This will further explain the antecedents of contractor selection and how the different variables moderate the outcome of contractor selection procedures.

Fourthly, to contribute to topic of to practice and the improvement of project performance result from contractor selection, future research could test best value procurement procedures (Elyamany, 2014; Elyamany and Abdelrahman, 2010 ; Palaneewaran et al., 2012; Sullivan and Guo, 2009) in the Malaysian context. This might include questions such as what is involved in the assessment of constructs in order to support best value contractor selection criteria, how to achieve it in the project situation and how to obtain better performance from contractors.

7.4.2 On relational norms

To contribute to greater generalisability, future research could consider qualitative techniques to utilise them in conjunction with quantitative studies. For the study on relational norms, it is the individuals that interact in the exchanges rather than the firms per se. Therefore, in-depth interviews with key people in the exchange organisations could bring a broader and richer appreciation of the relationship in the exchange to a study. Future research could conduct interviews with the clients' and contractors' teams to ascertain what they perceive as the important criteria in the contractor selection and what main influencing factors in the selection procedures are.

To add to research practice, future studies could consider a longitudinal field study measurement of performance of contractors where projects have incorporated the contractor selection criteria into their contract procedures. This type of study could run a parallel longitudinal field study data collection of two or more projects with relational procurement procedures and without the relational norms dimension i.e. based on formal contracts. This would allow future studies to look more deeply into the role of relationship playing over time and if the relationship factor enhances project team performance. Such research design would be useful to examine the implications of relationship and project outcomes.

7.5 Summary

This chapter presented the conclusions, the limitations of the research and future research opportunities. This chapter also reviewed the selection criteria used in order to get better project outcomes. However, as discussed with the focus group, the criteria weightage must be set by the developers who need to identify what are the more important business strategies in order to compete in housing market sales and define a set of selection criteria that will complement these organisations business strategies.

Based on the literature, the contractor selection process has been described as a balancing act by the project owners between the project objectives, and requirements, expectations in-conjunction where criteria such as the price, relationships, contractor expertise, qualifications and environmental impact along with and other issues. The better the contractor's performance, the lower the cost of monitoring which also includes the additional manpower for monitoring and tests a longer warranty period. Finally, Hill (1990), who argues that the market has a self-governance mechanism and a memory that "dis-incentivises" opportunistic behaviour where a firm's reputation and trustworthiness is important in order to secure future business partners. Therefore, too much emphasis on the opportunistic behaviour of contractors is a false market perception.

According to the literature, the award of low uncertainty contracts, for example, single family repetitive design housing projects, can be based on price (Eriksson, 2008a; Bradach and Eccles, 1989) and relationship. In contrast, for the more complex projects, where the contract information is not able to capture all the clients requirements due to human bounded rationality (Williamson, 1979), developers should get the contractor's early involvement from the design stage where their experience and expertise can be utilised in the design (Arranz and Arroyabe, 2012; Cai et al., 2011; Kadefors, 2005; Tangpong et al., 2010).

Appendix A Questionnaire

Henley Business School, UK

Doctoral Program (DBA)

Business Research Project

The importance of prequalification in the contractor selection process in housing development projects undertaken by developers in Malaysia.

Researcher Name: Francis, Lee Kok Siong

Field Project Start: December 1, 2013

Henley Supervising Faculty Names:

- **Dr Stephen Simister**
- **Dr Tim Osborn-Jones**

Dear Respondent,

The research is part of a doctoral research programme being undertaken by me at Henley Business School in the UK. The aims of this research project in the context of construction industry are:

- Advancing research by exploring the methods used in contractor selection.
- Assisting firms to better understand what happens in these selection 'tools' interactions in order to focus the firm's efforts on mitigating poor contractor's performance and enhancing stakeholders satisfaction.

The survey will take 15 to 20 minutes; your firm has been selected to participate on this survey based on registered member of Malaysia's Real Estate Housing Developers Association. Your view will provide invaluable assistance in the understanding of the contractor selection criteria and therefore successful project outcomes.

Please be ensured that firm confidentiality will be maintained and that only aggregate results will be reported. Your participation is voluntary; therefore you may withdraw from this research project at any time without prejudice. All data generated from this survey will be securely destroyed after the conclusion of the project.

The project has been subject to ethical review in accordance with the procedures specified by the University of Reading Research Ethics Committee and has been given a favourable ethical opinion for conduct.

By completing and returning the questionnaire it will be understood that you are aged 18 or over and that you give consent for your responses to be used for the purposes of this research project.

Should you have any queries regarding the survey, please contact me at my email address below.

Kindly return the completed questionnaire by email attachment to

Thank you for your participation,

Yours faithfully

Francis, Kok Siong Lee

Section A: Organisational background Information

1 How many years has your company been a member of REHDA?

(Real Estate & Housing Developers' Association, Malaysia)

Please specify: …….. Years

2 i) please indicate your company average yearly turnover in million (RM). (Please tick)

(RM 5 million equivalent to 1million Pound Sterling)

From RM 3 million to RM 10 million	
RM 11 million to RM 30 million	
RM 31 million and above	

Please indicate if the above was **NOT** typical year turnover for your firm.

Please specify…….

ii) Please indicate what percentage of the above turnover related to house building projects

…….. per cent.

3 i) Please indicate in what year your company was established?

Year: ……

ii) Please indicate in what year your company became involved in the development of house building projects (HBPs)

Year: ……..

4 Development project area.

Please indicate in which year you started developing in each state (if you do not work in a state please leave blank).

State	Year start of Development Operation
Perlis	
Kedah	
Penang	
Perak	
Selangor	
Wilayah Persekutuan	
N. Sembilan	
Malacca	
Johor	
Pahang	
Terengganu	
Kelantan	

5 Please indicate which of the following type of HBPs does your company often undertake?

Type	Year start of these type of development
Combination of terrace, semi-detached and detached houses	
Multi-storey Apartment	
Condominium	
Combination of all the above	
Other type; please specify ……	

6 Does your company carry out formal main contractor pre-qualification?

	Yes
	No

7 How many house-units has your company completed on average per year in the last 3 years?

House unit	2009	2010	2011
Up to 30 units			
31 to 100 units			
101 to 300 units			
301 to 1000 units			
Over 1000 units			

8 How often is formal contractors' pre-qualification carried out?

	On every project
	Annually
	more than once per year
	less than once per year
	never

9 What is your company perception of a typical main contractor performance? Please rate them according to the following

	High
	above average
	below average
	Low
	Other; please specify

10 What percentage of your contractors have been on your standing list for 2, 5, 7 or more than 10 years?

Years / Percentage	2	5	7	More than 10
Less than 10 %				
11 to 29 %				
30 to 49 %				
50 to 69 %				
70 to 89 %				
90 % and above				

Others, Please specify ……..

11 Please indicate the approximate value of HBPs that your company will develop in the next 5 years.

	No new project (Please indicate why in the space provided below)
	up to RM 20 million
	RM 21 million to RM 50 million
	RM 51 million to RM 100 million
	over RM 100 million

Our company has no planned future new project because (please state)

……

……

12 How many **full time** technical staff has your company employed in the years 2009 and 2010?

(Please tick the number that represents your company's situation)

Number of staff / Year 2012	**1**	**2**	**3**	**4**	**5**	**6**	**More (please state)**
Project Manager							
Engineer (Civil, Struct, M&E)							
Quantity surveyor							
Architect							
Site Supervisors							
Other technical Staff (state type) _____							

Number of staff / Year 2011	**1**	**2**	**3**	**4**	**5**	**6**	**More (please state)**
Project Manager							
Engineer (Civil, Struct, M&E)							
Quantity surveyor							
Architect							

Site Supervisors							
Other technical Staff (state type) _____							

13 Does your company own an in-house construction company/ division?

	Yes
	No

14 Type of your company incorporation

	Private limited company
	Public listed company
	Sole proprietor
	Other: …… (Please specify)

15 Your designation in this company -

	Company Director
	Owner
	Project Manager
	Contract Manager
	Financial Controller
	Others please specify ……..

16 How long have you been working for this company? (Please tick)

	Up to 3 year
	more than 3 years but less than 5 years
	More than 5 years less than 10 years
	Above 10 years

17 Does your company face shortage of qualified contractors for your developments?

	Yes
	No

If Yes, please indicate at which value category you face shortage of suitable contractor

	Up to RM 10 million
	RM 11 to RM 20 million
	RM 21 to RM 40 million
	RM 41 and above

Section B: *Please complete section B1 to B5* using Likert Scale 1 -7 for each question

B1	**Please evaluate the importance of formal CONTRACTOR PRE-QUALIFICATION exercise before a project tender**							
Item	**Description**	**Strongly Disagree**			**Neither**			**Strongly Agree**
		1	**2**	**3**	**4**	**5**	**6**	**7**
1	My company always carry out formal prequalification before tender							
2	My company undertakes a standard prequalification form for every new project							
3	Formal prequalification is not an important criterion in the contractor selection process in our company							
4	Our company does not have the manpower to handle formal prequalification exercise							
5	Our company is willing to work with existing contractor no matter what is the outcome							
6	My company rely on formal prequalification to source for qualified contractor for our project							
7	My company believe that prequalification will help us to find the "best value" tenderer							
8	My company believe that prequalification is purely subjective analysis							
9	The prequalification exercise would not produce the result it is intended as the final selection method always dependent on the tender sum							

B2	**Please evaluate the importance of COMPANY STANDING in your company selection decision to tender for your company project**							
Item	**Description**	**Strongly Disagree**			**Neither**			**Strongly Agree**
		1	**2**	**3**	**4**	**5**	**6**	**7**
10	The tenderer must have strong financial record such as paid-up capital, analysis of account and positive annual income							
11	The tenderer must have good credit rating such as bank finance facilities or arrangement and reference							
12	It is important the tenderer has a past turnover equal or higher than the project they are being asked to tender for							
13	The tenderer must have good credit line with their suppliers							

B3 Please evaluate the importance of TENDER PRICE in your company selection decision.

Item	Description	Strongly Disagree			Neither			Strongly Agree
14	Price is the single most important criteria in the contractor selection process							
15	My company always award project to the lowest tenderer							
16	My company always compare tenderer price with the lowest bidder							
17	My company always put pressure on the tenderer to lower their tender price							
18	My company bound to accept lowest tender bid							

B4 Please evaluate the importance of TECHNICAL EXPERTISE in your company selection decision.

Item	Description	Strongly Disagree			Neither			Strongly Agree
19	The tenderer must have a minimum of 5 years in the business experience							
20	The tenderer must be a registered contractor with the Malaysian Construction Industry Development Board or the relevant board for the type of project tender							
21	It is important for the tenderer to have completed similar size and type of project in the past							
22	My company always check the tenderer's past project records such as project failures and on schedule performance							
23	It is important the tenderer submit their quality control (QC) policy and audited work quality records							
24	It is important that the tenderer employed in-house full time qualified project management team such as Project Manager, Engineers and Quantity Surveyors							
25	It is important that the contractor have the relevant IT knowledge such as electronic documents management systems, e-tendering capabilities, 'AUTOCAD' or equivalent software for information exchange							
26	It is important that the contractor submit the list of their subcontractors and suppliers.							

B5 -	**INSTRUCTION: Choose ONE (1) particular contractor that your company has interacted with most recently and answer the questions in this section** **Please evaluate the importance of CLIENT AND CONTRACTOR RELATIONSHIP in your company selection decision.**							
Item	**Description**	**Strongly Disagree**			**Neither**			**Strongly Agree**
27	We intend to do business with this contractor well into the future							
28	My company do not hesitate to do business with this contractor when the situation is vague							
29	It is important this contractor is trustworthy and fair in its negotiation with us							
30	It is important there is a cooperative attitude between my firm and this contractor							
31	Formal selection process is not necessary due to our close relationship with this contractor							
32	Our relationship with this Contractor reflects a happy situation							
33	If there is disagreement our company always settle the dispute with this contractor without resort to litigation							

**** Thank you for your participation! **

Appendix B Ethical Approval Form

MSc in Business and Management Research/
Doctor of Business Administration

Ethical Approval process

As part of the approval process for your Pilot Study/thesis, you must seek ethical approval of your proposed research before you commence any data collection. The Ethical Approval Process is divided into a cover sheet and two sections. You must complete the cover sheet and Section A and submit those at the beginning of Phase 2 for the MSc, and at the beginning of the DBA, for review prior to undertaking your data collection. Note that you are not allowed to proceed with field research without ethical approval. Failure to comply with this may result in your research not being recognised as meeting the requirements of your programme and in disciplinary action being taken against you for contravention of the University of Reading policy on research conduct.

Further information is given in each part of this document.

If you have any questions regarding any aspect of this process, please contact your Programme Director.

MSc Phase	- Section A to be submitted at the beginning of Phase 2 via RISIS - Section B to be submitted with the Pilot Study via RISIS, and in hard copy
DBA Phase	- Section A to be submitted at the beginning of the DBA via RISIS - Section B to be submitted with the thesis, in hard copy

Full details, including Word versions of the application form and sample consent forms, can be found in HenleyConnect at:

http://hmcnotes1.henleymc.ac.uk/elearning/DL/RD.nsf/supportweb/4934F18F59442334802577C90046ABF8

Henley's approach to research conduct

Henley Business School expects that the highest standards of academic rigour and personal integrity are displayed by those undertaking research in association with the School, including Masters programme members. While you are undertaking your research, you are required to adhere to the School's policies regarding research practice. These are detailed in the University of Reading Code of Good Practice in Research, on the UoR website:

http://www.reading.ac.uk/qar/QAR%20documents/UCOGPRreprintJan2011.pdf .

Research ethics

It is particularly important that you ensure that your intended approach to your research complies with the ethical requirements of the University and Business School, even if you are undertaking your fieldwork within your own organisation.

The University requires Research Ethics Committee approval for research of all types including that involving:

- human participants – including questionnaires, surveys, focus groups and other interview techniques
- human data or records – ethical concerns are strongest where these data are gathered directly from the subject and then ethical approval is usually required
- research using personal information or samples stored from previous research (either initially or when a proposal is revised)

However, ethical approval is requested through the Ethics Approval form (Appendix B(i)) and research undertaken for the MSc/DBA at Henley Business School that is undertaken both professionally and in an ethical manner can normally be given ethical approval by a nominated academic supervisor, unless it involves:

- participants who are patients, clients or staff of the NHS or social services in the UK or equivalent health or social care system in another country (even if you have agreement from the relevant committee within the relevant organisation to conduct your research)
- subjects whose capacity to give free and informed consent may be impaired; this includes respondents under the age of 18
- questions that might reasonably be considered to be impertinent or likely to cause distress to any of the participants
- risk to the researcher or participants
- subjects in a special relationship with the investigator.

Where approval cannot be given by an academic supervisor, the proposed research will be referred to the appropriate ethics committee representative. In some cases you may be required to provide additional and more detailed information, especially in relation to the fieldwork. Depending on the decision of the committee the research may be allowed to proceed as planned, may be subject to modification or may be rejected. Please be aware that you must not start any fieldwork until you have approval. Failure to comply with this may result in your research not being recognised as meeting the requirements of your programme and in disciplinary action being taken against you for contravention of the University of Reading policy on research conduct. For further details about the ethical approval process, see the Notes for Guidance of the University's Research Ethics Committee: www.reading.ac.uk/web/FILES/reas/EthicsGuidanceJanuary_2011.pdf

If you have any questions regarding the approval process, please contact your Programme Director.

Conducting research professionally and ethically

It is important that you conduct your research both professionally and ethically. The University's Code of Good Practice in Research stresses the importance of honesty, openness and accountability.

It is particularly important that you:

- are properly prepared before you undertake your fieldwork
- adhere to the principle of informed consent by providing sufficient information to participants and, if applicable, their organisation(s) about what the research asks of them, and what they can expect in return
- ensure that you obtain express permission to record interviews or telephone conversations
- provide evidence of informed consent of participants when you submit your final project
- organise, present and discuss your material in a manner that upholds all assurances regarding, for example, confidentiality and that you inform all participants about how the material that you collect from them will be used prior to commencing the fieldwork

- fulfil any promises to participants for their participation or organisations that allow you access – it is especially important to keep promises to give copies of, for example, a summary of your results, or the final report.
- do not give the impression to any organisation, including those that are competitors to your own organisation, that you are conducting research as a researcher from Henley Business School or the University of Reading. However, it is important that you inform all organisations and respondents that you are undertaking the study as part of your MSc/DBA at Henley.

In summary, you should undertake your research with professionalism and integrity and should you have any concerns in respect to ethics within your research you should discuss this with your supervisor or your Programme Director.

Informed consent

As noted, you must ensure that all participation in your research is on the basis of the informed consent of those taking part. As part of this you are also required to provide evidence of that consent when you submit your final report. Note that the principle of informed consent applies even if you are doing the research in your own organisation. Failure to comply with these stipulations may lead to your research not being recognised as meeting the requirements of your programme and in disciplinary action being taken against you for contravention of the University's policy on research conduct. Please therefore pay close attention to this aspect of your research.

What informed consent means in practice

There are three main steps to follow in order to comply with the policy on informed consent:

1. Explain clearly, in writing, the purpose of the research and how it is being conducted to each participant. This explanation should cover:
   - the purpose of the investigation
   - why you are undertaking the investigation (i.e. as part of your MSc/DBA programme)
   - how the data will be used, and arrangements for ensuring anonymity and confidentiality

- recording or other data-capture arrangements
- how participants can access the findings (if you are going to offer them the opportunity)
- that the data will be securely destroyed after the conclusion of the project (or the storage arrangements for the data if you have been required to store the data). Note: data should only be destroyed following confirmation of your result by the Programme Examiners' Meeting
- that the project has been subject to review in accordance with the ethics policy of the University of Reading

2. Obtain explicit agreement from every participant that:
   - they understand the purpose and conduct of the research (as outlined above)
   - they are taking part willingly
   - they can withdraw at any time
   - they are over 18 years of age (if you have applied for ethical approval for research involving under 18s, you will be required to follow additional procedures regarding informed consent. These will be determined as part of the approval process).

3. Submit evidence of compliance with the above with your final report. Consent forms and other evidence of informed consent will be kept in storage by Henley for five years following completion of the study and then securely destroyed.

The ways in which informed consent is confirmed and evidenced depend on the specific method(s) of data collection being used. The following guidelines cover the majority of situations (for guidance on other cases, please contact your supervisor/Programme Director). If your research involves more than one method of data collection, you will still need to provide evidence of informed consent as appropriate. If you are in any doubt as to how to gather or evidence informed consent, please discuss with your supervisor before you start to collect your data.

Face-to-face interviews

If you are collecting data by means of face-to-face interviews, you should prepare a written information sheet for each participant describing the purpose and conduct of the research and a consent form to be signed by the participants. Take two copies to the interview and ask each participant to sign one copy and return the other to you. If you are doing group interviews, each participant should sign an individual form. The original, signed consent forms should be submitted along with your final report. A sample information sheet and consent form for face-to-face interviews is included in Appendix B(ii).

Self-complete questionnaires (e.g. online survey)

Where your data collection involves participants completing a questionnaire (whether electronically or on paper) you should include details of the purpose and conduct of the research in the introduction to the questionnaire along with an appropriately worded statement advising participants that in submitting/returning the questionnaire they are giving their informed consent to their participation in the research. When submitting your final report you should include a separate copy of the questionnaire showing the introduction and submission statement. An example introduction and submission statement for self-complete questionnaires is included at Appendix B(iii).

Remote interviews (e.g. telephone interviews)

If your data collection involves remote interviewing where there is neither face-to-face contact nor a self-complete questionnaire, informed consent can be confirmed and evidenced by email. Prior to each interview, you should send an email to the participant explaining the purpose of the research, how it will be conducted and asking them to confirm that they are giving their informed consent to participate. Confirmation can be by return email (note: where email is not available, fax or post can be used). Copies of the emails should then be submitted with your final report. Example information and a consent email for remote interviews is included at Appendix B(iv).

Appendix B(i) – Ethical Approval Form

Ethics form: student research projects

This ethics form comprises three elements:

1. Cover sheet
2. Section A - Research approval application
3. Section B - Final submission

The cover sheet requires you to provide details about you and your research project. Section A is used to apply for ethical approval for your research project. Section B is used when submitting the final version of your research project report. You should answer all the required questions and you should ensure that you have read and understood the ethics requirements of the University of Reading Research Ethics Committee.

Application for research project approval

The University Research Ethics Committee allows Schools to operate their own ethical procedures within guidelines laid down by the Committee. The University Research Ethics Committee policies are explained in their *Notes for guidance*, which can be found at:

http://www.reading.ac.uk/internal/res/ResearchEthics/reas-REethicshomepage.aspx

Approval must be obtained before the research project commences.

For student research projects, initial approval can be given by the academic supervisor. To request approval you must complete the cover sheet and Section A and submit them at the beginning of Phase 2 for the MSc/at the beginning of the DBA (you must complete all parts of Section A). You must not commence your data collection unless Section A has been approved by your supervisor. Note, also, that if you are submitting this document electronically via RISIS, no signature is required on Section A. Retain a copy of Section A as you will have to submit a hard copy with your final report submission (see below).

During the research project

There is an obligation on all researchers to observe ethical procedures and practice and actively bring to the attention of their academic supervisor any concerns or questions of clarification they may have. If during the course of your work the nature of the research project changes or ethical issues arise, you must seek advice from your academic supervisor before proceeding.

Final report submission

On completion of your Pilot Study/thesis, you must complete and sign Section B and send it in hard copy along with a copy of your original Section A plus an updated cover sheet when you submit the final version of your research report. In signing Section B, you are confirming that the research was conducted in the approved manner. The report will not be marked until this form is received.

Please note that this form is designed to conform to the University's requirements with respect to research ethics. Approval under this procedure does not necessarily confirm the academic validity of the proposed project.

MSc in Business and Management Research/
Doctor of Business Administration

Cover Sheet

Project details

Name of researcher: Francis, Kok Siong Lee

Programme: DBA 25

Email:

Title of proposed project: The prequalification and Contractor Selection Criteria

Responsible persons

Details of academic supervisor

Name: 1st Supervisor : Dr Stephen Simister, 2nd Supervisor : Dr Tim Osborn-Jones

Nature of project

(Mark with an 'x' as appropriate)

Undergraduate	[ ]	Masters (not MBA)	[ ]
MBA	[ ]	MSc in BMR	[ ]
Doctoral	[x]	Other	[ ]

Date of Cover Sheet/Section A submission: 3 March 2014

Date of final submission (to be completed on completion of Pilot Study/thesis):

Section A Research approval application

Section A must be completed in full and submitted prior to any data collection. If you have any questions regarding the form, please discuss them with your programme director or academic supervisor (if one has been appointed).

Approval must be obtained *before* the research project commences.

This research project is about the selection of a suitable contractor for construction project. The questionnaires will be sent to housing developers in Malaysia to ascertain their contractor prequalification and selection criteria practices that lead to final contractor selection. What are the important criteria in the contractor selection and is the relational contracting play a role in their selection process?

1. Questions about proposed research (University ethics requirements)

Please reply to all of the following questions concerning your proposed research by marking with an 'x' as appropriate.

		Yes	No
1.1	Have the participants and subjects of the study been chosen because they are patients and/or clients of the National Health Service or Social Services in the UK, or equivalent health or social care systems in another country?		x
1.2.	Are the participants and subjects of the study unable to give free and informed consent because they are not over the age of 18, or as a consequence of their mental capacity? (For more details on how mental capacity might impair the ability to give free and informed consent, please consult the Mental Capacity Act 2005)		x
1.3	Are you asking questions that are likely to be considered inappropriate or to cause distress to any of the participants?		x
1.4	Are any of the subjects in a special relationship with the researcher that could affect their ability freely to give informed consent?		x
1.5	Is your project funded by a Research Council or other external source (excluding research conducted by postgraduate students)?		x

If you have answered Yes to any of these questions, your proposal will be reviewed in accordance with the requirements of the University Research Ethics Committee.

If you are unsure whether any of these conditions apply, please contact your programme director or academic supervisor (if one has been appointed) for further advice.

2. Questions about proposed research (administration of investigation process)

Please respond to all the following questions concerning your proposed research project by marking with an 'x' as appropriate.

		Yes	No
2.1	The research involves only archival research, access to company documents/records, access to publicly available data and/or questionnaires, surveys, focus groups or other interview techniques.	x	
2.2	The need to reimburse expenses or make other payments to any research participants has been reviewed.	x	
2.3	Participants will be/have been advised that they may withdraw at any stage if they so wish.	x	
2.4	Arrangements for ensuring personal privacy, commercial confidentiality and data protection during and after the project and for the disposal of material will be in line with University guidelines.	x	
2.5	Arrangements for providing subjects with research results if they wish to have them have been considered.	x	
2.6	Research instruments (questionnaires, interview guides, etc) will be reviewed against the policies and criteria noted in The University Research Ethics Committee Notes for Guidance.	x	
2.7	The arrangements for publishing the research results and, if confidentiality might be affected, for obtaining written consent of this have been reviewed.	x	
2.8	Information Sheets and consent forms will be prepared in line with University guidelines for distribution to participants, as appropriate. This contains details of the project, contact details for the principal researcher and advises subjects that their privacy will be protected and that their participation is voluntary and that they may withdraw at any time without reason.	x	
2.9	Completed consent forms, where required, will be retained and submitted with the final report on completion of the project for retention by Henley Business School.	x	

If you have answered No to any of these questions, contact your programme director or academic supervisor (if one has been appointed) for further advice.

3. Safeguarding personal safety and security of the researcher(s) and research participants

If the research is to be conducted outside of an office environment or normal place of work and/or outside normal working hours please note the details in the comments box below and state how the personal safety and security of the researcher(s) and research participants will be safeguarded.

Comments

[x] I confirm that I have read and understood the ethics requirements of the University of Reading and will abide by these requirements in the course of my research.

Signed (student):

Date: December 1 2013

Print name: Francis, Kok Siong Lee Student number

(**Note to Research Associate**: a signature is not required for Section A if submitting electronically via the RISISweb portal. In submitting via the RISISweb portal you are confirming that declarations regarding your proposed research are true and correct to the best of your knowledge, that you have read and understood the ethics requirements of the University of Reading and will abide by those requirements in the course of your of your research).

Approval review (supervisor)

Academic supervisor to mark with an 'x' as appropriate:

[ ] I have reviewed this application as **Approved** and confirm that it is consistent with the requirements of the University Research Ethics Committee procedures.

This proposal is **Not approved** and

[ ] is returned to the applicant for further consideration

Or

[ ] has been referred for further review in accordance with University of Reading Ethics Committee requirements

Name (supervisor):

Signed (supervisor):

Comments (where application has been refused)

(**Note to supervisor**: a signature is not required for Section A if you are submitting proposal feedback electronically via the RISISweb Portal. In approving the proposal in the RISISweb Portal you are also confirming your approval of the proposed research from an ethical point of view. If you are not able to so approve the proposed research, you should not approve the proposal and should advise the appropriate assignments office.)

Further action (office use only)

Section B Final submission form

When you are ready to submit your Pilot Study/thesis, please update the cover sheet and complete and sign Section B. The complete ethics form, including Section A, must then be sent to the MSc/DBA Office at Henley in hard copy when you submit the final version of your Pilot Study (via RISIS), and when you submit your thesis for examination. The report will not be marked until this form is received. (You may sign and scan the cover sheet and Section B and attach this in RISIS with your Pilot Study, and then send a hard copy by post, if you wish).

Mark with an 'x' as appropriate:

[ ] I confirm that any related documents (including, as appropriate, copies of any questionnaires, interview schedules etc, and/or a copy of the information sheet and completed consent forms from each participant) are attached and submitted with this report.

I confirm that the primary data:

[/] will be destroyed on confirmation of award

or

[ ] is submitted with this report for secure storage (where this has been required by the University of Reading Ethics Committee) and that any other copies have been destroyed

[ ] I confirm that the research has been conducted in accordance with the ethics requirements of the University of Reading.

Signed (student):Francis Lee

Date:16/02/2016

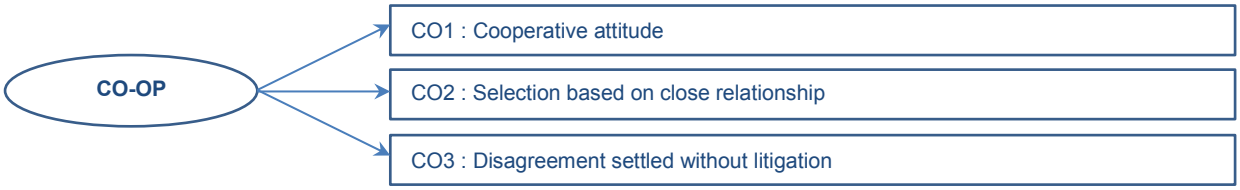
Print name: Francis Kok Siong Lee Student number:

Appendix C

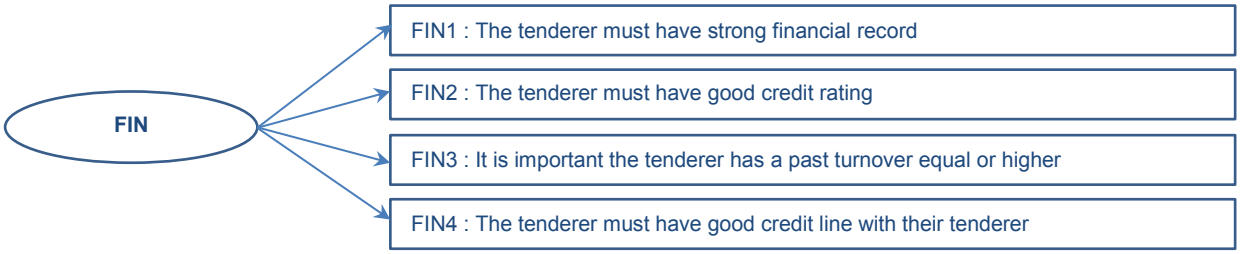
Coefficient and T-Value - PLS Model

Construct and Indicators Description

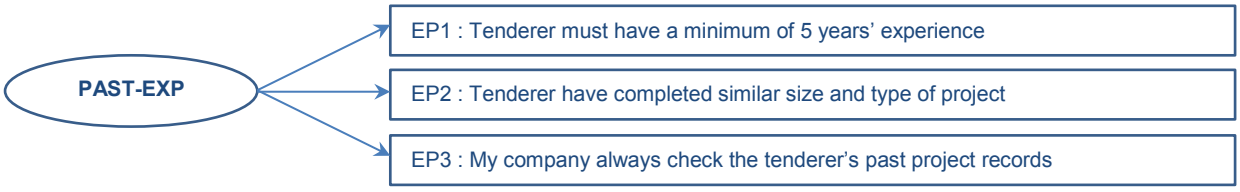
TRUST NORMS



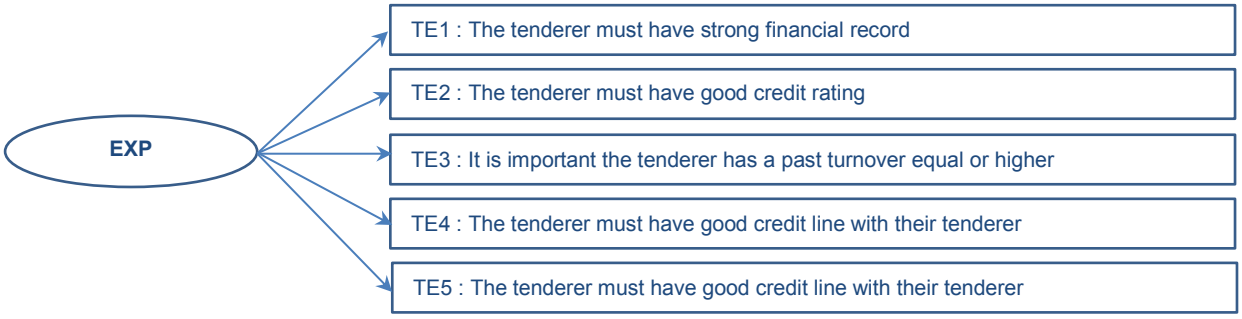
COOPERATIVE NORMS



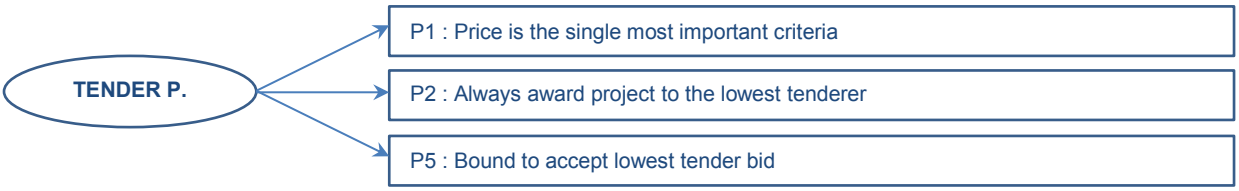
FINANCIAL STANDING



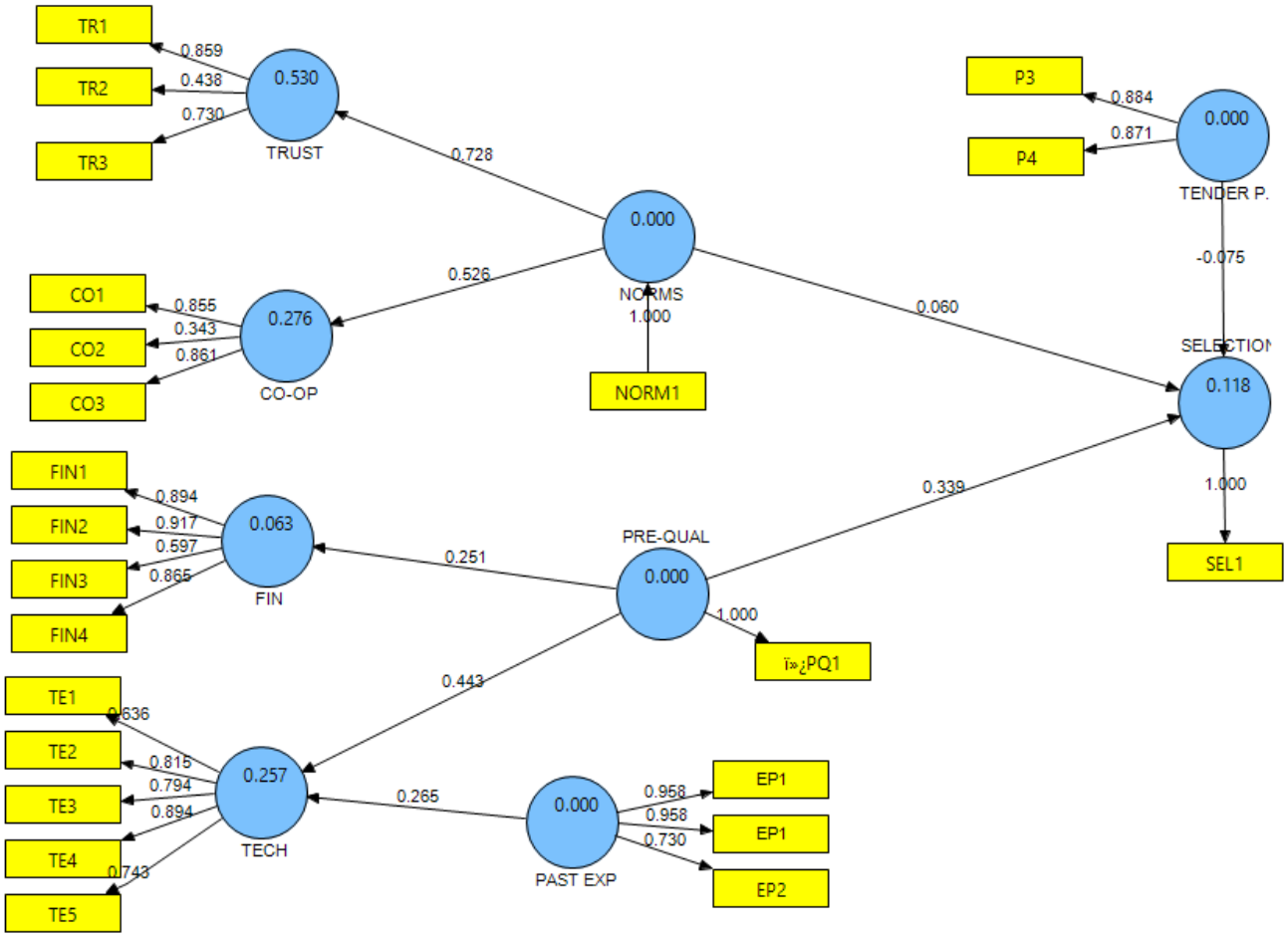
PAST EXPERIENCE



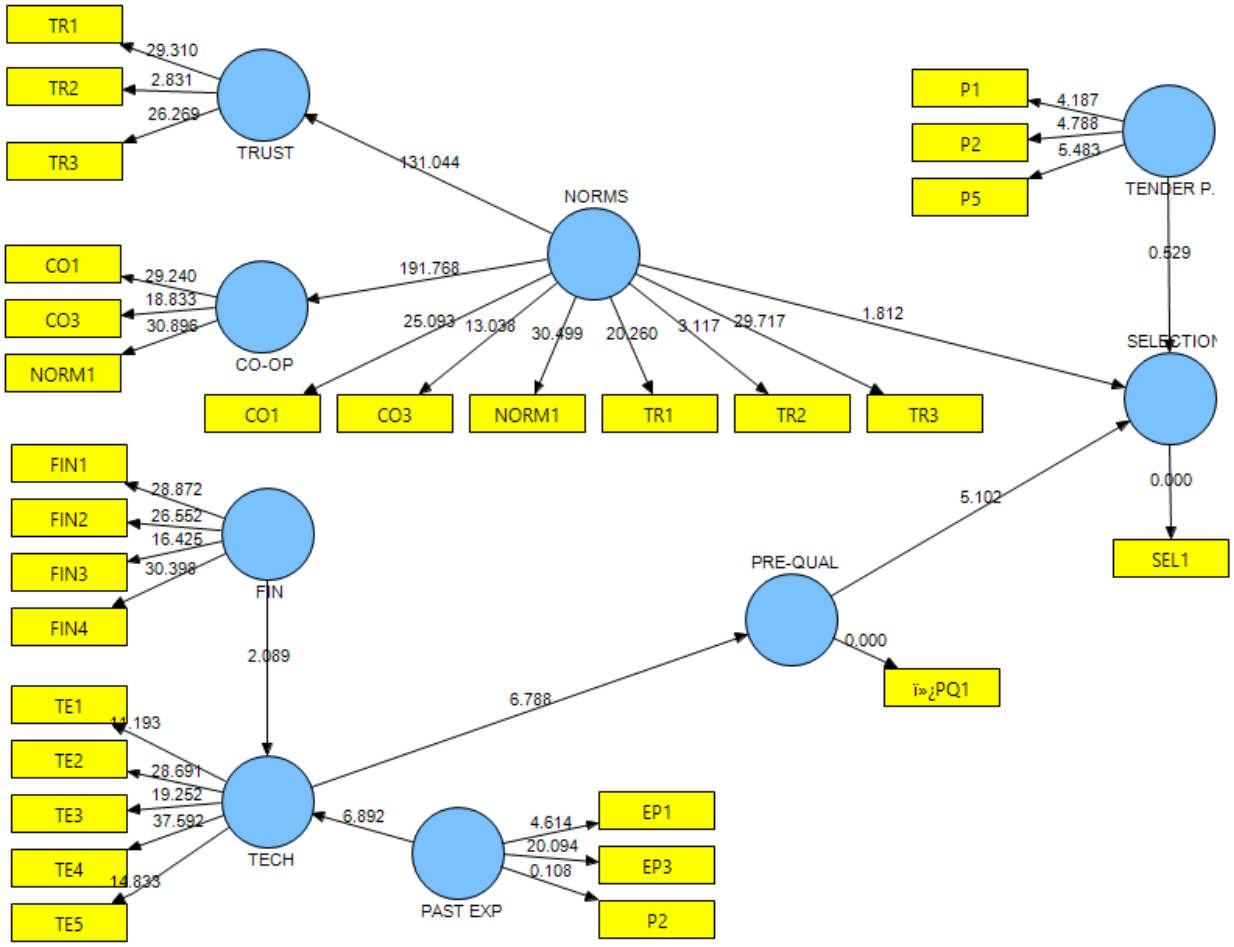
ORGANISATION EXPERTISE



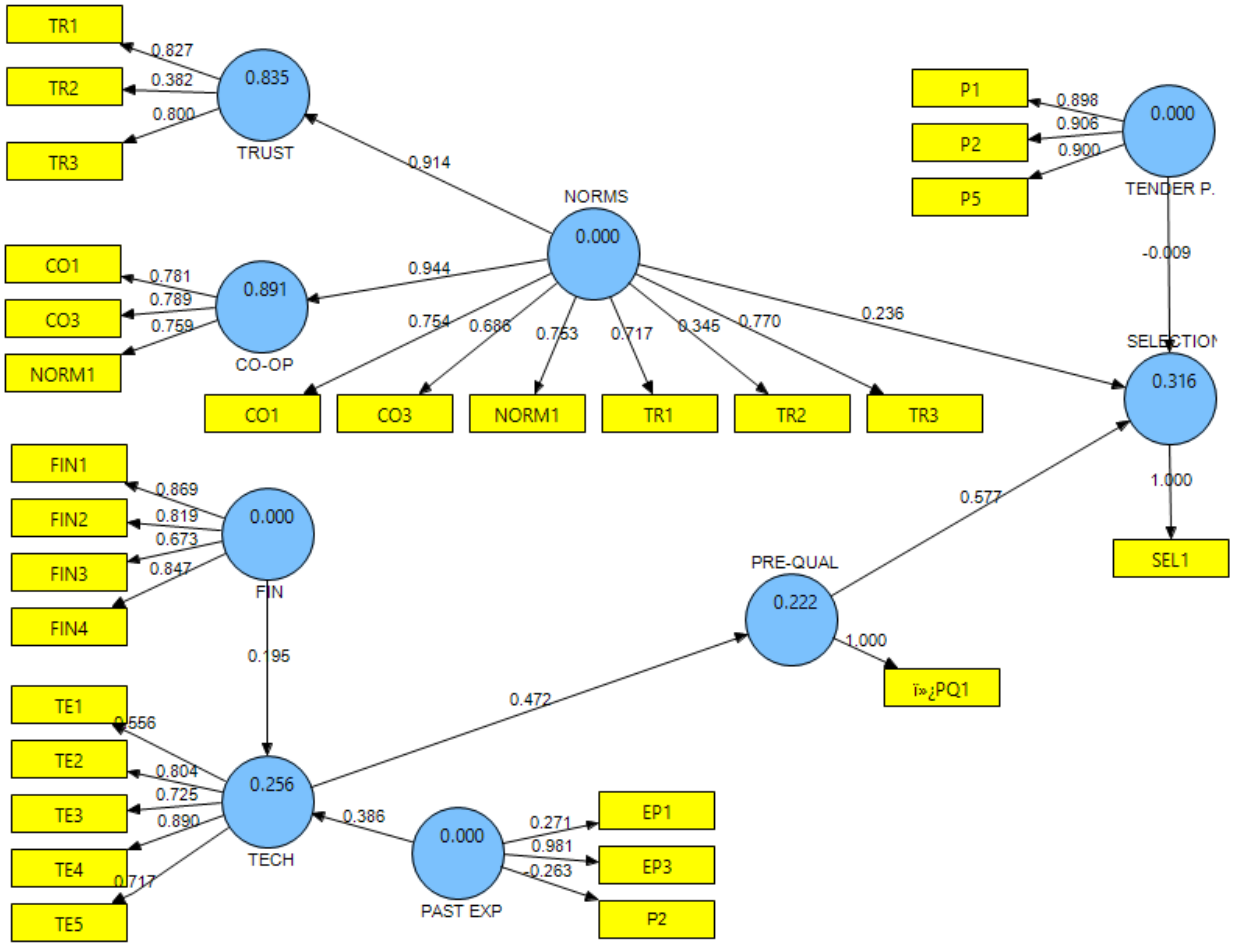
TENDER PRICE



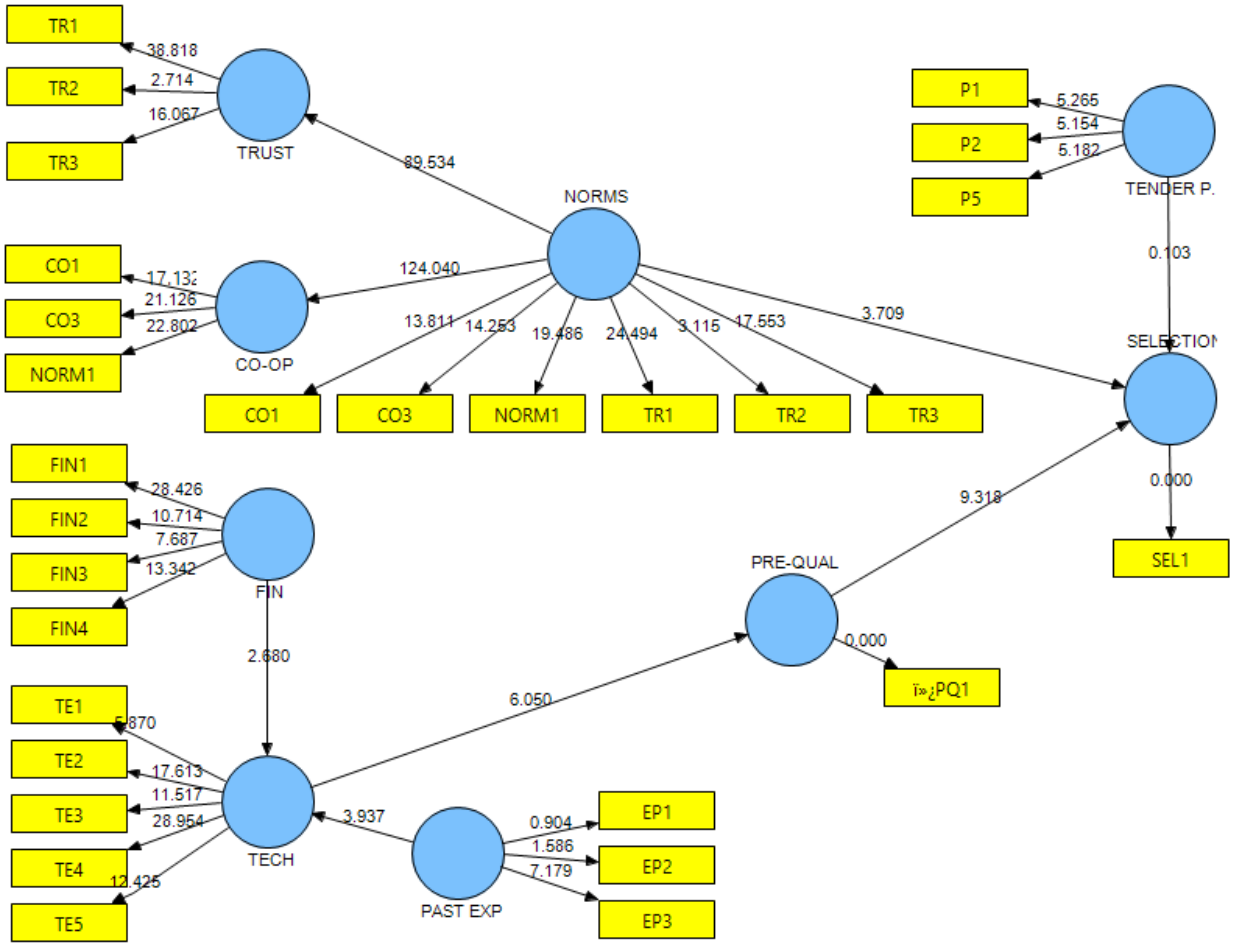
Case 1 - Aggregate Coefficient Model



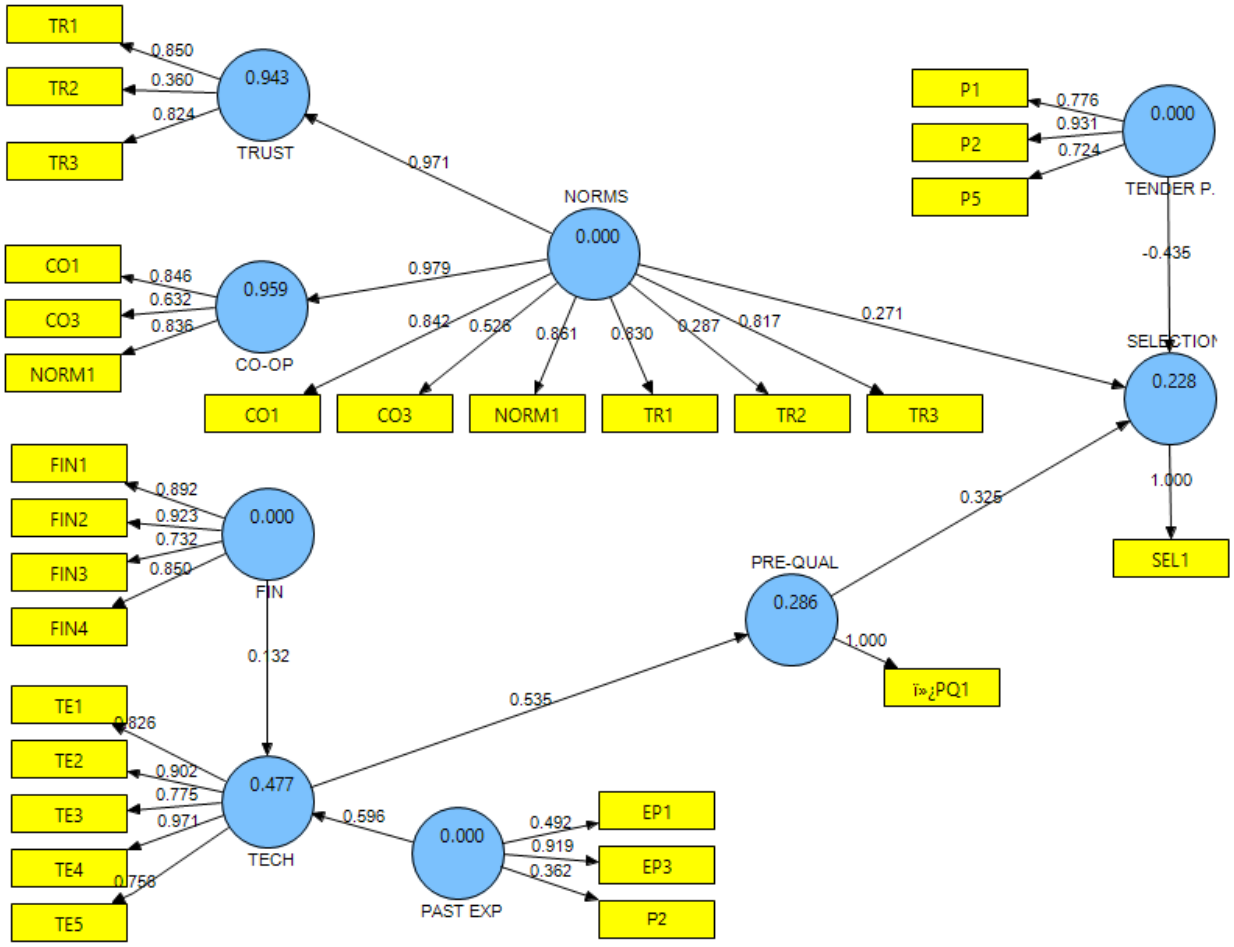
Case 1 - Aggregate T-Value Model



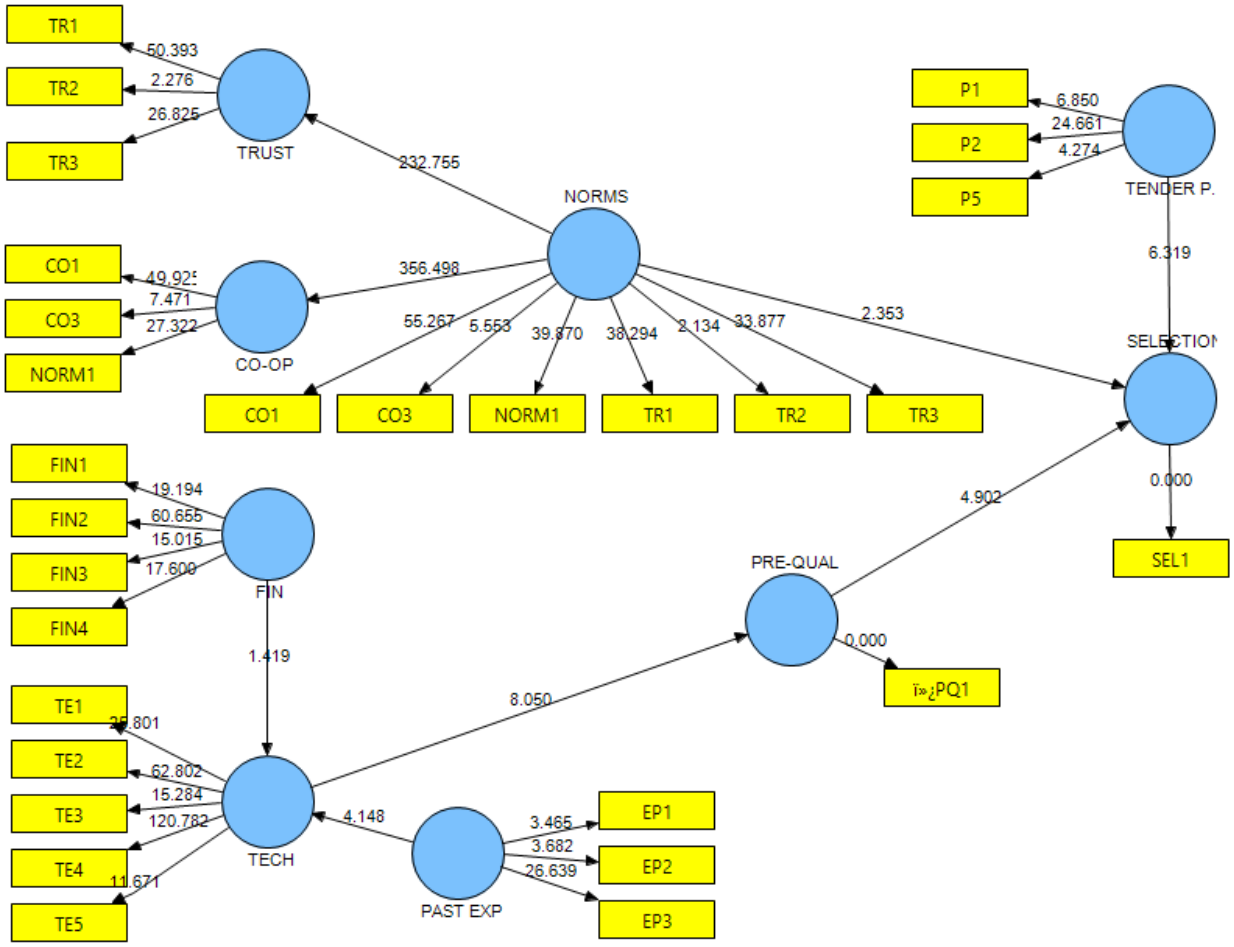
Case 2 – Small Size Firms Coefficient Model



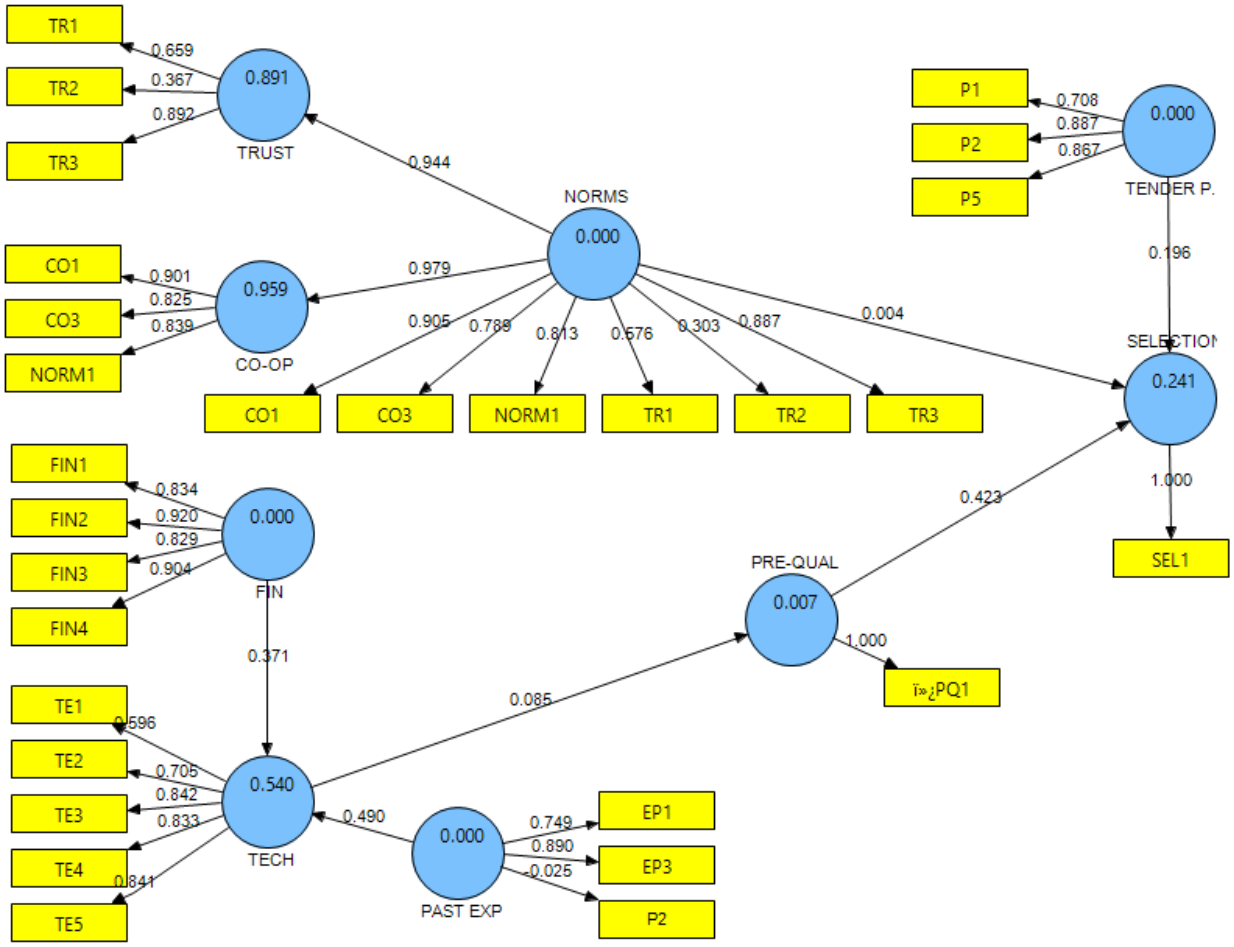
Case 2 – Small Size Firms T- Value Model



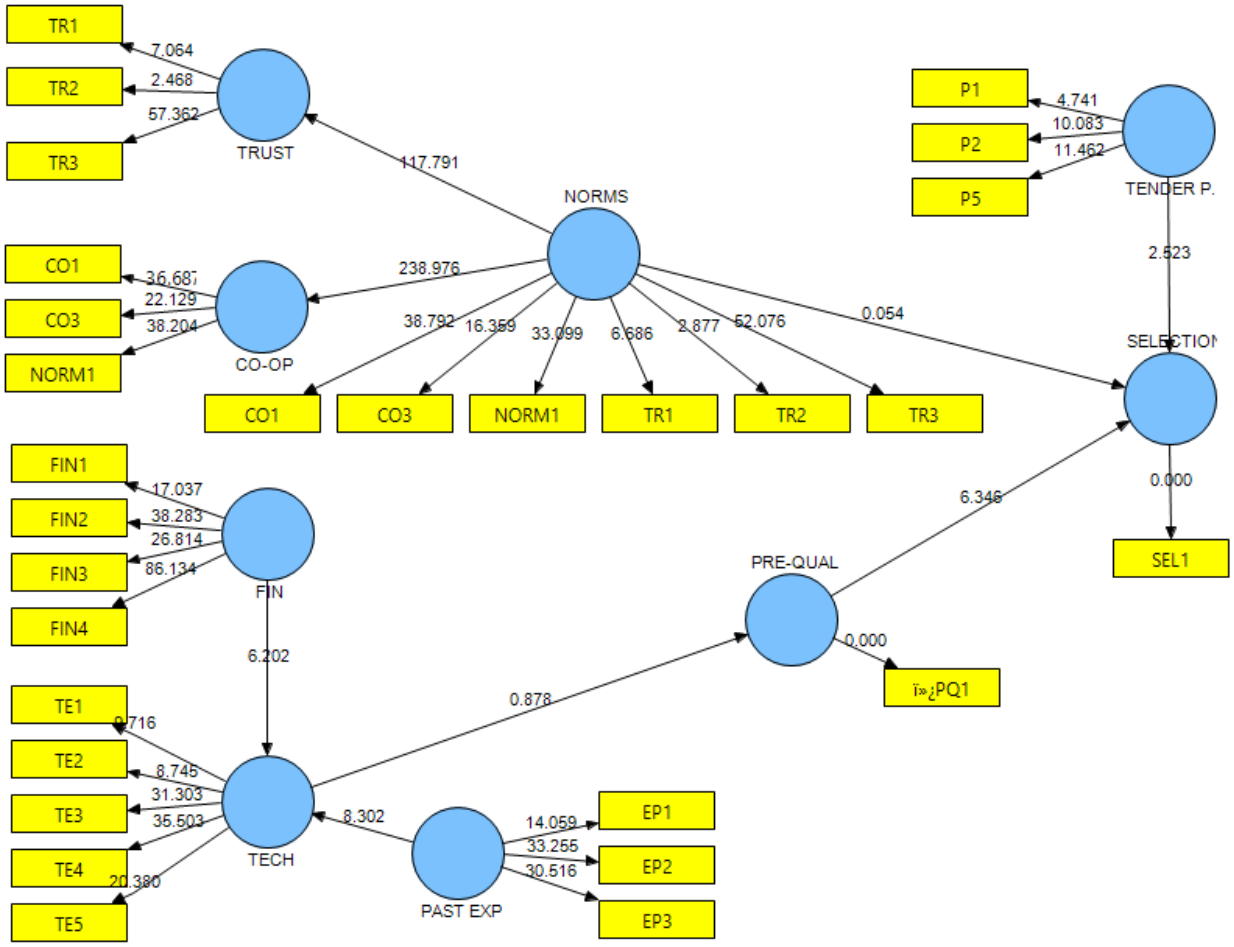
Case 3 – Medium Size Firms Coefficient Model



Case 3 – Medium Size Firms T- Value Model



Case 4 – Large Size Firms Coefficient Model



Case 4 – Large Size Firms T- Value Mode

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