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Trust and Engineer Selection
In the Oil and Gas Industry

BY

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Trust and Engineer Selection in the Oil and Gas Industry" submitted by Liwen Ren in partial fulfillment of the requirements for the degree of Master of Science.

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ABSTRACT

Trust that exists and develops between contracting parties in the initial contracting stages, more specifically in the Engineer selection process, is more critical to project success than the contract itself, and the financial issues involved in the project. Understanding the behaviour and role of trust in the Engineer selection process could significantly enhance the value and efficacy of trust in contracting and project successes as a whole.

In this research, a two-phased exploratory study was conducted using triangulated qualitative and quantitative methods. They are: 1) the pilot phase in the form of modified Delphi method; and 2) the main phase using in-depth interviews. The research studied how the three dimensions of trust in the "Trust Colour Model" influenced decision-making throughout the Engineer selection process.

Through the pilot phase, the research identified that trust was one of the critical factors to be considered in contract strategy design, and there was a significant connection between trust and the effective implementation of the Engineer selection method. In the main phase, more specific empirical information was obtained: (1) the performance of the "Trust Colour Model" throughout the Engineer selection process in general; (2) the extended understanding of the "Trust Colour Model" at both the interpersonal and interorganizational levels; (3) the presence and influence of three dimensions of trust proposed in the "Trust Colour Model" in each of the Engineer selection sub-phases; and (4) the dynamic cycle of the three 'trust colours' which influencing the decision making differently between the Owner and Engineer in the selection process. In summary, the importance and influence of actively applying trust at the outset of the project contracting process were clearly agreed on and appreciated by the industry experts who participated in this research.

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To

My dear parents

Who always love me and encourage me in the endeavour to learn

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CHAPTER 1 INTRODUCTION

This chapter provides an overview of this thesis. It presents a brief discussion of trust and contracting in order to introduce the topic and the area of research. This chapter presents a summary of the research background, literature review and gaps, research methods, research findings and recommendations. The detailed information relating to this research can be found in the corresponding chapters of the thesis.

1.1 BACKGROUND

In the Oil and Gas industry in Alberta of Canada, there are a growing number of projects being promoted requiring huge investments. The connections between the Oil and Gas Companies (the Owners) and the Engineering Procurement and Construction (EPC) Firms (the Engineers) are quite close because of the ongoing projects within this small community. The Owner has the serious responsibility of selecting the right Engineer to act on his behalf in order to deliver successful projects. In the meantime, the Engineer is also looking for an Owner with whom he can happily work on projects for the long term. Thus, the requirement of a good working relationship between the Owner and the Engineer becomes critical, wherein trust between the two parties emerges also as an important issue. The Owners pay close attention to the Engineer selection process in order to select the Engineer who can provide the best service with a real perceived value.

1.2 TRUST AND CONTRACTING

Contracting generally involves purchasing, renting, leasing, or otherwise obtaining supplies or services from vendors. Contracting includes a description of the supplies and services required, selection and solicitation of potential sources, preparation and award of contracts, and all phases of contract administration (Fisk 1997; Marsh 2000; Wideman 2000).[1,2,3]

On the other hand, developing a good working relationship is also one of the goals of the contracting process. Developing a good rapport necessitates that the parties develop a give-and-take approach, which results in a beneficial agreement for both sides to the contract (Ritz 1990; Bent 1997)[4,5]. Because of the level of uncertainty that accompanies projects, no contract or other agreements, no matter how complete or detailed, can account for every issue or every contingency that might arise (Cullen, Johnson and Sakano 2000)[6]. Busch and Hantusch (2000)[7] point out that both parties to a contract too often emphasize the issue of money and remain unaware that the absence of trust is

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[1] Fisk, E. R. (1997). Construction Project Administration. New Jersey, Prentice-Hall, Inc.
[2] Marsh, P. (2000). Contracting For Engineering and Construction Projects. Burlington, Gower Publishing Company.
[3] Wideman, R. M. (2000). Glossary of Common Project Management Terms v2.0, R. Max Wideman and PMForum. **2001**.
[4] Ritz, G. J. (1990). Total Engineering Project Management. New York, McGraw-Hill.
[5] Bent, J. A. (1997). Contractor Proposal Evaluation (CPE). International Seminar Presentation: Contracting and Contract Management.
[6] Cullen, J. B., J. L. Johnson (2000). "Success Through Commitment and Trust: The Soft Side of Strategic Alliance Management." Journal of World Business **35**(3): 223-240.
[7] Busch, J. S. and N. Hantusch (2000). "I Don't Trust You, But Why Don't You Trust Me?" Dispute Resolution Journal **55**(3): 56-65.

potentially a more powerful barrier to a successful project than either the contract or the money involved. Thus, trust is seen as an important issue in the relationship between the Owner and Engineer as well (Hartman 1999; Hartman and Romahn 1999)[8,9].

Jeffries and Reed (2000)[10] have argued that trust permits greater flexibility in the selection of governance structures when asset specificity is present, and trust results in closer relationships with less need for detailed contracts. Similarly, Gulati (1995)[11] argues that, to some degree, firms appear to substitute trust for contractual safeguards in their repeated contractual relationships. In a sense, trust can function as a substitute for control, reflecting a positive attitude about another's motives (Rousseau, Sitkin, Burt and Camerer 1998)[12].

Understanding of Trust

In speaking of trust, many researchers developed single definitions for trust from aspects such as inter-organizational management, intra-organizational management and close

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[8] Hartman, F. T. (1999). The Role Of Trust In Project Management. Proceedings of Nordnet "99" International Project Management Conference, Helsinki, Finland.

[9] Hartman, F. T. and E. Romahn (1999). Trust: A New Tool For Project Managers. Project Management Insitute 1999 Seminars & Symposium, Pennsylvania, USA, Project Management Institute.

[10] Jeffries, F. L. and R. Reed (2000). "Trust And Adaptation In Relational Contracting." Academy of Management Review **25**(4): 873-882.

[11] Gulati, R. (1995). "Does Familiarity Breed Trust? The Implications of Repeated Ties For Contractual Choice In Alliances." Academy of Management Journal **38**: 85-112.

[12] Rousseau, D. M., S. B. Sitkin (1998). "Not So Different After All: A Cross-Discipline View of Trust." Academy of Management Review **23**(3): 393-404.

family relationships. Typically, Doney, Cannon and Mullen (1998)[13] defined it as: a willingness to rely on another party and to take action in circumstances where such action makes one vulnerable to the other party. This definition includes both the belief and behaviour components of trust. However, these definitions of trust can only be applied in a relatively restricted area or discipline, and not necessarily in the relationship of exchange activity in project management.

On the other side, some researchers analyze trust through multi-dimensions as a dynamic concept. For example, Jones and George (1998)[14] presented that there are three distinct states or forms of the trust experience: (1) distrust, (2) conditional trust, and (3) unconditional trust. This interaction model conceptualises trust as a changing or evolving experience, in which values, attitudes, moods and emotions operate simultaneously to produce an overall state of trust or distrust. Hence, we view trust as a more dynamic experience – one that can shift or change, sometimes quickly, among trust states.

In general, single definitions of trust will cause unilateral understanding and judgement, however multi-dimensional definitions proposed in organizational management don't have enough empirical data to support the proposition and are not necessarily applicable

[13] Doney, Cannon and Mullen (1998). "Understanding the Influence of National Culture on the Development of Trust.": 601-620, (internet copy 1-14).

[14] Jones and George (1998). "The Experience and Evolution of Trust: Implications For Cooperation and Teamwork.": 531-546.

to project management practice. Thus, Hartman (2000)[15] proposed the "Trust Colour Model". It consists of three distinctive types of trust: (1) Blue Trust, (2) Yellow Trust, and (3) Red Trust. Blue Trust represents the competence dimension of trust. It answers the question of "Can you do the job?" Yellow Trust measures integrity. Here we ask: "Will you consistently protect my interests?" Finally, Red Trust symbolizes the intuitional side of trust, answering the critical question: "Does this feel right?" This model simplifies and summarizes the types and dimensions of trust in a business relationship within a project management context. This trust model is different from others that have single definitions such as 'high or low trust' and 'trust or distrust'. This model distinguishes itself from the black or white recognition of trust; rather it presents a defined trust colour spectrum.

Trust in the Engineer selection process

There are several researchers who emphasize that special attention should be paid at the early stages of project contracting, which include the Engineer selection phase, in order to improve the quality of early strategic decisions. In a survey conducted by the Royal Institution of Chartered Surveyors (1995)[16], both the clients and representatives from the U.K. construction industry highlighted the importance of strategic decisions made at the

[15] Hartman, F. T. (2000). Don't Part Your Brain Outside: a Practical Guide to Improving Shareholder Value with SMART Management, Project Management Institute.
[16] Royal Institution Of Chartered Surveyors (1995). Improving Value for Money: Guidance for Chartered Surveyors and their Clients. United Kingdom, Royal Institution Of Charted Surveyors.

project outset. Selection of an appropriate Engineer is included amongst these major decisions. Furthermore, Hartman (2001)[17] argued that developing the proper contracting strategies in picking an Engineer is critical for a project. This influences positions of power, responsibilities and more between the parties, so is critical to the success of projects. On the other hand, there is a tendency to view trust as important in reducing the possibility of contract disputes (Zaheer, McEvily and Perrone 1998)[18], lowering the contract transaction cost (Serrambana 1991; Gulati 1993)[19,20] and, more significantly, in improving the relationship between contracting parties (Arrow 1974; Ellram 1995; Smeltzer 1997)[21,22,23].

Thus, there is a need to conduct an exploratory study to look at the behaviours and roles of trust in the early stages of project contracting, particularly in the Engineer selection process. By understanding the importance and influence of trust upon decision-making between the Owner and the Engineer, it is possible to increase the possibility of selecting the best partner for a project.

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[17] Hartman, F. T. (2001). Horizontal and Vertical Integration of Work Packages: combining the work and materials supply for optimal performance. Calgary, Unpublished.
[18] Zaheer, A., B. McEvily (1998). "Does Trust Matter? Exploring The Effects of Interorganizational And Interpersonal Trust On Performance." Organization Science 9(2): 141-159.
[19] Gulati, R. (1993). The Dynamics Of Alliance Formation. Cambridge, Harvard University.
[20] Serrambana, J. V. M. (1991). A Computer Based Questionnaire To Measure Trust And Its Cost Impact in The Construction Industry. Department of Civil Engineering, Worcester Polytechnic Institute.
[21] Arrow, K. (1974). The Limits Of Organization. New York, Norton.
[22] Ellram, L. M. (1995). "Partnering Pitfalls And Success Factors." International Journal Of Purchasing And Materials management 31(2): 36-44.
[23] Smeltzer, L. R. (1997). "The Meaning and Origin of Trust in Buyer-Supplier Relationships." 33(1): 40-48.

1.3 RESEARCH OBJECTIVES

This research studied the performance of trust in the working relationship between Oil and Gas Companies (the Owners) and their Engineering Procurement Construction (EPC) Firms (the Engineers) in the Oil and Gas industry in Alberta, Canada. The main objective of this research was to study the behaviour and role of trust in the early stages of contracting, specifically in the Engineer selection process. This research can help us better understand how trust will influence decision-making throughout the process of Engineer selection. This research can also provide some guidelines for understanding the difference in valuing trust from both the Owner and Engineer perspectives.

The specific objectives of this research were as follows:

- Understand the important issues and contexts in the early stages of contracting and position trust among those issues.
- Review the methods for selecting and evaluating the Engineer.
- Review the literature relating to the various definitions and multi-dimensional models of trust in order to explain the behaviour and importance of trust.
- Compare the different presumptions of trust behaviour and roles in inter-organizational and intro-organizational management and determine their applicability to project management.
- Study Engineer selection practices in the Alberta Oil and Gas industry with specific attention to the influence of trust.

- Apply empirical study methods to test the viability of the proposed "Trust Colour Model" in a project management context.
- Provide a profile of trust performance in the Engineer selection process to project managers, which can provide them with a guide in order to improve their decision-making.

1.4 RESEARCH APPROACH

As identified through literature, trust has been widely recognized as having influence on project contracting phases and critical areas of contracting. Thus the researcher needs a more structured and robust research approach to target one specific contracting area, and identify the significance of the performance of trust within that area.

A two-phased research plan was developed, which includes: (1) pilot phase, in the form of a modified Delphi study; and (2) main phase, with the format of in-depth interviews. The purpose of the pilot phase was: 1) to map out the fundamental factors to be considered in the early stages of contracting, i.e. in creating a practical contract strategy; 2) to test the importance of trust at the early contracting stage in comparison to other key factors; 3) to identify the important connection between trust and specific contracting factors for further research in the main phase of this research; 4) to determine the appropriate research methods to be applied in the main phase, i.e. in-depth interviews vs. structured questionnaire. The modified Delphi method includes three rounds surveys. In

the first round, open-ended questions were applied to interview a group of experts in contract management and project management. Responses were collected in an open, flexible and informative way, where the interviewees have more opportunities to collaborate with the researcher. In the following rounds, a quantitative data collection tool, namely a mini-survey, was implemented. Responses from each of the previous round, together with some new questions, were tabulated in a mini-survey and sent back to the participants for comments in order to get consensus on various opinions.

In the main phase, in-depth interviews were applied to cope with the sensitive nature of the research topic after comparing with other possible methods, e.g. a structured questionnaire survey. An interview guide was developed as a guideline to direct the researcher to address key areas and keep track of the probing questions on site. The structure of the interview guide, logical sequence of major interview questions, back-up questions, and wording of each question were all designed and tested thoroughly. The interview questions were classified into three categories: 1) questions relating to the Engineer selection and pre-contracting process, 2) questions regarding performance of trust and the "Trust Colour Model" throughout the Engineer selection processes, 3) questions relating to final project performance, and 4) questions regarding the potential areas for improvement in contracting.

This two-phased study with the research being triangulated through use of quantitative and qualitative data collection methods, minimized the bias and errors caused by a single data collection method.

1.5 Research Process

This study is a carefully organized and thoughtfully planned piece of research. Literature validates the need to study the performance of trust in project contracting practices. A two-phased research method is the appropriate way to narrow down the research area and get a thorough understanding of a specific area to serve the research objectives. Major steps, from seeking the gaps in the literature, narrowing down the research topic, designing and implementing the pilot phase, to developing and executing the in-depth interviews, were each developed deductively, guided by the literature review, research methods and through the guidance of the researcher's advisor. The research process is illustrated in ***Figure 1.1***.

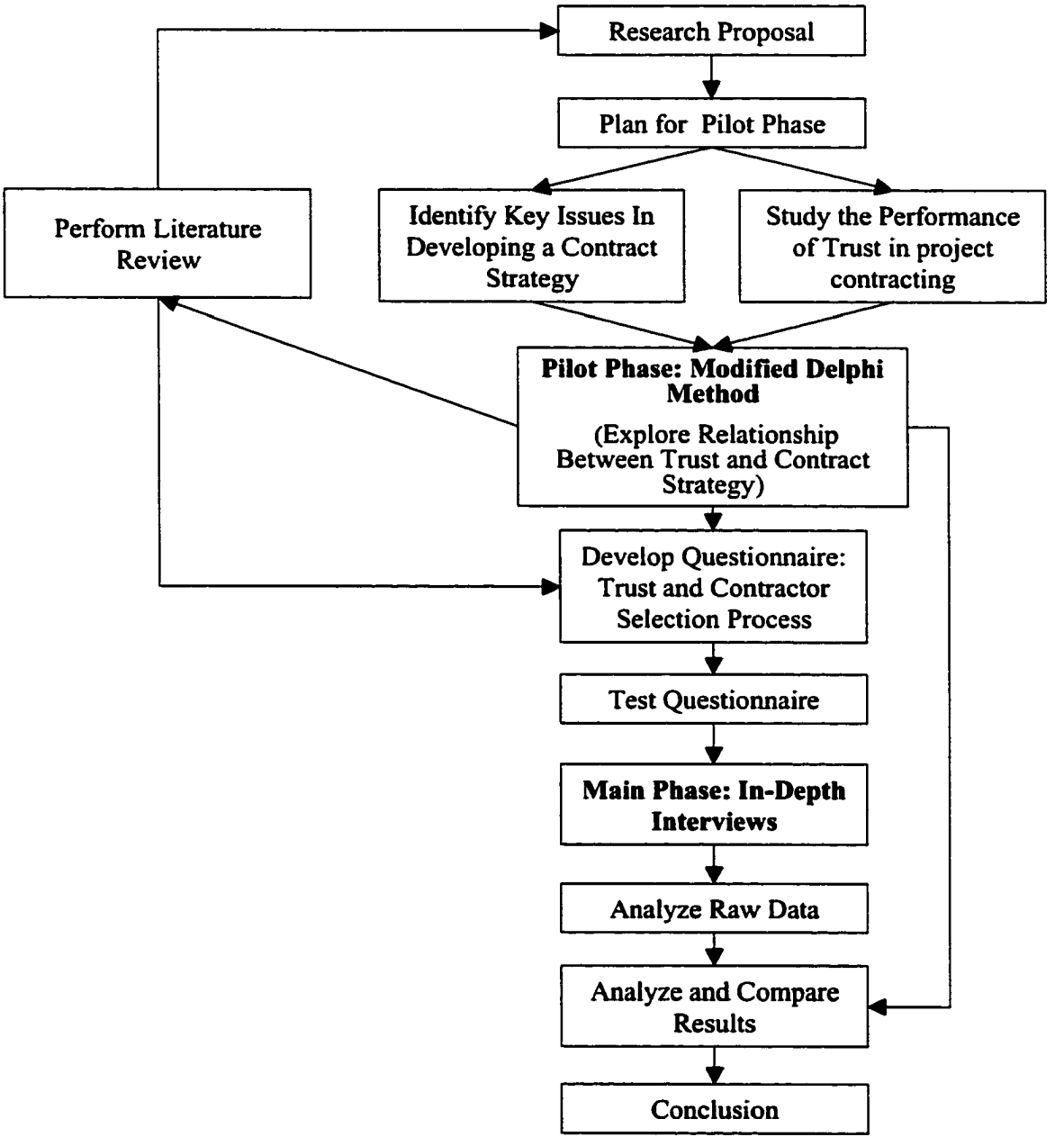

Figure 1-1: Research Process Flow Chart

1.6 PRINCIPAL ACHIEVEMENTS

Critical achievement and significant findings are summarized as follows:

- A list of prioritized key contracting considerations in developing a contract strategy was developed after the initial two rounds of the Delphi study, with input from experts in contract management and project management. Trust emerged as a vital consideration and ranked fifth out of sixteen key contracting factors.

- The connection between the "Trust Colour Model" and key contracting factors was identified through the mini-survey in the third round of the Delphi study. It was consistently agreed that three dimensions of trust proposed in the "Trust Colour Model" have significant influence upon the Engineer selection process.

- A picture of the Engineer selection process and evaluation method applied by the Alberta Oil and Gas industry was established. The advantages and disadvantages of this selection method were identified and explained in details by considering trust into the evaluation.

- The understanding of the "Trust Colour Model" was observed and extended at both the interpersonal and interorganizational level. Blue, Yellow and Red Trust, proposed in the "Trust Colour Model" were seen to be factors that played role individually or collectively at either the personal or organizational levels.

- The three dimensions of trust proposed in the "Trust Colour Model" took priority simultaneously or cyclically in the sub-phases of the Engineer selection process. In other words, at a specific sub-phase of the Engineer selection process, such as the long listing phase, and the short list phase, only Blue Trust and Yellow Trust had an influential impact on decision-making.

- A dynamic cycle of the three dimensions of trust in the "Trust Colour Model" through the Engineer selection process was developed. This dynamic cycle was synthesized based on: (1) understanding trust performance at the interpersonal and interorganizational level; and (2) the chronological presence and relative importance of the different trust dimensions throughout the sub-phases of the Engineer selection process.

- The development and nature of each trust dimension in the "Trust Colour Model" were studied in the Engineer selection process. This research found that certain dimensions of trust could be transferred from one individual to another, such as Blue Trust, while other trust types such as Red Trust could not. Certain dimensions of trust are more sustainable and stable, such as Blue and Yellow Trust, in a dynamically changing environment.

- An understanding of the different attitudes towards the value of trust between the Oil and Gas companies and EPC firms was established. Further, both Oil and Gas companies and EPC firms gave a different priority to each of the dimensions of trust at a particular stage and situation of contracting.

- A modified Delphi method applied in the pilot phase enabled the researcher to narrow down the research topic. Additionally, this modified Delphi method also helped the researcher develop appropriate subsequent research methods, i.e. in-depth interviews as opposed to structured questionnaire.

1.7 Structure of Thesis

There are seven chapters in this thesis, which are organized as follows.

Chapter 2 sets the background and theoretical foundation for the study. It provides a review of the key subjects relating to the project contracting process, especially the early stages of project contracting. It covers topics such as basic principles of contracting, contracting features in the Oil and Gas industry, the Engineer selection process, and Engineer evaluation criteria. ***Chapter 3*** provides a review of the literature relevant to the definition of trust, different trust dimensions, and the dynamics of trust. In this research, trust is reviewed within the business environment, the supplier-buyer relationship, the organizational operation, as well as the interpersonal relationship. ***Chapter 4*** defines the relationship between trust and project contracting, as well as the performance of trust in

the contracting environment. ***Chapter 5*** presents the research methods applied, and rationales behind selecting these specific data collection methods. In ***Chapter 6*** both the qualitative and quantitative results of findings are presented. This chapter also discusses the key findings from this research, compares these research findings with those stated in the literature, and presents how this research agrees and disagrees with the literature. ***Chapter 7*** concludes with a summary of the academic contribution to the body of knowledge, industrial application of research findings, limitation of this research, and recommended potential areas for related future research.

CHAPTER 2 CONTRACTING AND ENGINEER SELECTION

The goal of the initial phases in the contracting process, specifically the Engineer selection process, is to arrive at a mutually acceptable contract with a satisfied supplier who will provide the desired engineering services. The selection process is much like a mini-project for a service-oriented contract in engineering or construction. It takes a total effort in the project management approach to plan, organize, and control the whole selection process (Bent and Humphreys 1996; Bent 1997). This chapter reviews literature regarding the basic principles of contracting, the roles of the Owner and Engineer in contracting and the typical contracting phenomena in Oil and Gas industry. This chapter also presents the various Engineer selection methods and processes. It further explores the typical evaluation criteria for selecting an Engineer, and the features of those evaluation criteria.

2.1 BASICS OF CONTRACTING

The contracting system for capital project construction has evolved over the years. With advances in technology and the resulting increased sophistication of the world we live in,

the scope of such projects has expanded considerably. Thus, contracting has become complicated as well (Haswell and Silva 1989)[24]

Contracting generally involves purchasing, renting, leasing, or otherwise obtaining supplies or services from vendors. Contracting normally includes a description of the supplies and services required, selection and solicitation of potential sources, preparation and award of contracts, and all phases of contract administration (Wideman 2000). There are some basic principles in contracting that need to be addressed as well: contract law, contract formation, terms and conditions of contract, obligations outside of the terms of contract, etc (Hartman 2001)[25]. Most of these basic contracting issues should be attended to and acknowledged by the parties during the early stages of the contracting process.

It is important that every Owner involved in contracting has a formalized contract policy established by management, that broadly defines why, what, when and how provision of goods and services should be contracted out by the Owner (Smith 1995)[26]. The potential parties to a contract should have the intension to enter into a legal relationship. Typically, this legal relationship provides that one party will offer to do something that is beneficial

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[24] Haswell, C. K. and D. S. D. Silva (1989). Civil Engineering Contracts: Practice and Procedure. London, Butterworth & Co.
[25] Hartman, F. T. (2001). Typical Contract Problems And Their Causes: Common Law And Tort Issues, Changes In The Contracting Environment.
[26] Smith, N. J. (1995). Engineering Project Management. Oxford, Blackwell Science Ltd.

to the other party, while the second party undertakes to reward the first party in some way (Dingle 1997)[27].

To develop a good working relationship is also one of the goals of the contracting process. If this is realized, the ensuing discussions result in a document that minimizes the risks to each party. Developing a good rapport necessitates that the parties develop a give-and-take approach, which results in a beneficial agreement for both sides to the contract (Ritz 1990; Bent 1997).

While understanding the basic principles in contracting, and the importance of the selection process of the Engineer in the initial contracting stages, we also need to be aware that there are some other contracting scenarios to consider. They are introduced in the following section.

2.1.1 'Game' Situations in Contracting

Supposing that each project is unique, a project contract represents a one-off trading encounter between the contracting parties. That is to say, it is a representation of trust in terms of each party's expectation that the other will be honest or will cheat. Dingle

[27] Dingle, J. (1997). Project Management: Orientation For Decision Makers. London, ARNOLD.

(1997) argued that there are a limited number of 'game' situations that can be visualized in any typical project contract arrangement. These are summarized as:

- ***'Assurance':*** I will if you will; I won't if you don't. In this situation parties will react until the other takes the action in order to avoid risks. The proactive behaviour of trust initiation and building cannot be seen in this situation.
- ***'Chicken':*** I will if you don't; I won't if you do. Parties will not work on a collaborative basis. Only one party will be responsible independently for the work in a specific situation. And the other party will take the opportunity to avoid the associated responsibilities or risks.
- ***'Prisoner's Dilemma':*** in which each party expects to gain by cheating, whether the other party is honest or not. In this case, if you (the other party) are honest, it pays me to take your goods and refuse to pay. Or if you cheat, it pays me not to honour my obligations in the first place.

  In this situation, each party hopes the other will take a soft line so that he can win a concession by being hard. But both parties would rather concede than let the agreement fall through because they both believe that mutual concession is mutually advantageous compared to no trade at all.
- ***'Harmony':*** Both parties prefer to be honest, whether the other party cheats or not.

  'Harmony' is rare, if we only consider material incentives to trade. But there are always possibilities for converting 'Assurance', 'Chicken' and 'Prisoner's dilemma' situations into 'Harmony'. This is done on the basis that people will respond to moral

as well as material incentives. By associating guilt with the intention to cheat, it is possible to induce honesty. Proved that the feeling of guilt is sufficiently strong, it will always pay to be honest: the result is 'Harmony'.

We can see that each individual contracting scenario implies a different contracting perception regarding trust, honesty and professional ethics. But if we consider that a project contract is not a one-off encounter, but simply one example of several similar encounters, it is worth noting that the real benefits that follow from co-operation can only be obtained through long-term commitment. This implies trust to a certain extent (Dingle 1997).

Within the above contracting scenarios, contracting parties will have different roles, responsibilities and obligations to fulfil a specific contract. The process of creation of a contract requires the responsibilities, obligations and duties of the parties to be defined clearly and unequivocally and set out in such a manner that the project is brought into reality properly and with true economy. The Owner and the Engineer have to understand clearly what their roles are throughout the contracting process. Then both parties can develop a foundation for future relationship development.

2.1.2 Roles of the Owner and Engineer in Contracting

The Owner has, as his objective, the maximization of value for money invested via capital projects. Policy decisions for the project obviously rest with the Owner. The Owner alone is responsible for the payments due to the Engineer as and when they become due and according to the terms of the contract (Haswell and Silva 1989; Fisk 1997).

Haswell and Silva (1989) argue that the Engineer has essentially two roles to play. The first is his role with the Owner derived from the contract between him and the Owner under which the appointment was made. The Engineer has to ensure the Owner obtains a finished product that is viable, and that the Owner is given due value for money. This applies to all stages of the project: the pre-feasibility stage, which usually includes an estimate of final capital cost, alternative schemes, estimated times for construction and related matters. This also applies to the pre-tendering stage, when the Engineer prepares the tender documents, designs, and drawings, and to the Engineer's subsequent assessment of the submitted tenders.

Within the tender period, the period of construction, and up to the conclusion of the contract, the Engineer has to act impartially to the Owner, the Contractors and the Suppliers. It also behoves him to be seen to be impartial. This requires skill, tact,

experience, wisdom and engineering judgement and, above all integrity: it is not in any way an easy task for the Engineer.

After understanding the basics of contracting, the typical contracting scenarios, and the general roles of the Owner and Engineer in this contracting process, it becomes necessary to have a close look at the distinctive features of contracting embodied in the Oil and Gas industry.

2.2 CONTRACTING IN THE OIL AND GAS INDUSTRY

The Owner usually selects a particular group of professionals from a consulting firm that has demonstrated competence and where the Owner's staff have established a certain level of trust in their relationship with the individuals or small groups from the Engineering organization. This suggests that a trusting relationship is critical to carry out the engineering service function. If this is the case, technical expertise by the Engineer is necessary but clearly not sufficient. One of the highest compliments that an Engineering firm can receive is to be retained in business on a sole-source basis by an Owner organization (Walesh 2000).[28]

[28] Walesh, S. G. (2000). Engineering Your Future: The Non-Technical Side of Professional Practice in Engineering and Other Technical Fields. Reston, American Society of Civil Engineers.

Gerwick and Woolery (1983)[29] explain that the petroleum industry is actually a relatively small and closed community (as are some other industries). They compete hard, buy hard, and have high demands for performance. The Owners tend to have more faith when dealing with Engineers with whom they have worked before and who they know will perform well, and who understand the Owner's needs. In this situation, the industrial decision makers (the Owners) inherently have lower trust in any newcomers and set up barriers for their entrance, even if the Owners would like to widen the source for supply of the engineering services and products that they require.

2.3 Key Considerations in Developing a Contract Strategy

In large projects, particular to the Oil and Gas industries, the amount of money subject to the provisions of the contract is likely to be large. And the contractual arrangements also display the distinctive industrial scenarios for contracting, specific roles between parties, and their respective corporate images to the public. The impact of the contract strategy at the early stages of contracting significantly impacts subsequent contract implementation.

A project contract strategy provides the contractual framework, and also sets the business rules that, in turn, affect how both parties manage the contract. Generally, there are some

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[29] Gerwick and Woolery (1983). Construction and Engineering Marketing for Major Project Services. New York , John Wiley & Sons.

fundamental components to any contract strategy. The following table summarizes the fundamental components that should be considered in order to develop a comprehensive contract strategy as identified by Smith (1995), Dingle (1997) and Chen (2000):

Smith (1995)	Chen (2000)	Dingle (1997)
· Owner's motive in employing a Engineer · Project objective · Organization system for design and implementation · Risk allocation · Terms of payment (Contract Type) · Number of Contracts · Conditions of contract · Tendering procedure	· Owner's available resource and skill level · Project size and complexity · Acceptable risk level · Project schedule expectation · Degree of new technology involved · Engineer's size and capability · Effectiveness of work division among parties · Type of contract · Quality and availability of Owner personnel to administer contracts · Details of scope definition · Total financial risk to bidder's financial strength · Supply and demand market condition · Owner's company preference on bid solicitation / evaluation and negotiation	· Scope of the work · Priorities and objectives · In-house resources · External relations · Contract price terms · Contract type · Contract control

Table 2-1 Components of the Contract Strategy

As can be seen from Table 2-1, there is a diverse understanding of the various key issues that need to be considered when developing and designing a contract strategy. On the other hand, there are also some common factors that are generally agreed as being important to consider when designing a contract strategy. The generally agreed key factors to be considered for designing a contract strategy are: scope of the work, project objectives, risk allocation, contract types and terms, and contractor selection method.

There appears to be a widespread belief that different contract strategies have different impacts on projects. Latham (1994)[30] claimed that the appropriateness of a contract strategy is dependent upon the particular circumstances of the project. Quite often the contract strategy decision is characterized by uncertainty. Owing to this uncertainty, there is a need to adjust the key factors to meet the particular project circumstances.

In order to develop a reasonable contract strategy, in the face of uncertainty, the designers of the strategy will tend to make decisions based upon application of their experience and intuition. The decision as to which contract strategy is to be used on a project is, to some extent, reliant upon the decision-makers' subjective assumptions about the probable impacts of a particular contract strategy on the project (Wang and Perry 1996)[31].

Eccles and Stovin (1998) [32] conducted an empirical study to quantitatively estimate the respective cost and time impacts of contract strategies on projects. This study concluded as follows, which are consistent with the findings of Wang and Perry (1996) regarding the subjective decisions made upon experience and intuition:

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[30] Latham, M. (1994). Constructing the Team. United Kingdom, H.M.S.O.
[31] Wang, W., Hawash, K. I. M. and J. G. Perry (1996). "Contract Type Selector (CTS): a KBS for Training Young Engineers." International Journal of Project Management 14(2): 95-102.
[32] Eccles, S. and V. Stovin (1998). Quantitative Evaluation of Contract Strategies. First International Conference on New Information Technologies for Decision Making in Civil Engineering, Montreal, Canada.

- Frequently the project contract strategy decision process is neither particularly rigorous nor transparent. Therefore it may be possible to surmise that the first step towards better contract strategy decisions is to force the decision-maker to systematically evaluate his assumptions.
- There are dissenting views about adopting a quantitative approach in evaluating contract strategy.
- The majority of the interviewed industrialists were evidently unfamiliar with probabilistic techniques and they preferred to make decisions based on their experience.

While considering some special features of Oil & Gas projects, there will be some differences in the key factors to be considered to design a contract strategy that are only suitable to the particular project circumstance. Thus it was necessary to implement a pilot phase study to identify the key factors to be considered in designing a contract strategy in the Oil and Gas industry.

On the other hand, the decision making process at the early stages of contracting relies largely on subjective evaluation. Project managers tend to apply their experience and knowledge to do these evaluations. So, this research should be qualitative in nature in order to capture the richness and depth of the insights from industrial practitioners.

2.4 SELECTION OF ENGINEER

2.4.1 Engineer Selection Methods

The methods and process for selection of the Engineer have been identified as important factors to be considered when developing a contract strategy (Smith 1995; Chen 2000). There are several different methods that can be used for selecting Suppliers, Contractors and Engineers as well. The application of different selection method is largely based on the nature of the project, its size, market conditions, and resource availability from contractors. Chen (2000) and Smith (1995) summarize several possible Engineer selection methods applied in engineering projects:

- *Competitive Bidding:* The bidding is open to a restricted number of bidders and selects the best one among them to achieve lower costs with a longer project schedule. However in the Oil and Gas industry in Alberta, Canada, often the bidder who can deliver the project in a shorter timeframe, but with a cost premium on top, will be selected. The time to market and the profits along with the early delivery are the drivers for the project.
- *Two-stage Selection:* A bidder is selected competitively early in the design process. The tender documents contain an outline specification, preliminary design and approximate quantities of the major items. As design and planning proceed, the final tender is developed from the cost and price data supplied in the initial tender.
- *Negotiated Selection:* This method can be used when there are experienced negotiators who have a thorough understanding of project costs and fully defined technical specifications. The negotiations usually are held with one or

two bidders. The partnering approach tends to result in selection of the right bidder in a shorter time, with cost benefits to both parties. In this case, the time in solicitation of the qualified bidders is saved, and it reduces the transaction cost associated.

- *Continuity Bidding:* Bidders are competitively tendering on the basis that they are informed that the successful party may be awarded continuation contracts for similar projects based on the original tender.
- *Serial Bidding:* The bidder enters into a series of contracts, usually to a minimum total value. The alliance approach can be used to ensure benefits in the longer term.
- *Term Project Selection:* The bidder undertakes a known type of work, but without knowing the amount of the work, for a fixed period of time.

2.4.2 Engineer Selection Process – Competitive Bidding Procedures

Normally for large-investment projects: particularly in Oil and Gas industry, competitive bidding is used to select the Engineer. The competitive bids are for the purpose of outlining the objectives of the contract policy, and its application. Smith (1995) explained the objectives of the design Engineer selection process are to ensure that:

- The Owner's policies and procedures regarding Engineer selection are clearly stated and applied;
- The Owner's authority and responsibility for the preparation, award and control of contracts are defined;

- Appropriate input from different functional groups is incorporated at each stage of the selection process;
- Information passes in an orderly manner to those bidders, on a need-to-know basis;
- The best interests of the Owner and its staff are protected and safeguarded.

The process of competitive bidding can be designed in several different ways as well in order to achieve the above objectives. **Table 2-2** briefly summarizes the bidding procedures generally applied by Owners in selecting the engineering consultants (Smith 1995; Chen 2000; Walesh 2000):

Smith (1995)	Chen (2000)	Walesh (2000)
· Contract planning · Engineer prequalification · Contract Document preparation · Collation and issue of tender packages · Queries from tendering contractors · Bid review of particular engineering aspects · Bid conditioning & evaluation · Contract development and award	· Procurement strategy · Engineer prequalification and screening · Selection of bidders · Preparing bid invitation · Establishing selection criteria · Issuing bid invitations · Engineer proposal preparation · Bid review · Contract negotiation and award	· Decide on retaining a consultant from outside · Identify potential consultants · Request statements of qualification · Create short-list · Send request for proposals (RFPs) · Reduce list of consultants · Interview remaining consultants · Rank consultants · Negotiate contract and award

Table 2-2 Procedures of Competitive Bidding

Walesh (2000) presents the detailed process of selecting an Engineering consultant, which is generally adopted in the North America engineering consulting services. The

detailed step-by-step process is described as **Figure 2-1** and is explained in the following section, however certain steps may be omitted in the private sector.

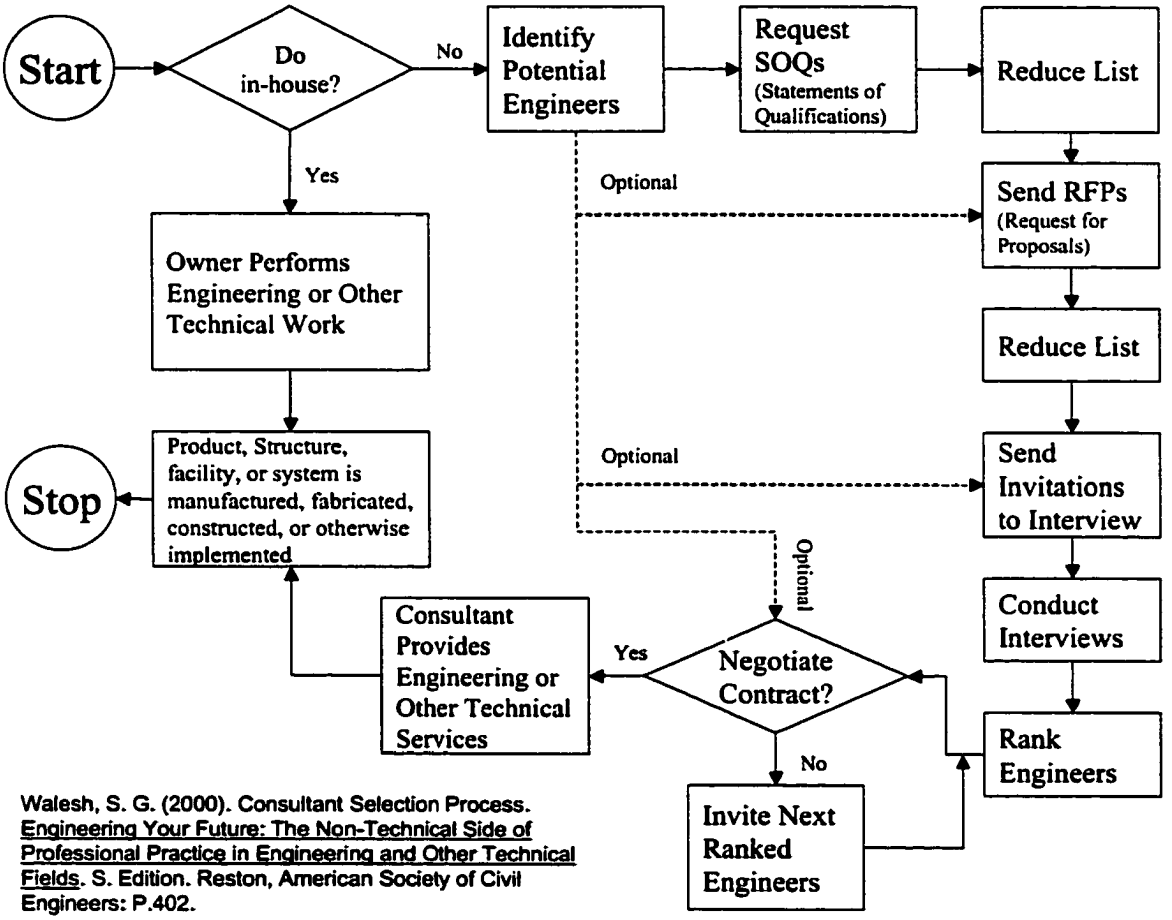

Figure 2-1 Engineering Consultant Selection Processs

(1) *Ask 'do it in-house?':* The Owner determines whether or not an Engineer will be retained for a project.

(2) *Identify potential Engineers:* The Owner will assemble a list of the potential consultants by using first-hand personal knowledge, referrals from colleagues, formal directories of engineering organizations, business cards appearing in professional publications, and even the Yellow pages in telephone books.

(3) *Request statements of qualification:* After screening the list, the Owner requests statements of qualifications (SOQs) from the Engineers that presumably have the ability to provide the necessary services. An SOQ focuses on qualifications of the Engineering firms with emphasis on their experience in the projects similar to the one being considered by the Owner. The checking of a firm's references – a representative list of current and past clients – can be a very effective way to screen consultants.

(4) *Create short list:* The Owner's representatives review the SOQs. They match the perceived needs of the project with their interpretation of the experience and ability of each Engineering firm.

(5) *Owner sends requests for proposals (RFPs):* The Owner invites the Engineering firms remaining on the list of eligible contractors to describe how they would complete the specific project. The Owner often asks interested firms to include an estimate of the cost of their services. The Owner may conduct, as part of the RFP process, an explanatory meeting for all Engineers intending to submit a proposal. These meetings serve two purposes. First, all the Engineers receive the same

information, including the answers to questions. Second, the Owner has an opportunity to meet representatives of the Engineering firms.

(6) *Owner reduces list of consultants:* Some Engineers are eliminated from further consideration by using the project-focused information provided by the Engineers or Owner's representatives.

(7) *Owner interviews the remaining Engineers for the project:* At this stage, the Engineering firm will re-visit their initial decision to pursue the project. The Engineering firm's team usually consists of a principle of the firm – the person who would manage the project, and members with expertise specifically related to the project. The Engineering team attempts to develop rapport with the Owner's selection team and the Owner's selection team tries to determine if a good working relationship could be established with the Engineer's project team.

"Although difficult to measure and sometimes denied, interpersonal "chemistry" probably becomes a significant factor at this point in the overall selection process because the Owner and each potential Engineer are now interacting with each other in a manner that roughly approximates the working relationship that would exit on the project." (Walesh 2000)

(8) *Owner ranks the Engineers:* The evaluation is based on the interview, and on the additional consideration of the proposal received prior to the interview.

(9) *Owner and the first-choice Engineer try to negotiate a contract:* The first-ranked Engineer is invited to prepare a contract for professional services and present it in

draft form to the Owner as the basis for negotiation. Typically the representatives of the Owner meet with the representatives of the Engineer to review the document in detail and to arrive at a mutually agreeable contract.

2.4.3 Engineer Evaluation Criteria

After understanding the selection procedures of the Engineer as described earlier, it is necessary to have a close look at the criteria used to evaluate the Engineers. Understanding the evaluation criteria can help both parties prepare for better decisions and performance in the selection process.

Many owners fail to develop evaluation criteria before issuing the bid inquiry. Sometimes, the evaluation criteria are developed after bids were received to favour a targeted bidder. This practice is unfair to the bidders and prevents the Owners from selecting the best value contract proposal. Evaluation criteria should be an integral part of procurement planning in order to meet the unique requirements of different contracting settings (Haswell and Silva 1989; Chen 2000).

Owners also have a tendency to keep the evaluation criteria as a secret. On the contrary, it is best to share some or all of the evaluation criteria with the bidders. This will ensure that the bidders are fully aware of the bid evaluation process. Thus, the bidders are able to

provide the necessary information in an expected form to facilitate the bid evaluation(Dingle 1997; Walesh 2000).

From the literature review, a consensus can be seen on the evaluation criteria of specific aspects of the Engineers' experience and capability in project management, project design, project control, project procurement, project safety, quality control, and past experience with a particular Owner (Wong, Holt and Cooper 1999; Chen 2000). Chen (2000) says that the evaluation criteria generally focus on three crucial parts in selecting a service-oriented Engineering firm: (1) Technical evaluation, (2) Project execution plan, and (3) Commercial evaluation. He presents a sample evaluation scheme that summarizing the different considerations in conducting the technical and commercial evaluation:

Technical Evaluation Criteria		**Commercial Evaluation Criteria**
General Conditions	**Project Specifics**	
· Approach to safety; · Approach to project execution; · Approach to construction; · Proposed control system; · Approach to quality assurance and quality control; · Management commitment to project; · Approach to procurement; · Size of project handled; · Size of company; and · Stability of company.	· Process design experience and resources; · Design disciplines' experience, depth, breadth, quality and efficiency; · Key personnel's experience together in function, project manager, Engineer, process leader, and cost Engineer; · Understanding of scope; · Experience in geographical area; and · Experience with Owner's other projects	· Bid price; · Overheads and profit; · Contract terms; · Insurance and bonding limits; · Financial strength; · Risk management and allocation;

Table 2-3 Sample Evaluation Factors for Engineer Selection

Defining the evaluation criteria is not enough for the assessment, however because the establishment of the selection criteria involves two tasks: (1) the determination of the criteria, and (2) the development of the weighting factors to the criteria. Chen (2000) publishes an example evaluation scheme with weighting factors for the Engineer selection:

Criteria	Weight	Rating 1-10	Weighted Score
Project Management · Organization · People posed · Procedures · Quality control	**20**		
Process Design · Experience on similar process · Process safety · Ease of operation · Maintainability · General labour · Process reliability	**25**		
Cost and Schedule Control · Control systems: costs – earned value system, scheduling system · Reporting – type and frequency · Preparation of detail estimate	**20**		
Design Capability · Civil/structural · Electrical · Instrument/controls · Mechanical · Piping · Incorporate safety in design · Value engineering · Design standards · Constructability – involve Engineer · Innovation to support fast-track project	**20**		
Procurement · Procedures · Interface with Owner	**10**		
Other · Experience at Owner's site	**5**		
Maximum Score Possible = 100	**100**		

Table 2-4 Sample Evaluation Scheme with Weighting Factors

From the above sample evaluation scheme we can see that: (1) there is some flexibility in rating the individual criterion under a particular weighting category. It thus creates a myth of how the ratings are distributed among different evaluation items under one weighting category. This rating scheme is always kept confidential by most of the Owner Companies in this research as well. (2) the majority of the weight is related to the evaluation of the Engineer's technical resources and capabilities to deliver the project, such as quality of design, quality control, cost and schedule control, procurement procedures, etc. (3) some criteria with limited weight are used to evaluate the Engineer's project management resources and experience, such as the project organizational structure, proposed project management personnel, interface with the Owner, and experience with the Owner. In the bidder evaluation process, most effort is given to assessing the traceable and auditable hard facts in order to test the Engineer's ability in delivering the project. Limited attention is exerted on subjective measurement such as the quality of the Engineering service, and the willingness to deliver a successful project. And no attention is paid to evaluating the compatibility of organizational policies and procedures between two parties, efficiency and quality of communication, and the possibility of the meeting of minds, etc.

One recent multinational study shows that the Owners of downstream petroleum and chemical companies in the US and Europe rank quality of key personnel as their number one consideration in choosing the Engineer. The second and third factors respectively

were project management capability and the Engineer's price.[33] The results show that Owners are starting to become more aware of the importance of project management and related skills. The selection of key project personnel can help develop a good working relationship between the Owner and Engineer's project teams.

From the above evaluation criteria we can see that there is still a tendency to emphasize the Engineer's technical capability and resources, and the commercial terms of his bid. More often, the direct result of this tendency is to pick the lowest price bid instead of the best value bid. Reflecting on this failure, one of Ewards Deming's 14 points for management suggests that companies should end the practice of awarding business on the basis of price (Deming 1986; Hybert 1996).

One reason for an Owner's failure to pick the best-valued bid is that they are often unable to define their needs sufficiently at the beginning. The Owner is unable to develop proper evaluation criteria to compare the bids on an apples-to-apples basis either. What are the measures that the Owner can apply to compensate for the situation where the evaluation criteria cannot be fully designed? Whether 'trust' can function as a supplementary evaluation criterion, which is highly valued as important to the relationship between parties, becomes a valuable area for further study in this research. How the level of trust existing between the contracting parties influences the final evaluation and selection of

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[33] Anonymous (2001). "Personnel Quality Key To Selection." Oil & Gas Journal 99(18): 60-62.

the Engineers, becomes critical to understanding how to improve the Engineer selection process.

2.4.4 Features of Evaluation Criteria

From the above sample evaluation criteria there are several important trends in Engineer selection can be identified:

- Most of the evaluation criteria relate to the Engineer's ability and resource availability for delivering projects in order to meet the cost, quality and safety requirements within a determined time frame. These evaluation criteria are used to assess the tangible and auditable records of the Engineers in an objective way.
- Some attention is given to evaluating the Engineer's management systems and processes to ensure successful project delivery. These criteria are used to try to understand the Engineer's organizational compatibility with the Owner's organization in order to reduce cultural clashes in future project.
- Some evaluation criteria are to examine the Engineer's experience in similar projects, technologies, geographical areas, project markets, and with specific owners. This provides a foundation to assess consistency in the Engineer's performance. However, more detailed assessment criteria should be developed to measure the quality of the Engineering service rather than just the Engineering product.
- A small amount of evaluation focuses on assessing the Engineer's ability to understand Owner's mind, needs, and project philosophies. This implies that price is

not the only and last measure for selection of engineering service providers. More effort should be exerted to test the willingness of the Engineer to provide a better service to the Owner and also safeguard the Owner's benefits.

2.5 SUMMARY

From the above literature review, the following gaps can be summarized:

- The effort is required to identify the various contracting factors that have to be considered at the early stages of contracting in the Alberta Oil and Gas industry. Quite often these contracting factors are more dynamic and should be adjusted according to particular project environment.
- The research is needed to identify the appropriate Engineer selection method and process in the Oil and Gas industry, particularly that of Alberta, Canada. Some of the Engineer selection method and process proposed in literature are not applicable in the Oil and Gas industry to a certain extent.
- The practice of applying the featured Engineer selection criteria in the Oil and Gas industry needs to be explored. Questions of how do project managers apply the defined evaluation criteria and make their decisions needs to be answered in this research.

CHAPTER 3 CONCEPTUAL PARADIGMS OF TRUST

This chapter discusses the various single definitions of trust and differentiates trust from other similar concepts. It provides extended literature reviews regarding the multi-dimensional understanding of trust, and introduces the identities of trust at both the interorganizational and interpersonal levels. This chapter further discusses the dynamics of trust between parties over time at both the interorganizational and interpersonal levels. Finally it discusses the importance of applying a multi-dimensional trust module in project management to understand the behaviours of trust in the working relationship between contracting parties.

3.1 DEFINITIONS OF TRUST

Cullen, Johnson and Sakano (2000) propose that trust is one of the important areas of relationship capital, which consists of the socio-psychological aspects that are positive and beneficial to both of the parties in a relationship. As they define it, trust is based on beliefs by one party about how the other will behave in the relationship. Can our partner be trusted? Is he reliable? Would he do something to harm me? Will he take care of the relationship and me? Deutsch (1960)[34] defines trust by stating that the individual must have confidence that the other individual has the ability and intention to produce the

work. Cook and Wall (1980)[35] give a similar definitions to trust as "the extent to which one is willing to ascribe good intentions to, and have confidence in, the words and actions of other people."

Mayer, Davis and Schoorman (1995)[36] define trust as the willingness of the 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. This definition of trust is applicable to a relationship with another identifiable party who is perceived to act and react with goodwill.

Not only can trust be seen between individuals, but trust can also be extended to the relationship between larger groups of individuals, between two organizations or institutions. Denny (1990) of the CII Contracts Phase II Task Force has defined trust as: "the confidence and reliance one party has in the professional competence and integrity of the other party to successfully execute a project in the spirit of open communication and fairness"[37]. This definition emphasizes two components of trust as competence and

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[34] Deutsch, M. (1960). "The Effect Of Motivational Orientation Upon Trust And Suspicion." Human Relations **13**: 123-140.
[35] Cook, J. and T. Wall (1980). "New Work Attitude Measures Of Trust, Organizational Commitment, And Personal Need Nonfulfillment." Journal of Occupational Psychology **53**: 39-52.
[36] Mayer, R. C., J. H. Davis (1995). "An Integrative Model Of Organizational Trust." Academy of Management Review **20**(3): 709-734.
[37] Denny, J. T. (1990). Cost-Trust Relationship Preliminary Study. Department Of Civil Engineering, Worcester Polytechnic Institute.

integrity. In any contracting or business relationship, one must be reasonably certain that the other party has both the administrative and field knowledge, experience, ability and resources to perform the work. Inherent in this is the belief in the other party's willingness to seek out additional resources, if necessary, to perform the work. The second part of the definition addresses the idea that one party must have faith that the other party has a genuine concern for the other's welfare rather than only a concern for its own welfare.

3.2 Trust and Other Concepts

The brief definitions of trust in the relationship between individuals or organizations provide some conceptual framework to understand the meaning of trust. However, quite often there are several notions that have been used synonymously with trust, which have obfuscated the nature of trust. Among those notions are *cooperation*, *confidence*, *predictability*, and *respect*, which are perceived to be easily confused with trust.

3.2.1 Trust vs. Cooperation

Although trust can frequently lead to cooperative behaviour, trust is not a necessary condition for cooperation to occur, because cooperation does not necessarily put a party at risk (Mayer, Davis and Schoorman 1995). Cooperation with someone can happen whenever there is no real trust toward that individual. If there are external control

mechanisms that will punish the trustee for deceitful or dishonest behaviour, if the issue at hand doesn't involve vulnerability to the trustor over issues that matter, or if it is clear that the trustee's motives will lead him or her to behave in a way that coincides with the trustor's desires, then there can be cooperation without trust.

3.2.2 Trust vs. Confidence

Confidence arises as a result of specific knowledge, which can become routine. It is built upon reason and fact. In contrast, trust is not always rooted in past experience with others, nor in the facts (Shaw 1997)[38]. Luhmann (1988)[39] proposes a distinction that helps to differentiate trust from confidence. He argues that trust differs from confidence because it requires a previous engagement on a person's part, recognizing and accepting that risk exists. The distinction depends on perception and attribution. If you do not consider alternatives (every morning you leave the house without a weapon!), you are in a situation of confidence. If you choose one action in preference to others in spite of the possibility of being disappointed by the action of others, you define the situation as one of trust.

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[38] Shaw, R. B. (1997). Trust In The Balance: Building Successful Organizations On Results, Integrity, And Concern. San Francisco, Jossey-Bass Inc.
[39] Luhmann, N. (1988). Familiarity, Confidence, Trust: Problems and Alternatives. Trust. D. G. Gambetta. New York, Basil Blackwell.

3.2.3 Trust vs. Faith

Trust, however, is not absolute faith. Faith can be seen as a belief that is largely immune to contradictory information or events, if it is in the most extreme form. Pure faith is beyond reason. People with such faith can justify any event or view, even if it conflicts with their worldview. This is what we mean by "blind faith" (Shaw 1997).

Faith is resistant to change even when it is detrimental to have the faith of being a 'believer'. However, trust is commonly understood as being more fragile than faith. Trust can be broken more readily by events of considerably less significance than those that might damage faith.

3.2.4 Trust vs. Predictability

Both prediction and trust are the means to reduce uncertainty (Lewis and Weigert 1985).[40] Much of the literature tends to equate predictability with trust. However, to be meaningful, trust must go beyond predictability (Deutsch 1958).[41] If we are to equate the two, it is to suggest that a party can be expected to consistently ignore the needs of others and act in a self-interested fashion. It is simply because the party's behaviour and

[40] Lewis, J. D. and A. Weigert (1985). "Trust As A Social Reality." Social Forces 63: 967-985.
[41] Deutsch, M. (1958). "Trust And Suspicion." Journal of Conflict Resolution 2: 265-279.

performance is predictable. What is missing from such an approach is the willingness to take a risk in the relationship and to be vulnerable.

Trust can be differentiated from the above notions – cooperation, confidence, faith, and predictability. There is some common ground between trust and these notions, but there are some important differences too. This set of difference helps to present the multi-dimensional features of trust, which cannot be explained thoroughly through any single definition.

3.3 Multiple Dimensional Understanding of Trust

Scholars have proposed that trust has a "bandwidth", in that it is composed of several dimensions. It can vary in scope as well as degree depending on the situation. More often, trust takes different forms in different relationships (Rousseau, Sitkin, Burt and Camerer 1998).

3.3.1 Mechanics of Trust

3.3.1.1 Rational and Emotional Trust

Some researchers believe that trust between parties is rooted in two distinct bases, one rational and the other emotional (Moorman, Deshpande and Zaltman 1993; Kramer 1999). Brief descriptions of the two components of trust are as below:

Credibility trust, the rational component of trust, is the confidence that the partner has the intent and ability to meet her obligations and make the promised contributions to both parties. This is the practical side of trust. It concerns belief about whether or not a partner can really deliver what she promises. Can the partner be relied upon in alliance activities and operations? Does the partner have the expertise and resources she says that she has? Beyond this, lies the question about whether or not the partner will use and apply her expertise and resource to the operation.

Benevolent trust is the belief that one partner will behave with goodwill toward the other. Benevolence is the subjective or emotional side of trust. It has more to do with one's beliefs regarding a partner's caring about the relationship. Can the partner be trusted not to harm the alliance? Can the partner be trusted to protect and preserve the alliance even when conditions change?

Credibility trust, first tests the ability of one party to meet the obligations. It also tests one party's intent to meet the obligation agreed between parties. Thus, there is the willingness to trust evolving with the capability to trust. In other words, benevolent trust tests parties' integrity and the care-taking perspectives of trust.

McAllister (1995) and Johnson, Sakano and Voss (1998) provide some other empirical findings showing that trust has both cognitive-based and affect-based dimensions as well. These findings confirm the existence of both the rational and emotional dimensions of trust. Also these findings further disclose the features of the emotional side of trust.

Cognitive-based trust reflects technical competency and a fiduciary obligation to perform and is based on predictability, past behaviour, dependability, and fairness. It relies on a rational evaluation of another's ability to carry out obligations.

Affect-based trust is rooted in emotional attachment, care and concern for the other party's welfare. There is an intrinsic value to the relationship itself and a belief that the other party feels the same way.

These two-dimensional definitions of trust recognize the distinction between relational and emotional trust. Emotional trust is more about an individual trait, which determines the individual's expectancies about the trustworthiness of others in general. That distinction is important because high relational trust does not imply naively trusting all exchange partners. Rather, relational trust is likely to be based on the individual's particular experience and interaction with a particular exchange partner.

3.3.1.2 Multi-dimensional Trust

Zaheer, McEvily and Perrone (1998) did their investigations within 107 sample organizations and identified the trust performance in the buyer-supplier interfirm relationships. Their findings extend the trust definition into three components in practice. Firstly, trust is to expect the party can be relied on to fulfill obligations; secondly, the party will behave in a predictable manner; and thirdly, the party will act and negotiate fairly when the possibility for opportunism is present.

This definition of trust explicitly allows for the possibility of betrayal, which most people view as an inherent feature of trust. In this definition, the complexity of trust is captured by proposing the three components of trust – reliability, predictability, and fairness – into both interpersonal and interorganizational trust.

Shapiro, Sheppard and Cheraskin (1992)[42] propose there are three dimensions of trust operating in the development of a business relationship: deterrence-based trust, knowledge-based trust, and identification-based trust.

> ***Deterrence-based trust*** is based on the consistency of behaviour – that people will do what they say they are going to do. Behavioural consistency is sustained by the threat of punishment.
>
> ***Knowledge-based trust*** is grounded in behavioural predictability – a judgement of the probability of the other's likely choice of behaviours. It occurs when one has enough information about others in order to understand them and accurately predict their likely behaviour.
>
> ***Identification-based trust*** is based on a complete empathy with the other party's desires and intentions. At this level, trust exists because each party effectively understands, agrees with, empathizes with, and takes on the other's values. More often it is also because of the emotional connection between them, which helps both parties to pass the chemistry test and act for the other.

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[42] Shapiro, D., B. H. Sheppard (1992). "Business On A Handshake." Negotiation Journal 8(4): 365-377.

Lewicki and Bunker (1995)[43], Sheppard and Tuchinsky (1995)[44] and Bechtel (1998) [45] describe three dimensions of trust based on the further understanding of earlier research. They also replace and enrich the "Deterrence-based Trust" with the new dimension "Calculus-based Trust". They argued that: Calculus-based Trust is based on control or assuring that the other party will do what they say. It is grounded not only in the fear of punishment for violating trust but also in the rewards to be derived from preserving it. The threat of punishment is likely to be a more significant motivator than promise of a reward. Calculus-based trust often involves a high degree of monitoring to assess whether a party is being opportunistic. Calculus-based trust is fragile and therefore any violation of trust has the potential to significantly alter or even end a relationship.

Building on earlier classification of trust, Sabherwal (1999)[46] further modified and enriched the meaning of the existing three dimensions of trust. Adding performance-based trust makes this multi-dimensional definition of trust somewhat applicable to the project management arena. He modifies the dimensions of trust as follows:

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[43] Lewicki, R. J. and B. B. Bunker (1995). Developing And Maintaining Trust In Work Relationships. Trust In Organizations: Frontiers Of Theory And Research. R. M. Kramer and T. R. Tyler. Thousand Oaks, Sage Publications: 114-139.

[44] Sheppard and Tuchinsky (1995). Micro-OB And The Network Organization: 140-165.

[45] Bechtel, C. (1998). An Investigation Into The Antecedents Of Trust In Cooperative Buyer-Supplier Relationships. Department Of Marketing And Supply Chain Management, Michigan State University.

[46] Sabherwal, R. (1999). "The Role Of Trust In Outsourced IS Development Projects." Communications Of The ACM 42(2): 80-86.

Calculus-based trust is rooted in the rewards and punishments associated with a particular project. For example, the Owner trusts and cooperates with the Engineer. The Owner will apply structural controls and penalty clauses in order to minimize opportunistic behaviour and inconsistent performance to a certain extent. Establishing control structures (such as reporting mechanisms and frequencies, change-management procedures, and Owner-involvement plans) early in a project inspires confidence about the project outcome. Calculus-based trust is facilitated through the Owner's recognition of the Engineer's desire to contract future projects with good will.

Knowledge-based trust depends on the two parties knowing each other well. Experience is shared between parties on other projects as well. Knowledge-based trust may be facilitated through a 'courtship', through which the participants seek to know each other well before starting the project. This familiarity can also be facilitated by an initial meeting between several senior executives. This meeting is a critical chemistry test between the parties.

Identification-based trust is based on identification with the other party's desire and intentions. Each party comes to understand what they must do to sustain the other's trust. Identification-based trust is also characterized as having: collective identity, collocation of personnel, creating joint products or goals, and commonly shared values. It can be developed through shared goals and through early team building efforts. By bringing together key project participants and emphasizing shared goals, the project managers help participants identify with the overall group.

Performance-based trust depends on a project's early successes. Accomplishing project goals can help improve the cooperation and trust, whereas the

> performance problems can cause conflict and distrust. In some projects, jointly celebrating completion of interim deliverable, improved the participants' trust for one another. Sometimes, the demonstration of the completed portion of trust also helps. Instead of just saying 'trust me', we want to have something tangible to show the existence of trust.

As we can see from the above, calculus-based trust is more focused on consistency of performance in the future, which can be substituted through structured control mechanisms. More often the punishment system is associated with calculus-based trust in order to safeguard and maintain the existing trust level in the relationship. Identification-based trust talks about goal sharing and caring taking place between the parties. It requires frequent communications and interactions between the parties in order to develop the acquaintance. Knowledge-based trust happens with the thorough understanding of each other, emotional connection and chemistry tests between parties.

3.3.2 Identity of Trust – Interpersonal and Interorganizational Trust

When discussing the single and multi-dimensional definitions of trust, there is a mixed understanding of trust behaviours at the interpersonal and interorganizational level. More often, one definition can only be applied to explain trust in a personal relationship, and the other can be limited within an alliances or collaborative business relationship. There is a need therefore, to break down trust into those two levels, and understand how trust performs separately at the personal and organizational level.

3.3.2.1 Interpersonal Trust

Williamson (1993)[47] defines the interpersonal trust as characterized by the absence of monitoring. The favourable or forgiving predictions are present in relations with family and friends. While, more often safeguards will be designed within business relations. Mayer, Davis and Schoorman (1995) remark that the interpersonal trust is about the ability, benevolence, and integrity of the trusting individuals. McAllister (1995) explains trust between individuals as "the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decisions of another".

However, the problem is that these definitions tend to focus on personal expectations and close interpersonal relationships. Thus, they fail to provide a global picture of the emergence of trust between individuals from different organizations through a managerial perspective.

Beccerra and Cupta (1999)[48] propose three dimensions of trust in interpersonal relationships as well, which provides an understanding of trust between individuals in a business relationship: (1) Attitude-focused trust: trust in the other person's honesty and

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[47] Williamson, O. E. (1993). "Calculativeness, Trust, And Economic Organization." Journal Of Law And Economics 32: 458-486.

[48] Beccerra, M. and A. K. Cupta (1999). "Trust Within The Organization: Integrating The Trust Literature With Agency Theory And Transaction Costs Economics." Public Administration Quarterly 23(2): 177-203.

benevolence; (2) Behaviour-focused trust: trust in the other person's behaviour; (3) Competence-focused trust: trust in the other person's ability to do what is required.

3.3.2.2 Interorganizational Trust

Companies differ in organizational cultures and management philosophies. They differ in their routine policies and procedures as well. When the parties from different organizational cultures get into a contract, these differences are magnified and commonly generate misunderstandings. Even for the most financially rational relationship, without a continuous investment in building commitment and trust, the differences between contracting companies can greatly inhibit the success of a contract (Cullen, Johnson and Sakano 2000).

Serrambana (1991) argues that trust is the lubrication that makes it possible for organizations to work. It is hard to imagine that an organization without the appearance of trust could operate. Thus trust can be applied to many facets of an interorganizational relationship, such as:

(1) How much confidence do you have in the other parties' competence and ability to do what is being asked of them?

(2) How sound do you believe the other party's judgement is?

(3) How much do you believe the other party is willing to help you?

(4) How certain are you that the other party does not desire to harm you?

Zaheer, McEvily and Perrone (1998) define interorganizational trust as the extent of trust placed in the partner organization by the members of the focal organization. Interorganizational trust describes the extent to which the organizational members have a collectively held trust orientation toward the counter organization. It is quite different from simply saying that the organizations trust each other.

Most of the authors have approached trust as a "collective attribute" based upon the relationships between the people that existed in a professional community. Zucker (1986)[49], for example, defines trust at the interorganizational level as a set of logical expectations shared by everyone involved in an economic exchange. As for organizational trust, it is a collective orientation toward another organization. It becomes obvious, that collective nature of trust eliminates the emotional attachment between organizations. Generally it is believed that organizations are incapable of having emotion. So organizational trust remains cognitive and logic in nature to a certain extent.

3.3.2.3 Interpersonal Trust and Inter-organizational Trust

The connection between interpersonal and interorganizational trust is based on the organizational interaction processes. This has been proposed and explained by Zaheer,

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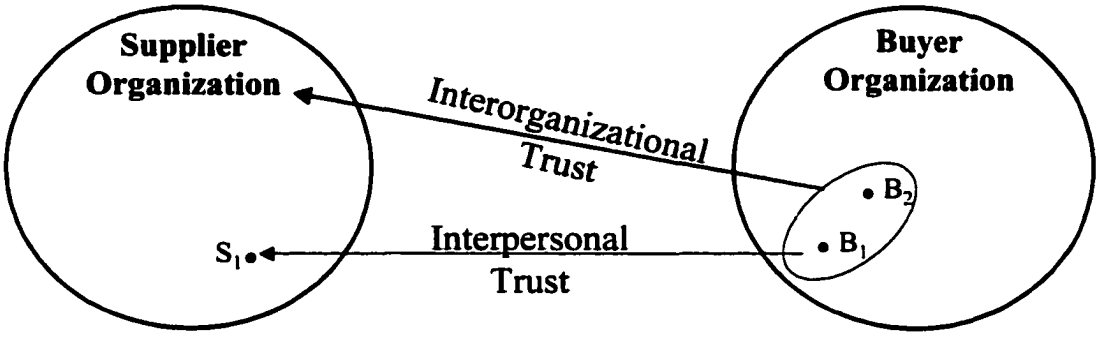
[49] Zucker, L. G. (1986). Production Of Trust: Institutional Sources Of Economics Structure, 1840-1920'. Research In Organizational Behaviour. B. M. Staw and L. L. Cummings. Greenwich, JAI Press: 53-111.

and McEvily (1998). These authors argue that as the relationship between organizations is faceless and monolithic, it is more actively handled and managed by a small group of individuals at the boundaries of the respective organization, i.e. "boundary spanners". This group of boundary spanners is more closely involved in the interorganizational relationship than other members of the organization, and tends to interact with its counterparts to a greater extent than others in the organization. (See ***Figure 3-2***)

The relationship between two firms evolves into deeper and more stable cooperative arrangements over longer time and through repeated interaction. Although individuals functioning at the organizational boundaries come and go, role definitions are more stable and enduring. Organizational interaction processes regulate the informal commitments made by individuals at the organizational boundaries in the established and taken-for-granted organizational structures and routines over a period of time. Thus, as new individuals enter the interorganizational exchange relationship, they become accustomed to the norms of the small mixed community. Norms from the interorganizational relationship are internalized and recreated through the "boundary spanners" and their interpersonal trust orientations toward each other as well. At the same time, interpersonal trust is recreated. In turn, the trust orientations of the individuals at the organizational boundaries influence the orientations of the interorganizational trust. The creation and re-creation of trust at the interpersonal and interorganizational levels is akin to the

connections of trust at those two levels. In sum, these arguments imply that interorganizational trust and interpersonal trust exert a positive influence on each other.



S1 – Primary Boundary Spanner	B1 – Primary Boundary Spanner B2 – Secondary Boundary Spanner

Source: Zaheer, A., B. McEvily (1998). "Does Trust Matter? Exploring The Effects of Interorganizational And Interpersonal Trust On Performance." Organization Science 9(2): 141-159.

Figure 3-1 Interorganizational and Interpersonal Trust

3.3.3 Mixed Trust Model

There are some researchers who developed an understanding of trust based on the identification of trust performance at both the interpersonal and interorganizational levels. Meanwhile they also took trust into consideration through a multi-dimensional perspective. These notions of trust quite often can be applied both in the personal relationship and the business relationship.

Shaw (1997), based on his experience as a management consultant and his research findings, argues that trust is built on three basic imperatives: *achieving results, acting with integrity, and demonstrating concern.*

> ***Achieving Results:*** is perhaps the most important imperative in earning trust in a business setting – or indeed, in any setting that demands action and results. It involves people's performance in fulfilling their obligations and commitments. Even if people's motives are characterized by goodwill, they will not retain our trust if they are incompetent or powerless to fulfil the expectations we have for them. In such cases, we deem them unworthy of trust not because they are malicious but because they can't deliver, which implies the issue of competence and ability to produce results.
>
> ***Acting with Integrity***: by integrity, the author means the honesty in one's words and consistency in one's actions. In most cases, people trust those who behave consistently in their words and actions, and who truly live by the motto of 'we do what we say we will do.' Thus, trust requires most importantly that the expectations in a given situation should be fulfilled. Gaps between what is anticipated and what actually occurs give rise to distrust. Inconsistency in words and actions is one of the most important indicators that others are incompetent or perhaps malevolent. Meanwhile, the impact of integrity on trust is particularly important early in the history of a relationship. At that time, each side assesses the degree to which it is willing to risk the vulnerability.
>
> ***Demonstrating Concern***: at the most basic level, we trust those who care about us. We trust those whom we believe understand our concerns and will act in a way that meets or at least does not conflict with our needs. This element of

> concern involves the degree to which we believe others are supporting our own well-being. We expect those we trust to remain loyal to our interests even if future events provide an incentive to do otherwise. It does not require that those we trust subjugate their own needs in all situations, but we do assume that these individuals will not deliberately hurt us or take advantage of our reliance on them.

Serrambana (1991) in his research of trust and construction cost summarized one multi-component trust model as below:

- A belief that both parties will do what they say they will do;
- A willingness for both to risk being vulnerable to the other party, supported by the belief that neither party will take advantage of the situation;
- The ability to have candid communication about how each party sees the relationship;
- Sensitivity to each other needs.

Trust takes different forms in different relationships and in various business contexts as well. Trust behaves in the form from a calculated weighting of perceived gains and losses to emotional responses based on interpersonal attachment and identification. Interorganizational exchanges may emphasize calculus-trust more, whereas a communal relationship might emphasize identification-trust. However, even in the same context, the mixture of multi-dimensional trust may vary, depending on the history of the relationship, the stage of development, and the cues and signals from other parties in the immediate setting.

The above researchers have studied trust and tried to understand and explain it from different perspectives, and in different business contexts as well. However, we still do not have a well-developed multi-dimensional trust model, which can be applied in project management.

3.3.4 Trust Colour Model

Hartman (2000) identifies the "Trust Colour Model", which is based on a detailed study of literature, and some scholars conducted extensive research work on different issues related to project management. This model is composed of three distinct types of trust which carry labels based on the three primary colours – 'Blue Trust', 'Yellow Trust' and 'Red Trust'. The following sections present excerpts of the "Trust Colour Model" (Hartman 1999; Hartman and Romahn 1999; Hartman 2000).

3.3.4.1 Blue Trust

Blue Trust: answers the question: ***"Can you perform or do the task?"*** It can be interpreted as the reliance on the competence of the other party as a basis on which to do business. This type of trust can be transferred through reference, track record, reputation and other traceable and auditable vehicles. In other words, we look for the tangible evidence in some form that helps us to build a knowledge-based picture of that party's capability.

Several researchers have addressed the competence dimension of trust as well (Bulter 1983; Bechtel 1998). Gabarro (1978) even breaks competence-based trust into two key areas. First, the 'specific competence' is trust in the other's specific function or area. Second, 'interpersonal competence' is the ability of a person to work with people. However, Blue Trust in the "Trust Colour Model" not only emphasizes competence trust at the personal level but also at the interorganizational level.

Blue Trust is the type of trust that many people are comfortable with. We can prove or demonstrate how we arrived at that trust, and that means we can justify it most readily. This type of trust is relatively simple and measurable, and is the apparent basis on which most relationships are established. It has one other useful attribute - the most predictable of the three. Blue Trust is the most stable and measurable form of trust. Once, there is Blue Trust in place, we can generally be more confident that this type of trust will be justifiable in the future. Equally, of the different trust types, a breach of Blue Trust will have the smallest impact on a relationship.

Blue Trust is represented with an icon – a stepped pyramid. (*See Figure 3-2*) The steps represent the plateaus of trust that we have for the competence of a person or organization. Generally, we build this trust by granting the trustee more responsibility in steps. If a trusted person – who has done something well for many years, suddenly fails to

perform, then we may drop our trust level a bit. It would be unusual to drop it entirely. Hence the steps can go up or down.

3.3.4.2 Yellow Trust

Yellow Trust: addresses the answer to the question: ***"Can I rely on you to care for my best interests and will you behave consistently?"*** The first component of the question addresses whether or not the person or entity we wish to trust will take care of our interests. The second part of the question determines whether these interests will be cared for consistently. It represents our ability to rely on others to preserve our interests. It requires direct experience in a relationship before we are comfortable with the level that we are willing to work with.

Similarly, Bromily and Cummings (1992)[50] propose that trust is the expectation that another individual or group will: (1) have good faith and make an effort to behave in accordance with their commitments, both explicitly and implicitly; (2) be honest in the negotiations that precede those commitments; and (3) not take excessive advantage of others when the opportunity to renegotiate is available.

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[50] Bromily, P. and L. L. Cummings (1992). Transaction Costs In Organizations With Trust, working paper No. 28. Minneapolis, Strategic Management Center, University Of Minnesota.

Reliability is the key element in Yellow Trust. Reliability is dependent on the prior contact and experience with a party. Time is a key element to reliability-based trust. A second related major element is the repeated interactions between the firms. Repeated interactions over time lead to levels of confidence, consistency, and finally trust. Reliability can then lead to predictability. It is the confidence of one party in the other's future actions. Furthermore, reliability must be based on integrity or honesty in order to be effective (Good 1988; Bechtel 1998). Cummings and Bromily (1995)[51] describe the consistency more as a comfort that one party has for the ability of the other party to complete actions without worry over their performance.

By the same token, Yellow Trust will likely build more slowly, because it needs personal and direct experience with a certain party in order to validate or adjust the initial opinions or trust level. Also because it is essentially opinion based, it is hard to measure objectively. It normally relies on the terms and conditions of a contract in order to manage or enforce the standards of behaviours.

Development of Yellow Trust is less likely to follow a unique path. A shared view of Yellow Trust between two parties will depend on the extent to which those people have the same standards and expectations in common. Thus there is volatility, a result of the

[51] Cummings, L. L. and P. Bromily (1995). The Organizational Trust Inventory (OTI): Development And Validation. Trust In ORganizations: Frontiers Of Theory And Research. R. M. Kramer and R. M. Tyler. Thousand Oaks, Sage Publications: 302-323.

fact that Yellow Trust can be achieved only through the perceptions by one party of the other. Once it is destroyed, Yellow Trust is difficult or impossible to recover.

Yellow Trust is represented as a Yellow wedge (*See Figure 3-2*). The wedge has a steep slope on one side representing the hard climb to the highest level of integrity trust. The drop on the far side represents the loss of trust should this type of trust be breached. Normally, once the breach of Yellow Trust happens, it is permanently lost.

3.3.4.3 Red Trust

Red Trust: answers the question: ***"Does it feel right?"*** Red Trust can be divided into two sub categories "Raw Emotion" and "Rapid-Processing". Raw emotion is our immediate response to a situation based on prejudices, biases, education, culture and the myriad of factors that build our character and personality. The second part, 'rapid processing' relates to a person's subconscious recognition of situations or patterns and it is a learned or trained response. This is the very fast thinking that we do without being conscious of it. "Gut reaction" is a term often used to describe how we behave with Red Trust. Red Trust is more related to the emotional dimension of trust, and the personal attachment and identity associated with trust.

Red Trust will grow or shrink depending on circumstances. The emotional part is volatile. This volatility makes Red Trust hard to predict. The other part of Red Trust

draws upon our ability to recognize patterns and to link them through knowledge and experiences to a current situation. It is generally hard to separate the 'rapid processing' part from the purely emotional part all the time. The rapid processing piece should point us to action such as asking questions or doing specific checks to validate the initial reaction. The results of the validation process will probably affect the level of Yellow and Blue Trust more than the level of Red Trust.

Red Trust is represented by a wave icon. The red colour is hot, emotional behaviour and also serves as a warning colour. The wave represents the uncontrollable natural phenomenon. It represents power and the ability to drown out the other two dimensions of trust. (*See Figure 3-2*)

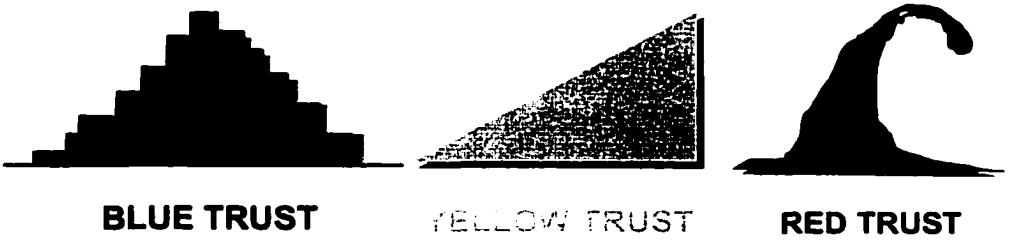

Figure 3-2 Icons of Three Primary 'Trust Colours'

3.4 Dynamics of Trust

Modeling trust as a multi-dimensional concept, and understanding trust both at the interpersonal and interorganizational levels provides the contextual background for the meaning of trust. However, because trust performs differently from one situation to

another, there is a need to look at trust as a dynamic notion and see the various trust behaviours at different stages of a relationship as well.

Most experts who study business negotiations believe that trust in relationships, such as those between alliance partners, builds up through a feedback pattern or cycle (Zand 1972; Bechtel 1998). Just as individual people in personal relationships, interacting parties often feel vulnerable in the initial stages of the relationship (Neal and Bazerman 1992).[52] It is well understood that trust evolves or develops over time as the relationship develops.

3.4.1 Trust over Time

Trust cannot be demanded but must be earned and developed over time. Trust can also be built as firms interact repeatedly. Lorenz (1988)[53] found that clients determine the trustworthiness of a contractor not only through reputation but also through his/her own experience (cognitive-based trust). While time plays a role in building trust, it is important that the contracting parties move through stages with levels of trust and responsibility increasing at each stage. The Owner should carefully manage the time

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[52] Neal and Bazerman (1992). "Negotiator Cognition And Rationality: A Behavioral Decision Theory Perspective." Organizational Behavior and Human Decision Processes 39(228-241).

[53] Lorenz, E. H. (1988). Neither Friends Nor Strangers: Informal Networks Of Subcontracting In French Industry. Trust: Making And Breaking Cooperative Relations. D. Gambetta. New York, Basil Blackwell Inc.

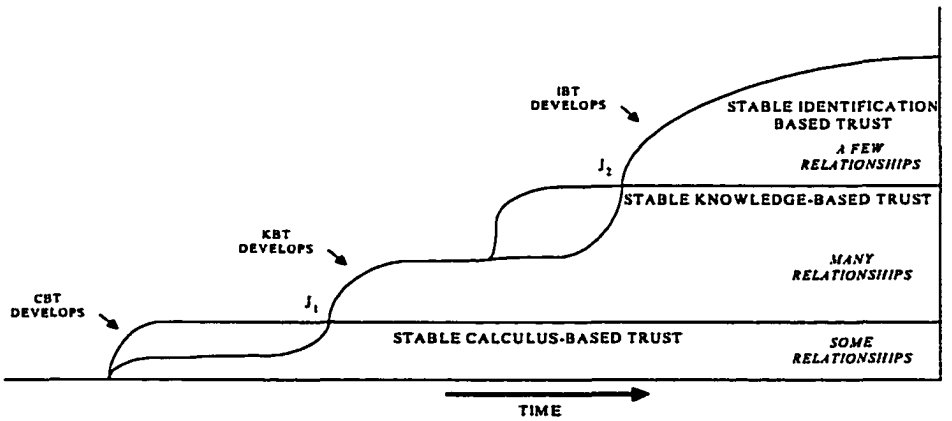
frame of trust growth, so that he can simultaneously reduce his exposure to risk while developing the relationship with the Engineer (Bechtel 1998).

Mayer, Davis and Schoorman (1995), stated that a more complete understanding of trust will come from consideration of its evolution within a relationship. The level of trust will evolve as the parties interact. Different dimensions of trust will interact with each other, shift the priorities and create synergistic effect of trust along the road as well. Further, Rousseau, Sitkin, Burt and Camerer (1998) propose that a phenomenon as complex as trust requires theory and a research methodology that reflects the many facets and levels of trust. A set of special issues that help to unveil the features of trust should be studied. The proposed facets of trust study covers areas such as: trust at many levels (Individual, group, firm, and institutional); trust within and between organizations, and multidisciplinary trust. There are topics discussed earlier. Furthermore, this approach emphasizes the importance of studying trust as a dynamic notion as well.

3.4.2 Dynamics of Interpersonal Trust

Lewicki and Bunker (1995) proposed that in a professional relationship, trust develops gradually as the parties move from one stage to another. These authors explained the evolution stages of trust development at the interpersonal level as following (see ***Figure 3-2.***)

1) Generally speaking, the movement is from calculus-based, to knowledge-based, and them to identification-based trust. However, not all relationships develop fully. As a result, trust might not develop past the first or second stage.
2) Relationships start building with the development of calculus-based trust activities.
3) If these activities develop and provide confirmation that the other party is consistent, and no frequent deterrence is required, the parties will begin developing a knowledge base about the other's needs, preferences, and priorities.
4) The movement from knowledge-based trust to identification-based trust occurs in a similar manner. As the parties come to learn more about each other, they may also begin to identify strongly with each other's needs, preferences, and priorities and come to see them as their own.



J1 At this point, some calculus-based trust relationships become knowledge-based trust relationships

J2 At this juncture, a few knowledge-based trust relationships where positive affect is present go on to become identification-based trust relationship

Source: Lewicki, R. J. and Bunker, B. B. (1995). Developing And Maintaining Trust In Work Relationships. Trust In Organizations: Frontiers Of Theory And Research. R. M. Kramer and T. R. Tyler. Thousand Oaks, Sage Publications: 114-139.

Figure 3-3 Stages of Trust Development

3.4.3 Dynamics of Interorganizational Trust

Cullen, Johnson and Sakano (2000) report the results of field research involved with non-equity Japanese strategic alliances with U.S. companies. They gathered the information from both Japanese and U.S. partners in 98 alliances. This study discovered how partners build reciprocal trust, and how trust and commitment affect alliance performance. The details of this research findings are as followings:

(1) The trust dimensions, benevolence and credibility, are highly connected and develop in parallel. Firm managers develop confidence in their partner's reliability and ability to deliver on expectations in alliance activities – the credibility side of trust. Simultaneously, they develop beliefs that the partner firm will act with good intentions and will not harm them – the benevolence side of trust.

(2) In most cases, trust declines when we act inconsistently and fail to follow through on our commitments. Yet the nature of today's business environment makes commitments increasingly short-lived as conditions call for rapid changes in a firm's strategy and policy. This may create barriers that prevent trust from developing into a long-term commitment.

In the multi-dimension trust model proposed by Rousseau, Sitkin, Burt and Camerer (1998), which includes deterrence-based trust, calculus-based trust, and relational trust. These authors explain that there is a coevolving and shifting process among the different dimensions of trust.

1) The dynamic of relational trust is its potential for expansion or contraction, where experiences over time can escalate positive beliefs regarding the intentions of the other or, conversely, exacerbate negative beliefs.
2) Calculus-based trust is relatively circumscribed and limited, because it is too reliant on the existence of deterrents. Relational trust involves a broader array of resource exchange and entails a greater level of faith in the intentions of the other party.
3) Exchanges based on calculus-based trust are likely to be terminated once a violation occurs. The exchanges characterized by relational trust often are more resilient.

Shaw (1997) proposed that the relative importance of each trust imperative – results, integrity, and concerns – varies with the situation. Some circumstances require a greater emphasis on one element. For example, a crisis situation may require a greater focus on the results and less on concern. Still the absence of one or more of the three imperatives can result over time in the low level of overall trust, even if the other two are present. As a consequence, he proposed thinking of trust as an equation, where the organizations must perform sufficiently in each of the three areas in order to achieve and sustain trust. ***(See Figure 3-3)***

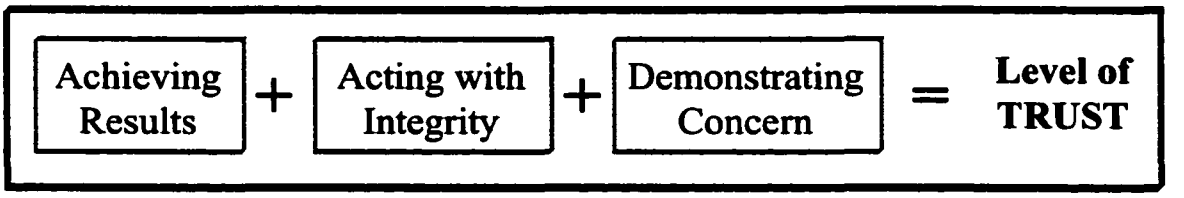


Figure 3-4 Achieving and Sustaining Trust

3.5 SUMMARY

From the extended literature search of trust in management and organizational behaviour, the following key gaps needed to be filled in order to study the dynamic behaviours of trust in the project management discipline.

- A single definition of trust should not be advocated. A cross-disciplinary concept of trust should be promoted.

More often, definitions of trust are given in a narrow discipline area, such as in close personal relationship, buyer-seller relationships, alliance relationships, or partner relationships. However, these narrowly defined definitions were difficult to transfer and make applicable to the engineering field. Especially in project management – a cross-disciplinary field of engineering, management and many other specialist areas, it is even harder to apply such restricted definitions. Thus, trust should be considered more as a systematic cross-disciplinary concept in order to be explained and applied to larger knowledge areas.

- Multi-dimensioned trust matrix should be promoted, where the existence of trust will not be simply viewed as 'Yes' or 'No' in the relationship.

As the status of trust is variable from situations to situation, it implies the existence of multi-dimensions of trust, where trust at each dimension changes with the circumstance. Thus, the behaviour of trust becomes a complex composition of different dimensional ingredients. In different circumstance, there will be different mixtures of different trust dimensions. The mixture of trust dimensions creates a typical flavour of trust to meet the contextual requirement. There should be an equation among different dimensions of trust in a relationship. The existence of trust in a relationship cannot be simply viewed as either present or absent.

- The dynamics of trust should be studied over time in a relationship in order to understand the variability of trust.

Trust should be treated as a longitudinally evolving and dynamic concept, rather than viewed as a cross-sectional definition. Because variability is at the core of the mystery of trust relationships and the art of trust building, it is critical to study trust along a time line for a relationship over each particular stage in a project.

- The study of mechanics of trust is required in the relationship between an Owner and an Engineer in order to understand the performance and behaviours of trust in the project management arena.

A significant amount of literature has pointed to the importance of trust in the buyer-seller relationship and in organizational behaviour. However, how trust really functions in a working relationship between the particular contracting parties within a project, and what the mechanics that allow trust to function in the Owner-Engineer relationship currently remain unstudied.

- Empirical research needs to be done to test the validity of the proposed trust models.

Most of the proposed definitions and models of trust are based solely on theoretical frameworks. But there are very few empirical studies to test and prove the validity of the proposed theoretical frameworks for trust. Thus, further effort is required to implement empirical research to test the viability of the proposed trust models.

CHAPTER 4 TRUST AND CONTRACTING

Trust in the working relationship between contracting parties at the early stages of project contracting will influence the success of subsequent project implementation. The literature also presents arguments that trust would develop through frequent personal and institutional interactions, and trust between individuals and organizations would improve the performance of both parties in contracting as well. Trust can make both contracting parties more reliable in fulfilling their obligations in a predictable manner. Trust would help both parties to act fairly and not take undue advantage of opportunities that present themselves. The trust relationship between potential contracting parties can even function as a glue to bind them to work towards mutually agreed objectives.

This chapter introduces the social context of contracting between two contracting organizations, and the psychological context of contracting between two individual professionals. Literature review shows that trust is important in the relationship between buyers and suppliers. This chapter further discusses that trust will have an influence on the transaction cost of contract administration, the efficiency of contract negotiation, and the development of proper risk allocation plan among parties at the early stages of contracting.

4.1 CONTRACTING CONTEXT

4.1.1 Social Context of Contracting

The inadequacies of legal contracts as mechanisms for governing exchange have long been criticized, especially in the face of uncertainty and dependence. Cannon and Achrol (2000)[54] argue that it is not the contracts per se but the social norms in which they are embedded that determine their effectiveness. They also propose that the social norms surrounding contracting are as followings:

> ***Flexibility:*** The attitude among parties that an agreement is but a starting point to be modified as the market, the exchange relationship, and the fortunes of the parties evolve.
>
> ***Solidarity:*** The extent to which parties believe that success comes from working cooperatively versus competing against one another. It requires that parties stand by one another in the face of adversity, and the ups and downs of marketplace competition.
>
> ***Mutuality:*** The attitude that each party's success is a function of everyone's success and that one cannot prosper at the expense of one's partner. It expresses the sentiment of joint responsibility.
>
> ***Restraint in the use of power:*** Forbearance from taking advantage of one's bargaining position in an exchange. It reflects the view that the use of power exacerbates conflict over time, undermines mutuality and solidarity, and opens the door to opportunism.

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[54] Cannon, J. P., R. S. Achrol (2000). "Contracts, Norms, and Plural Form Governance." Journal of the Academy of Marketing Science **28**(2).

These fundamental social norms for contracting, such as mutual understanding, sharing, cooperation, care-taking and flexibility, can possibly be achieved only when trust exists in the relationship between the contracting parties. It requires both of the contracting parties – two relatively independent functioning organizations – to work collaboratively, avoid we-you confrontation, not take advantage of the weaker party, and leave space for the contractual relationship to develop outside the boundary of the legal system.

4.1.2 Psychological Context of Contracting

Rousseau (1995)[55] proposes that the psychological contract is about beliefs that individuals hold regarding promises made, accepted, and relied on between themselves and another individual in an organization. The psychological context of contracting emphasizes the norms of contracting at the individual level. It differs from the social context of contracting which puts weights on the norms of contracting at the organizational level.

Psychological contracts have the power of self-fulfilling prophecies. People who make and keep their commitments can anticipate and plan for the future, because their actions are more readily specified and predictable both to others and to themselves. A key feature

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[55] Rousseau, D. M. (1995). Psychological Contracts in Organizations: Understanding Written and Unwritten Agreements. Thousand Oaks, SAGE Publications, Inc.

of a psychological contract is that the individual voluntarily assents to make and accept certain promises, as he or she understands them (Rousseau 1995).

Reflecting upon the "Trust Colour Model" proposed by Hartman (2000), the active anticipation of other individuals' willingness to make commitments in a predictable way creates the foundation for the development of Yellow Trust in a contract between individuals. As the individuals work through their understandings of each other's commitments over time, a degree of mutual predictability becomes possible. There is a perception of agreement and mutuality between individuals, even if not an agreement in fact (Rousseau 1995). The degree of trust in the belief that the other people will take care of your interest consistently, is strengthened and increased through repeated and consistently trustworthy performance.

4.1.3 Trust and Contracting

Serrambana (1991) argues that a contract functions as an instrument for communicating terms and conditions of partnering and working together in the business world. Contracts have evolved into complex documents that define the roles of participants and address risks and all possible uncertainties that may arise during a project.

Rousseau, Sitkin, Burt and Camerer (1998) argue that in a sense, trust is not a control mechanism but a substitute for control, which reflects a positive attitude about another's

motives. Control comes into play only when adequate trust is not present. To a certain extent, a detailed legal contract is one mechanism for controlling behaviour. Detailed contracts can get in the way of creating an effective exchange relationship. There is no necessity to develop trust when the exchange is highly structured and easily monitored.

However, because of the level of uncertainty that accompanies the projects, no contract or other agreement, no matter how complete or detailed, can account for every issue or every contingency that might arise (Cullen, Johnson and Sakano 2000). Formal contracts can never anticipate and identify all the events and changes that occur over the lifetime of the contract execution. Likewise, it is not feasible that contracting companies rewrite an agreement every time a new issue or situation arises. Hart and Holmstrom (1987)[56] remark that it is usually impossible to lay down each party's obligations completely and unambiguously in advance, and so most contracts are seriously incomplete.

Jeffries and Reed (2000) have argued that trust permits greater flexibility in the selection of governance structures when asset specificity is present, and trust results in closer relationships with less need for detailed contracts. Parkhe (1993)[57] observes that the presence of a prior history of cooperation between two firms limits their perceptions of

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[56] Hart, O. and B. Holmstrom (1987). The Theory Of Contracts. Advances In Economic Theory. B. T. Cambridge, Cambridge University Press: 71-155.

[57] Parkhe, A. (1993). "Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation." Academy of Management Journal 36(4): 794-829.

expected opportunistic behaviour and as a result lowers the level of contractual safeguards employed. Similarly, Gulati (1995) argues that, to some degree, firms appear to substitute trust for contractual safeguards in their repeated contractual relationship.

Ultimately, an informal relationship is developed out of necessity. Trust, the social fabric of the relationship, will fill the gaps in the formal agreement and keep the relationship running smoothly (Cullen, Johnson and Sakano 2000). The formally negotiated relationship is only the starting point of the contractual relationship. The real relationship can only proceed when one is adequately comfortable with the other partner. This comfort is based on beliefs regarding the partner's good will and dedication to the relationship. The emotional side of trust can serve as a flexible substitute for formal contracts as well, when there is sufficient comfort and compatibility existing between parties.

4.2 PERFORMANCE OF TRUST IN CONTRACTING

4.2.1 Trust and Buyer-supplier Relationship

Trust is inevitably mentioned as an important variable in the development and maintenance of the relationships between contracting parties (Ellram 1995; Smeltzer 1997).

When trust exists in the relationship between a buyer and seller, there will be positive effects on the performance of a particular contract. When trust is in place, both parties are willing to openly exchange information with respect, listen to the other's concerns, positively and honestly react to the problems, and reasonably share the cost increases or savings. As a final result, an open, mutually respectful, honest and sustainable working relationship can be created (Smeltzer 1997).

4.2.2 Trust and Transaction Cost

Trust reduces the costs and the numbers of delays associated with the traditional monitoring systems and formal legal contracts. Bradach and Eccles (1989)[58] argue that the three primary control mechanisms that govern economic transactions between firms are: price, authority, and trust. Organizations always pay attention to the cost associated with conducting exchange between partners by specifying contingencies fully in a contract. The efficiency and performance of an exchange relationship is consequently greatly influenced by the parties' ability to limit the costs associated with contracting, in particular the costs of negotiation and renegotiation. With trust in place, improved control efficacy and better the exchange relationship between parties can be achieved.

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[58] Bradach, J. L. and R. G. Eccles (1989). Markets Versus Hierarchies: From Ideal Types To Plural Forms. Annual Reviw Of Sociology. W. R. Scott. Palo Alto, Annual Reviews Inc.: 97-118.

As Arrow (1974) claims, trust is perhaps the most efficient mechanism for governing economic transactions. Trust can allow firms to enter partnerships that may otherwise have been deemed impossible under a detailed equity contract. Furthermore, Zaheer, McEvily and Perrone (1998) argue that the detailed contracts can stifle a partnership's adaptability to dynamic environments. As a result, when unforeseen contingencies arise, such as costs not explicitly covered by the terms of a contract, high levels of trust facilitate the development of a common understanding about the contingencies and how they might be resolved.

Another efficiency-related benefit for firms in trusting relationships is the reduced search costs. An important concern for firms seeking new contracting parties is the availability of trustworthy partners, with the considerable effort that can be devoted to finding them (Nohria 1993).[59] Firms placed in trusting relationships can significantly reduce their search for new partners when they decide to ally with an entity they already trust (Gulati 1993).

Serrambana (1991) proposes an industrial curve of trust and cost. He argues that normally there are significant cost associated with this trust behaviour in contracting. Cost goes down as the level of trust between parties increase. However, when the contract enters

[59] Nohria, N. (1993). Information And Search In The Creation Of New Business Ventures: The Case Of The 128 Venture Group. Networks And Organizations: Structure, Form And Action. N. Nohria and R. G. Eccles. Boston, Harvard Business School Press: 240-261.

into a blind trust area, where a very high range of trust exists and at least one party may have become too comfortable with another party and be taken advantage *(See Figure 6)*.

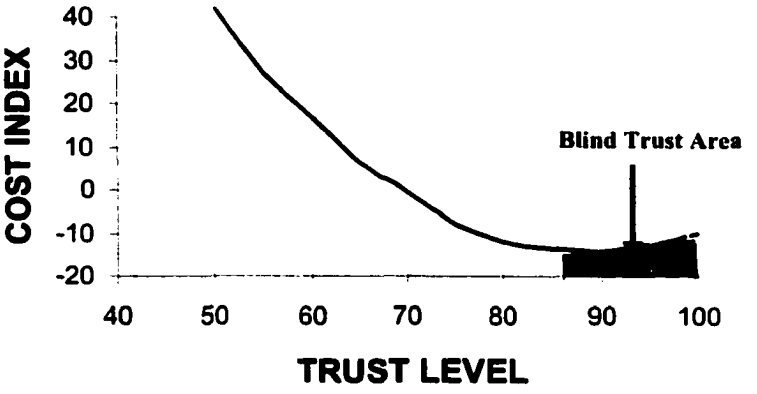

Figure 4-1 Trust and Cost

4.2.3 Trust and Negotiation

Zaheer, McEvily and Perrone (1998) argue that negotiations are less costly under conditions of high interorganizational trust because agreements are reached more quickly and easily. Parties are more readily able to arrive at a "meeting of the minds", where both parties can properly understand each other's objectives and concerns.

Interorganizational trust mitigates the information asymmetries inherent in the inter-firm exchange by allowing more open and honest sharing of information. When interorganizational trust is high, negotiating positions are based on similar underlying

assumptions, and agreements are likely to be reached more quickly. In a related vein, we suggest that trust promotes negotiating efficiency by enabling each exchange partner to be more flexible in granting concessions because of the expectation that the other exchange partner will reciprocate in the future. The superior efficiency of interorganizational relationships is that trust simply reduces the inclination to guard against opportunistic behaviour on the part of the exchange partner.

In situations of low trust, lengthy and difficult negotiations over unforeseen contingencies are likely to take place between exchange partners. While, under high trust conditions, in contrast, firms are less inclined to rely on elaborate safeguards for specifying, monitoring, and enforcing agreements (Zaheer, McEvily and Perrone 1998).

A trust-based relationship is conducive to the discovery of mutually beneficial, integrative solutions. Negotiations become easier because of the representatives from the organizations who work together are willing to share sensitive information. Also they are confident that information provided by the counterpart is not misrepresented. Consequently, expected mutually beneficial agreements can be reached more quickly if there is trust in place.

4.2.4 Trust and Risks

The issue of trust arises because economic transactions involve risks. In perfect competition, risk is ruled out by the assumptions of perfect information and candid rationality. In the real world, however, parties face the risks when they enter a commercial exchange. They have limited capacity to collect, store and process information. More often these processes themselves incur costs as well. There are limits to how far contingencies can be predicted and incorporated into contracts, and also limits to the extent to which relationships can be monitored.

Humphrey and Schmitz (1998)[60] argue that if a certain level of trust exists between parties, there are two possible outcomes of trust:

- One party's acceptance of risk arises from the actions of others, and the expectation that the 'partner' will not take advantage of the opportunities opened up by his acceptance of risk.
- Even when the partners could gain from opportunistic behaviour, they will refrain from doing so. Parties will be willing to take the risks with possible losses rather than take advantage of the others for greater gains.

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[60] Humphrey, J. and H. Schmitz (1998). "Trust And Inter-Firm Relations In Developing And Transition Economies." The Journal Of Development Studies 34(4): 32-61.

4.3 SUMMARY

Social and psychological contexts of contracting require trust to function as a norm to regulate the relationships between organizations and individuals. With trust in or outside of a contractual relationship, parties can work cooperatively and commit to joint responsibilities. There will be more flexibility and less opportunistic behaviour in the relationship. With trust bonding, individuals are more willing to make and realize commitments in a predicable and care-taking way.

Contracting is a process, which is embedded within a specific social context, and psychological context. There is a need to take these contracting contexts into consideration in the early stages of contracting, especially in evaluating and selecting the Engineer. Most often, the ability to deliver a project, willingness to deliver on commitments, initiatives that demonstrate taking care of others and mutuality in objectives are the key evaluation criteria to select the right Engineer for a project.

Meeting the evaluation criteria, the parties to a contract can work cooperatively in a smooth buyer-supplier relationship. Improved outcomes of contracting can be achieved in lower transaction cost, better negotiation and better sharing of risks.

Having trust between parties can help in selection of an Engineer while maintaining significant competitiveness in the market, a willingness and ability to afford reasonable

risks, flexibility in negotiation, and efficiency in reducing the Owner's transaction cost. Thus it is important to study the behaviours of trust through a multi-dimension model in the Engineer selection process. This research will identify the correlation between trust and picking the right Engineer. Finally, it can improve the practice of Engineer selection through a better understanding of trust behaviours.

CHAPTER 5 RESEARCH METHODS

This chapter describes the tailored research methods adopted to conduct this research. It provides the rationales of applying this two-phased research, which is to narrow down the research topic, search for the proper data collection method, and obtain a deeper understanding of the research topic. This chapter explains the modified Delphi method employed in the pilot phase, and outlines the data collection and analysis mechanism applied. Furthermore, the features of applying the in-depth interviews for the main phase study are introduced. Development of the interview guide, implementation of interviews and systematic data analysis are also discussed in details.

5.1 General Research Design

This research was aimed at studying the behaviour and role of trust in the initial contracting process between Oil and Gas companies and EPC firms based on a range of projects with values from $10 million to $100 million. The literature review showed that there were a variety of factors and issues to be considered in designing a contract strategy. Unaddressed questions included the following: what are the contracting issues that are highly influenced by trust between parties in oil and gas projects? How does trust behave or influence in the initial contracting process between Oil and Gas companies and their EPC firms? These questions can only be addressed by identifying and assessing the significance of the relationships between trust and specific contracting issues.

Considering the nature of the research questions, the researcher decided to use the sequential triangulation method to collect both qualitative and quantitative data in two phases. Grinnell and Richard (1997)[61] argue that the concept of triangulation is based on the assumption that any bias inherent in any particular data source, in any particular researcher and in any research approach, will be neutralized when used in conjunction with other data sources, other researchers, and other research approaches. Taylor (1997)[62] argues that, to a certain extent, qualitative-quantitative triangulation minimizes the limitation of the quantitative and qualitative methods and can add significant benefits to the issues of validity and reliability. Qualitative researchers emphasize the meaningfulness of the study and validity issues, while quantitative researches emphasize reliability and replicability in research.

Thus a two-phase study using both quantitative and qualitative methods was initiated. The two-phase study includes: 1) Pilot phase in the form of a three-round modified Delphi study; and 2) Main phase composed of in-depth interviews.

The pilot phase was carried out with an expert panel of thirty-six contracting and project management experts from the Oil and Gas industry in Alberta. Through the first two

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[61] Grinnell, J. and M. Richard (1997). Social Work Research & Evaluation-Quantitative and Qualitative Approaches. Illinois, F.E. Peacock Publishers, Inc.
[62] Taylor, S. J. (1997). Introduction To Qualitative Research Methods: A Guidebood And Resource. New York, John Wiley & Sons, Inc.

rounds of the Delphi study, key factors to be considered in designing a contract strategy were identified and ranked. In the third round, the relationship between trust and other key contracting factors was identified.

In the main phase of this research, in-depth interviews were designed to gain a deeper understanding of how trust performed in the relationship between Oil and Gas Company and EPC Firm throughout the Engineer selection processes in particular. Sixteen primary interviews with additional follow-up interviews were conducted with practitioners. All participants had senior positions in contract management or project management.

5.2 SAMPLE DESIGN

The sample for such a research should be representative of the population, which is a professional community with a collection of interacting people who share professional principles, beliefs of value, and techniques (Neuman 1994)[63].

Interviewees can be found in a number of ways. Snowball sampling is a method for identifying and sampling (or selecting) cases in a network (Neuman 1997)[64]. Also it is one of the easiest ways to build a pool of interviewees – getting to know some

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[63] Neuman, W. L. (1994). Social Research Methods: Qualitative and Quantitative Approaches. Massachusetts, Simon & Schuster, Inc.
[64] Neuman, W. L. (1997). Social Research Methods: Qualitative And Quantitative Approaches. Boston, Allyn & Bacon.

interviewees first and having them introduce you to others (Talor 1997). It starts by selecting a nucleus of interviewees for the purpose of the in-depth interviews. They will be asked for referrals to ensure the continuity of the sampling criteria throughout the selection process (Grinnell and Richard 1997).

This sampling method does not mean that each person directly knows, interacts with, or is influenced by every other person in the network. Rather it means that, taken as a whole, there are direct and indirect links, more like an interconnected web of linkages (Neuman 1997). After the nucleus interviewee selection and referral selection, a well-spread network of interviewees was achieved.

The Oil and Gas industry is a community, where practitioners are highly connected through networking between the Owners (Oil and Gas companies) and Engineers (EPC firms). There are some generic professional practices and opinions relating to contracting and project management existing with the community. These opinions and norms can be obtained through interviewing with a small group of representatives of the industry. Thus, the researcher selected the nucleus of interviewees to include with several senior project management persons from both the Oil and Gas Companies and EPC Firms to initiate the expert panel. Subsequently, the expert panel was expanded based on the first layer reference from the nucleus of interviewees. Finally, throughout the three-round Delphi study, 36 participants were involved. The members of this expert panel had an average of

17 years of experience in contact management. Participants had diverse positions from project manager and project director, to program manager and VP.

For the main phase, the snowball sampling method was also deployed with a dual purpose: (1) to verify the results of the pilot phase in an extended sample and (2) to obtain a deeper understanding of the behaviours of trust throughout the Engineer selection process. There were sixteen interviewees actively involved in the main phase. Five out of the sixteen interviewees were participants in the pilot phase. And eleven were newly selected through the second or third cycles of referrals. Seven participants were from Owner organizations (Oil and Gas Companies), and nine were from the Engineering companies (EPC Firms).

The size of the sample was determined toward the end of the research rather than at the beginning, when data collection reached the point when additional interviewees yielded no genuinely new insights (Taylor 1997). In other words, data saturation was reached at that point. Thus the interview results from sample groups in the pilot and main phase were internally verified to a certain extent. Detailed characteristics of the research samples from the two-phases of the research are show below:

Comparison of Samples	
Pilot Phase: Modified Delphi Study	**Main Phase: In-depth Interviews**
· 12 participants in each round and 36 participants in all three rounds · 7 from Oil and Gas companies, 5 from EPC firms	· 16 participants in total · 7 from Oil & Gas companies, 9 from EPC firms

Table 5-1 Comparison of Samples in Two Phased Study

5.3 PILOT PHASE – MODIFIED DELPHI METHOD

5.3.1 Modified Delphi Method

The Delphi Method was originally developed for use as an iterative questionnaire targeted at a group of experts in order to produce a consensus and reasonably accurate forecast when the necessary information to predict an outcome was not available. The result of a Delphi method study is usually a consensus forecast. But the method can be used for other purposes as well, such as collecting reliable information about a research topic. Typically, three rounds of questions are used to solicit general information, then increasingly to sort out specific comments or issues from an expert panel in a particular area (Hartman and Baldwin 1995).[65]

[65] Hartman, T. F. and A. Baldwin (1995). "Using Technology To Improve The Delphi Method." ASCE Journal Of Computing In Civil Engineering 9: 244-249.

In this research, the Delphi method was used for a dual purpose, (1) The first objective of the Delphi study was to narrow down the research topic. The literature review showed that there was a gap in understanding of the role and behaviour of trust in project contracting. In considering the scope of this research work, a more specific phase or area of project contracting practice needed to be concentrated on. Through this modified Delphi study, the most important research area for the benefit of industry practice was identified and agreed upon by a group of experts. (2) The second objective was to choose the most appropriate research method, (e.g. in-depth interview vs. structured questionnaire) for the following phase of the study.

Normally, there are several rounds in a Delphi study. A different data collection format and method can be applied at each round in order to cope with the research objective at that stage. Thus, qualitative methods such as in-depth interviews could be used in the first round, and structured questionnaire could be applied in the following rounds. Afterwards, the advantages and disadvantages of different data collection methods in a particular research area could be compared.

Many variations of the Delphi Method exist. In this study the researcher basically followed the steps outlined by Millett and Honton (1991)[66], together with some

[66] Millett, S. M. and E. J. Honton (1991). A Manager's Guide To Technology Forecasting And Strategy Analysis Methods, Battelle Press.

modifications to address the specific research requirements and objectives of this study. The detailed steps in planning and implementing this modified Delphi method were as follows:

- The researcher established the goals of the study to be: (1) identify the key factors to be considered in designing a contract strategy at the early stages of the contracting process, and (2) find any significant connections between trust and specific contracting issues. This required a logical and well-designed open-ended questionnaire with well thought out implementation instructions to get as many informative data as possible within the study area.
- It was important to put together an appropriate list of experts to complete the questionnaire and to maintain a high quality professional opinion. To a certain extent, the experts' experience helped the researcher focus on the key issues more quickly and more accurately.
- In the first round, the researcher implemented open-ended questions in the interviews. Here the researcher tried to get as many experts' opinions as possible. Only through this process could the researcher find the key factors to be considered in developing a contract strategy at the early stage of contracting, and determine the importance of trust in project contracting. Thus the research was able to: (1) verify the important contracting factors in industrial practice and compare findings of the literature review

with other sources; and (2) identify the gap between academic knowledge and industrial practice.

- The Delphi technique was iterative, so the participants were asked to comment on the answers from other participants in the sample group from the previous round. The iteration process, along with the feedback information that allowed development of a consensus, made the Delphi Method a dynamic group method for collecting data, rather than a simple questionnaire technique. This iterative process happened for both the second and third round.
- In round two, based on the rich information from the first round, the researcher decided to develop the questionnaire in a more structured way to help respondents reach consensus. The researcher organized the responses from the first round into a new questionnaire, and sent the new questionnaire back to the respondents. The participants were asked to rank the key factors to be considered in designing a contract strategy. Also, they were asked to provide opinions regarding the importance of trust in the early stages of project contracting.
- In round three, based on the findings from round two that trust was positioned as fifth out of sixteen key factors to be considered in the early stages of project contracting, the connection between trust and other key contracting factors was further studied. In this round, a structured questionnaire was designed using a combination of Likert scale responses to the questions, and paired comparison questions.

- Different research methods, such as structured questionnaires and in-depth interviews, were applied and compared in the three rounds. After comparing those methods, the researcher found that in-depth interviews were more appropriate for the following phase of study. For the rationale behind this choice and the detailed features of in-depth interviews vs. structured questionnaire, see section *5.4 Main Phase – In-depth Interview.*

5.3.2 Round One Study – Expert Panel Interviews

The purpose of the first round of interviews was to gather as much information as possible without restricting or directing interviewees' responses. Three open-ended major questions together with several probing and follow-up questions were applied. These questions explored the existing contracting and trust issues in the Oil and Gas industry at large. These open-ended questions reduced researcher bias and provided the interviewees with opportunities to present their insightful thinking.

Validity in interviewing can be achieved by having a plan specifying the topics to be covered and the kind of information sought (Herzog 1996)[67]. Thus, these open-ended questions targeted four areas: 1) identifying the critical factors to be considered in

[67] Herzog, T. (1996). Research Methods and Data Analysis in the Social Sciences. New York, Harper Collins College Publishers.

developing a contract strategy, 2) studying the acceptable trust levels, and forms of trust in the project contracting environment, 3) studying the power influence between contracting parties i.e. between the Owner (Oil and Gas company) and the Engineer (EPC firm), and 4) seeking factors that influence the performance of trust in project contracting. *(See Appendix I for detailed interview guide.)*

The interviews were held in places convenient to the interviewees and were tape-recorded with the agreement of the interviewees. *(See Appendix II for consent form.)* However, in some situations, interviewees stated the preference for not tape-recording their words. In these cases, the researcher explained the purpose of this study, the ethics of interview questions, the procedures and confidentiality of data management in order to address the concerns of interviewees, but their request was honoured. To compensate for the absence of taping, the researcher completed the interview in a slower and more careful way. This ensured that the researcher gained a proper understanding and interpretation of interviewees' answers. It was important that the interviewee had a relaxed mood in order to provide the most forthright and complete responses for the researcher, and provide the best possible informative data. In those cases where no taping was permitted, the interviewees provided some company related confidential information, such as standard contracting guidelines and manuals, which provided some critical background knowledge for the researcher. Furthermore, throughout the interview process, the participants

generously helped the researcher understand and interpret their words correctly and precisely.

Through these questions, researchers collected various opinions regarding important contracting factors and trust behaviour, and identified different possible areas that were valuable for further research from the industrial practitioner's point of view. Key factors to be considered in contract strategy design were provided by interviewees based on each individual's experience and the industry's perspective. Also there were preliminary indicators that trust was important in the early stages of contracting from most of the interviewees.

There were still questions that needed to be studied in the following rounds: How important is trust compared with other contracting factors in the initial contracting stages? What are the rankings or priorities of different fundamental contracting considerations? Will the level of trust between contracting parties affect other contracting issues?

5.3.3 Round Two Study – Mini Survey

Based on the rich information from the first round of interviews, feedback from this round together with the questions for round two were assembled in the form of a mini-survey. It included two main parts 1) ranking of factors critical to contract strategy

design, and 2) Likert scale responses of critical issues of trust in contracting. (*See Appendix III: Questionnaire – Round-Two Pilot Phase*)

In the questionnaire, the key factors to be considered in contract strategy design were synthesized based on the analysis of interview transcriptions and notes. The participants were asked to rank these factors in order of their importance. In order to reach a consistent and correct understanding of all the contracting factors, the definitions of the sixteen key factors were prepared based on multiple sources. These sources include: (1) descriptions given by the interviewees, (2) Max Wideman's (2000) online project management glossary, (3) the PMBOK® Guide 2000 Edition[68], and (4) Literatures in contract management, project management and trust.

Critical statements relating to the relationship between trust and contracting issues were summarized based on the interviews in round one. These statements were synthesized and designed based on the opinions from round one. Some of the new statements that the researcher wanted to test in this second round were added as well. Finally these statements were all organized into a Likert scale questionnaire. The participants were asked to assess the importance of each statement on a Likert scale (1 = Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, 5 = Agree). Thus, these

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[68] PMI Standards Committee (2000). A Guide To The Project Management Body of Knowledge. Newtown Square, Project Management Institute.

questions were aiming at clarifying certain statements, and cross-verifying opinions among participants regarding the importance of trust in project contracting.

5.3.4 Round Three Study – Mini Survey

Through the work in the first two rounds, a way of mapping the key contracting factors was identified and the priority ranking was developed (See details in discussions of results of Chapter 6). Also, the importance of trust in contracting and the behaviour of trust in the early stages of contracting were recognized.

In the third round of the pilot study, the concept of "Trust Colour Model" was introduced, which gave the participants a fresh understanding of trust through a multi-dimensional model from the project management perspective (Hartman 2000). A mini-survey was designed composed of the following. First, the thirty Likert-scale questions were developed. They were designed to test how the three different dimensions of trust in the "Trust Colour Model" would influence other key contracting factors, and which of the three dimensions would be more influential to any of the contracting factors. Second, a set of paired comparison questions was added. These questions were designed to compare the influencing power of trust on different contracting factors. (*See Appendix IV: Questionnaire – Round-Three Pilot Phase*)

5.3.5 Data Analysis Procedures – Pilot Phase

5.3.5.1 Analysis of Qualitative Data – Round One Study

In the first round of the pilot Delphi study, the qualitative interview data was collected systematically and analyzed consistently. Interviews were taped with the agreement of participants, and transcribed word by word into documents. Code categories for analysis were created in a consistent way as well.

One of the purposes of these interviews was to identify the key factors to be considered in designing a contract strategy. The cues relating to key contracting factors were picked out. Firstly, the cues were organized into relatively detailed categories – secondary coding category – that allowed the researcher to identify the codes more quickly. Secondly, all the secondary codes were reassembled and synthesized into main coding categories. The main coding categories presented the fundamental concepts and opinions from the respondents.

Only with this well-organized and condensed analysis, could this research (1) analyze the data at a higher theoretical level, (2) provide the participants with the most valuable feedback, (3) reduce participant's precious time in answering the questionnaire, and (4) arouse further interest in participating in the following rounds. ***Table 5-2*** presents the sample coding categories:

Main Coding Category	Secondary Coding Category	
Alignment	· Shared Objectives · Common Understanding · Win-win philosophy in contracting · No we-they confrontation · Meeting of minds	· Conditions of satisfaction · Mutually acknowledged constraints · Agreement among contracting parties · Agreement within project team
Company Characteristics	· Industrial logo · Community visibility · Business/market position · Company culture · Contracting philosophy	· Contracting regulations · Organizational structures · Power distribution among project management personnel · Senior management support
Contract Form	· Boiler-plate contract · Letter of agreement · Short form of contract	· Long form contract · Form for profession service
Contract Type	· Product purchasing · Service purchasing · Cost plus fixed fee · Cost plus incentive fee	· Cost plus percentage of cost · Firm fixed price · Fixed price plus incentive fee · Unit price contracts"
Contracting Framework	· Levels of subdivisions of project · Numbers of its major service or product elements · Integration of customer and Engineer effort	· Framework for the planning, control, and reporting · Strategic alliance, partnership, joint venture · Flexible vs. tight structured · Broad vs. narrow structured
Engineer Selection Methods	· Competitive bidding · Sole-sourcing · RFPs (Request for Proposals) · Preferred contractors	· Consecutive purchasing · Kick-off meetings · Pre-bid meetings · On-site visits
Contractual Relationship	· Level of legal legitimacy · Previous working experience with the other party	· Numbers of disputes had before with certain party · Contracting setting: strategic alliance, partnership
Control Mechanism	· Contract administration procedures · Change order management · Reporting scheme (cost, schedule, quality)	· Safety program · Documentation standards · Auditing regulations and procedures
Dispute Resolution Mechanism	· Classification of disputes · Dispute resolution alternatives	· Dispute resolution procedures · Consistent change order management process
Incentive Scheme	· Setting up certain target price or objectives · Targets in terms of time, cost and safety criteria	· Formulation of the incentive/penalty distribution · Cost calculation of associated risks

Main Coding Category	Secondary Coding Category	
Legal Awareness and Involvement	· Legal duties and rights related to contract · Legally defined contracting processes · Potential causes of disputes, liabilities, and breaches of contract · Means of resolving disputes	· Legal basics of industrial relations (e.g. influence of the legal department to the design of contract strategy.) · Legal department's responsibility and involvement · Rigidity of contract language
Negotiation Methods	· Non-negotiable part of contract · On-going negotiable part of contract · Key personnel in negotiation	· Negotiation atmosphere · Negotiation process · Targeted content level of the relationship
Project Execution Strategy	· Sophistication of organization: i.e. strength, expertise and experience in similar projects of mother company · Working environment of partners: e.g. organizational structure of the project · Project environment or scene e.g. market competition, resource availability	· Project characteristics: project constraints, size, complexity, uniqueness, geographical location, stakeholders, technical requirements and financing accessibility · Project Objectives: targeted performance standards, cost, schedule, quality (results vs. behaviour), and safety.
Risk Allocation	· Identify risks · Identify party's capability in taking risks · Analyze and develop risk mitigation plan · Allocate risk to the right party	· Allocate risk onto an activity · Allocate risk onto a specific contracting party · Integrate risk allocation plan into contracting process
Scope Definition	· Scope integration among parties · Mutual understanding of proper scope · Breaking down work into deliverables	· Levels of project break down structures · Broad scope definition vs. detailed scope definition · Contract scope: service vs. product
Trust	· Open communication · Work efficiency · Quick alignment · Less risk associated · Vulnerability · Respect	· Faith · Confidence · Positive assumption · Not taking advantage · Fair treatment

Table 5-2 Sample Coding Categories of Pilot phase

5.3.5.2 Statistical Analysis of Quantitative Data – Round Two and Three Study

In the second and third rounds of the pilot phase, the quantitative data were collected through mini-survey, and the statistics software package SPSS (Statistical Package for Social Science) was applied to analyze the quantitative data to see the statistical significance of the results.

In order to analyze the statistical data more efficiently and sufficiently, measurements were classified into two categories: nominal measurements, and ordinal measurements. The following section described the application of the two types of measurements in details.

Nominal Measurement

Nominal measurement indicated that there was a difference among categories (Neuman 1997). In this research nominal measures were applied to categorize the demographic information of respondents. Examples of demographic information would be: Contracting Position (Oil and Gas company vs. EPC firms), Working Sectors (legal department, contract administration and management, project management and senior management), and Positions (project manager, program manager, contract manager, VP).

The numerical numbers were assigned to represent the categories of a particular demographic factor. For example, for the Contracting Position, "1" was assigned to

represent Oil and Gas company and "2" was assigned to represent EPC firm. The usage of numerical numbers in this case was not for ranking, but just for the purpose of differentiating the categories. Nominal measurement involved no underlying continuum. The numeric values assigned were arbitrary and the assigned numbers had no arithmetic meaning (Neuman 1997).

For nominal measurement, the descriptive analysis such as the frequency analysis was applied. It mapped out the main characteristics of the sample, and the distribution features of participants within the sample. For detailed sample characteristics of pilot phase, see Appendix V.

Ordinal Measurements

Ordinal measurements indicated a difference from category to category. In most cases, the categories were either ordered or ranked (Grinnell and Richard 1997; Neuman 1997). In this research ordinal measures were used to rank the key contracting factors to be considered in designing a contract strategy. Numerical numbers represented the important levels of different contracting factors. The smaller number meant a higher importance level, while the larger number meant a lower importance level. Thus in this case, the contracting factor assigned with "1" meant that it was most important, such as Project Execution Strategy which ranked top of the list.

However, there was no specified amount of distance between numbered categories and the underlying continuum were not in a one-to-one relation. In other words, it was not intended to tell the exact difference in importance between two closely positioned factors through the assigned numbers. Furthermore, the importance difference between factors No.1 and No.2 might not be equal to that between factors No.2 and No.3. See Appendix VI, for descriptive analysis of detailed ranking results of key contracting factors in round two.

Similarly, for the Likert scale questions, scales from 'Disagree', 'Somewhat Disagree', 'Neutral', 'Somewhat Agree' and 'Agree', were assigned respectively with numerical numbers from "1" to "5". As can be seen, the bigger number indicated the greater agreement with the statement.

For ordinal measurements, descriptive analysis was applied. The meanings of the various statistics indicators in descriptive analysis are now described briefly:

- The mean is a measure of the central tendency in order to reflect the distribution of values, i.e. the opinion trend toward the designated statements.
- Maximum and minimum numbers were identified in the form of a numerical range. They were to indicate the gap between the lowest and highest value for an individual measurement, which represented the spread of opinions between all respondents.

- Finally, the standard deviation was calculated, on which the researcher relied heavily to explain the results. The standard deviation reflected the variability in a set of values. It also gave a sense of how much dispersion there was in a variable, i.e. how much dispersion between the expert agreements with a single statement. See Appendix VII for descriptive analysis of questionnaires in round three regarding the connection between different trust dimensions proposed in "Trust Colour Model" and key contracting factors.

Furthermore, there were also analyses applied across the different participant groups as well. The results were analyzed and compared between participants' organizations, i.e. Oil and Gas Companies and EPC Firms, in order to see the different opinions to the importance of trust in early stages of contracting. There is some slight statistical difference in viewing the importance of trust in contracting process and other contracting factors between the Owner group and Engineer group. (*See details in Chapter 6: Discussion of Results*)

5.4 MAIN PHASE: IN-DEPTH INTERVIEWS

Based on the findings in the pilot phase, the main phase of this research was aimed at discovering the behaviour and role of the three dimensions of trust proposed in "Trust Colour Model" throughout the process of Engineer selection. The objectives of this main phase of the study were as follows.

- To identify the influence of different dimensions of trust in "Trust Colour Model" at particular sub-phases of the whole Engineer selection process;
- To understand the trust behaviour within two distinctively different interest group i.e. the Owner (Oil and Gas company) and Engineer (EPC firm) groups; and
- To discover possible ways of more effectively introducing trust into the early stages of project contracting.

Considering the objectives of this phase of the study, and the nature of trust behaviour in the Engineer selection process, in-depth interviews were considered to be more appropriate than other methods such as structured interviews. In-depth interviews could verify the results from the pilot phase, and also help gain a deeper understanding from the insights of industrial practitioners regarding the behaviour and role of trust throughout the Engineer selection process. These are some of the features of in-depth interviews compared with structured questionnaires, which are beneficial to this research in particular (Neuman 1997; Taylor 1997):

- The questions and the order in which they were asked were tailored to specific people and situations. It provided the researcher with more flexibility in adjusting the number and sequence of questions on site.

- The researcher showed interest in responses and encouraged elaboration, instead of appearing neutral at all times. The researcher was active in encouraging different opinions from interviewees, which created a dynamic interview environment.
- The interviews were interspersed with jokes, asides, stories, diversions, and anecdotes, which were recorded as well. This information provided richer background knowledge regarding the responses.
- The researcher and interviewees jointly controlled the pace and direction of the interview. This helped avoid the researcher imposing her thoughts and pace onto the interviewees, and limit the possibility of a passive interviewing atmosphere. The interviewees would be more willing to present valuable insights in response to the researcher. This is critical to the study of sensitive issues in trust and contracting.

5.4.1 Development of Interview Guide

In the in-depth interviews, the researcher designed a set of open-ended and nondirective questions. The in-depth interviews involved asking questions, listening, expressing interest, and recording what was said. So an interview guide was prepared to help the researcher to cover the questioning areas, but within certain degree of flexibility.

The interview guide was not a structured protocol. Rather, it was a list of general areas to be covered with each informant. An interview guide was useful when the researcher had already learned something about informants through preliminary interviews (Taylor

1997). In the mean time, the validity of the interview can be achieved by having a plan specifying the topics to be covered and the kind of information sought (Herzog 1996). Reliability can be achieved by carefully following an interview protocol. This interview guide designed and organized questions into three integrated parts (***see Appendix VIII for Interview Guide***).

(1) Identify the general issues that were important in contracting and the Engineer selection process. They were aiming at discovering the key issues that exist at the early stage of project contracting from an industrial practitioners' point of view, and validate the findings from the pilot phase. These questions were also designed to understand the Engineer selection methods generally adopted in the Oil and Gas industry, and map out the selection procedures and activities within a normal EPC(M) service contract between an Oil and Gas company and an EPC firm.

(2) Discover the performance of trust in general, and the three dimensions of trust proposed in the "Trust Colour Model" in particular. These questions were aiming to:

- Understand the generally recognized behaviour and role of trust in competitive bidding;
- Test the viability of the three trust dimensions proposed in "Trust Colour Model" throughout the Engineer selection process;
- Identify the influences of the particular dimension(s) of trust in the "Trust Colour Model" at different sub-phases of Engineer selection;

- Identify the dynamic cycles of the three dimensions of trust in the Engineer selection process; and
- Discover the difference in understanding the importance of trust from both the Owner' and Engineer' perspectives.

(3) Identify the future improvement of initial contracting processes. The questions were to seek the possible ways of introducing the trust element into the initial contracting processes.

5.4.2 Implementation of Interviews

The interview guide was expanded or revised as the researcher was conducting the real interviews. On interviewing sites, the researcher decided how to phrase the questions and when to ask the questions. As the researcher began to identify themes in interview data, questions were added to the interview guide so that these areas could be covered with new informants in the following interviews (Taylor 1997).

During interviewing, the questions were not put in a rigid pre-established order, as outlined in the interview guide (Gummesson 2000).[69] The selection of questions was governed instead by the actual situation confronting the researcher, which was a probing

[69]Gummesson, E. (2000). Qualitative Methods In Management Research. Thousand Oaks, Sage Publications, Inc.

technique. Sometimes the interview guide acted as a particular conceptual model and checklist to govern the choice of questions. Whereas on other occasions, the researcher would limit the questions to those she felt were appropriate to ask on the spur of the moment. Throughout the whole interviewing process, the researcher followed up particular responses by asking specific questions, encouraging the informants to provide details, and constantly seeking for clarification of the informant's words (Taylor 1997).

The first five interviews were carried out with previous respondents from the pilot phase. The major purpose of using a small portion of the old sample was to provide the researcher with some first-hand information through acquaintance. It also helped the researcher create the basic patterns of different thoughts around the interview questions. The researcher did the transcriptions, and preliminary analysis immediately after conducting these interviews. Through this preliminary analysis, and pattern recognition, the researcher was able to find and adjust the questions where the questioning topics were not so familiar to the interviewees. The researchers also discussed about adjusting questioning direction and structure with the advisor before carrying out the rest of the interviews, and received the consent of the advisor as well.

After the initial interviews, the interview guide and questions became more robust. The interviewing skills of the researcher were enhanced by facing challenging feedback, figuring out the meanings behind the words, and making sound logical arguments. The

researcher also identified the areas where more probing questions should be asked in order to get valuable and interesting insights for the rest of interviews.

In dealing with the core interview questions, the researcher often rephrased the interviewee's response to seek clarification and confirmation. In situation where the interviewees had difficulty presenting answers in a logically clear way, researcher asked the interviewees to provide examples of what he or she meant in order to get a clarified understanding. The researcher would sometimes provide a brief summary of the interviewee's opinions after a particular interview section, which was highly appreciated by the interviewees. Based on those summaries, interviewees could better organize their thoughts and prepare for the following interview sections.

5.4.3 Qualitative Data Analysis

In general, data analysis meant a search for patterns in data – recurrent behaviours, and objects. It involved examining, sorting, categorizing, evaluating, comparing, synthesizing, and contemplating the coded data as well as reviewing the raw and recorded data (Neuman 1997). In qualitative data analysis, the researcher analyzes data by organizing them into categories on the basis of themes, concepts, or similar features. This helps to develop new concepts, formulate conceptual definitions, and examine the relationships among concepts. Eventually, concepts of similar categories were linked to each other in terms of a sequence into theoretical statements.

The researcher started analysis with research questions and a framework of assumptions and concepts. *Open coding* was performed during the first phase through the collected interviewing data, such as the interview transcripts. The researcher located themes and assigned initial mass of data into categories. The researcher carefully looked for critical terms, key events, and themes. Then the researcher wrote preliminary concepts or labels at the edge of the transcription notes and highlighted them. The theoretical framework of the initial coding categories was developed and enriched throughout the process of analysis, and generally included:

(1) Critical contracting issues especially suitable for service contracting between the Oil and Gas Companies and EPC Firms;
(2) General phenomena of trust in the contracting environment;
(3) Behaviour of three dimensions of trust proposed in "Trust Colour Model" both at the interpersonal and interorganizational levels;
(4) Evolution of different dimensions of trust along the processes of Engineer selection;
(5) Priority shifting among the three primary trust colours throughout the Engineer selection process;
(6) Transferability of the three primary trust colours at both the interpersonal and interorganizational levels.

(7) Erosion and diminishment of three primary trust colours in the Engineer selection process, including the tracks of erosion, ability to resist erosions, conditions of diminishment etc.

After the initial coding categories were developed, *axial coding* was applied. In axial coding, the researcher began with the organized set of initial codes or preliminary concepts, and more concentration was given on making connections among themes or elaborating the concepts (Strauss and Corbin 1990). At each stage, the evidence and the theory shaped each other. The concepts were modified over and over to become successively more accurate. The detailed key steps in axial coding were described as the following (Neuman 1994):

- Researcher focused on the initial coded themes more than on the original data.
- Additional codes or new ideas emerged during this pass, and researcher renewed and examined initial codes.
- Researcher developed probes into the data, and made connections with lines of interviewing transcriptions.
- Researcher tried to identify the thoughts between the lines, ask questions of the evidence, and reveal features of the data.
- Researcher also created some new concepts and sub-categories by abstracting from the evidence and adjusted concepts to fit the evidence better.

- Researcher then collected additional evidence to address unresolved issues that appeared in the initial interviews, and repeated the whole process.

Finally a detailed coding scheme was developed after the processes of open coding and axial coding. The following scheme laid out the sample coding system applied in this research:

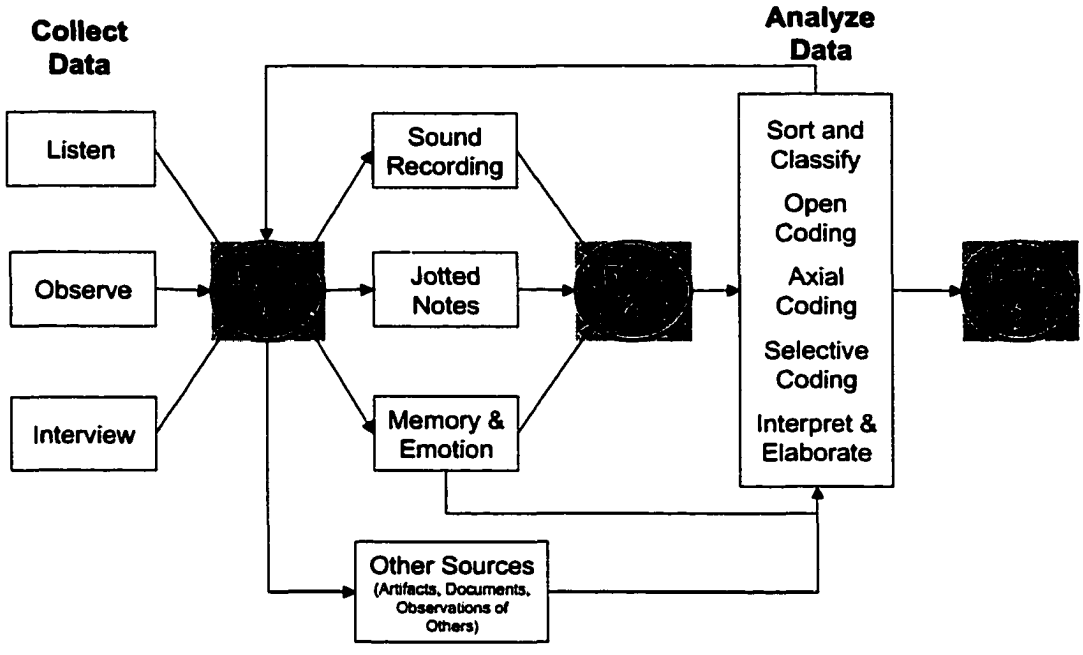
Main Coding Category	Secondary Coding Category
Critical contracting issues	· Generic project characteristics · Market condition · Scope of the work · Engineer selection methods · Core competences · Complexity and integration of the work · Working relationship · Client's preference · Business development opportunity · Pre-requests for the work · Schedule and level of engineering definition · Risk allocation · Contractual structure & contract type · Boiler-plate contract form · Targeted profit margin
General phenomena of trust in the contracting environment	· Good working relationship with the client · Open communication · Work efficiently · Senior employee's good ability to work with clients · Strong technical competence of senior employees · Totally represented as the Owner's agent · Striving to get the job done · Minimized number of problems · Not driving for getting the lowest priced EPC contract · Client satisfaction · Not taking advantage of poor relationship · Less documentations · Client's forgiveness of Engineer's mistakes

Main Coding Category	Secondary Coding Category	
Performance of "Trust Colour Model" respectively at the individual and corporate levels	⊗ **Corporate level** · Blue Trust took the first presence · Blue Trust was used in Engineer screening, evaluation and final selection · Yellow Trust was a significant evaluating consideration in long listing and short listing. · Red Trust on individual level would subconsciously affect the decision and evaluation of the Engineer at the organizational level	⊗ **Individual Level** · Red Trust took the first presence · Yellow Trust and Blue Trust acted as back-ups to verify the viability of Red Trust · Yellow Trust would be a hurdle for Red Trust · Red Trust took precedence in pre-awarding presentation, interviewing, site visiting and negotiations · Yellow Trust would get more attention at the individual level by smaller companies · Blue Trust was automatically transferred to individual from the corporation
Priority shifting among three primary trust colour in the Engineer selection process	**EPC company's view** · Red Trust → Blue Trust → Yellow Trust → Red Trust · OR · Blue Trust → Red Trust → Yellow Trust → Red Trust	**Oil company's view** · Blue Trust → Yellow Trust → Red Trust · OR · Yellow Trust → Blue Trust → Yellow Trust → Red Trust
Erosion and diminishment of three primary trust colours in initial contracting	· Blue Trust was massive · Blue Trust was solid and heavier · Yellow Trust was won over time, and lost easily · Once Yellow Trust was discontinued, it took the same amount of time or longer time to build up · Red Trust largely was built at the first several meetings or immediately · On some occasions, Red Trust could be developed over time · Red Trust was easy to lose, and easy to win.	
Transferability of different trust colours at the individual and corporate levels	· Lack of Blue Trust would undermine Yellow Trust and Red Trust · Blue Trust could be remedied by Yellow Trust · Yellow Trust was a hurdle for Red Trust · Yellow Trust would affect the evaluation of Blue Trust · Lack of Yellow Trust would erode Red Trust · Red Trust influenced the effort contributed on building the other two trust colours · Red Trust was automatically credited based on Yellow Trust and Blue Trust · Red Trust with the support of Yellow Trust would speed up the contracting processes	

Main Coding Category	Secondary Coding Category
Benefit of having trust in contracting situation	· Reduced cost and direct dollar value of a contract · Lower profit margin of Engineer's contract · Less claims related to contract · Gaining reputation · Less defensive in working environment · Increased friend territory vs. enemy territory · Client's appreciation and acknowledgement of Engineer's effort · Fun to work

Table 5-3 Sample Coding System for In-depth Interviews

After the first two stages of coding, the researcher had identified major themes and created the network of codes. Thus the *selective coding* was applied. It involved scanning the data and previous codes. The researcher looked selectively for cases that illustrated themes and made comparisons after most or all data collection was completed (Strauss and Corbin 1990). The researcher often went back to certain sections of the interview transcriptions, read thoroughly between the lines, compared with original codes and enriched the understanding of individual answers. Thus a concept verification and creation process was applied (Ellen 1984). The detailed process of qualitative data analysis was show in ***Figure 5-1***.



Notes: Data 1 = Raw data, experiences of researcher; Data 2 = Recorded data, physical record of experiences; Data 3 = Selected, processes data in a final report)

Source: Ellen, R. F. (1984). Ethnographic Research: A Guide To General Conduct. Orlando, Academic Press., Neuman, W. L. (1997). Social Research Methods: Qualitative And Quantitative Approaches. Boston, Allyn & Bacon.

Figure 5-1 Qualitative Data Analysis Process

CHAPTER 6 RESULT DISCUSSION

In this chapter, the findings from this two-phased research are presented. This chapter provides an overview of the key research results. These results form an integrated part of the overall results, which includes the literature review and research methods development. This chapter will discuss the following major findings, which are in the chronological sequence of this research:

- Identify the contracting parties' roles in designing a contract strategy.
- Review the key factors that need to be considered in designing and developing a contract strategy, where trust emerges as an important factor.
- Identify the connections between trust and other key contracting factors to be considered when designing a contract strategy.
- Analyze the current industrial practice of Engineer selection in the Oil and Gas industry in Alberta, Canada. The features of this Engineer selection process are discussed as well.
- Obtain a greater understanding of the behaviour and role of the three dimensions of trust proposed in "Trust Colour Model" throughout the Engineer selection process. This understanding can significantly influence and accelerate decision-making in selecting the right Engineer.

- Discover the influence of particular dimensions of trust at each sub-phase of the Engineer selection process.
- Extend the understanding of the "Trust Colour Model" at both the interpersonal and interorganizational levels.
- Generate the dynamic cycles of trust throughout the whole process of Engineer selection.
- Compare the understanding and appreciation of trust from both the Owner and Engineer's standpoints. These comparisons provide some useful insights for the contracting parties to work successfully in order to meet their mutual objectives for future projects.
- Describe the general approaches to trust building at the Engineer selection stage.

6.1 Results from Pilot phase – Modified Delphi Method

6.1.1 Roles of Contracting Parties in Designing a Contract Strategy

It is important to understand the roles of different contracting parties at the early stages of project contracting. It can provide background knowledge of the power status, responsibility requirements and coordination work between the parties.

The results show that project managers on the Owner's side take the leading role in initiating a contract strategy. This occurred in 42% of the sample responses. The project

manager is the person who takes the final responsibility for the outcomes of a contract or project. He can consult with project team members, get concurrence from the senior management and make a final decision. He also updates and manages the changes regarding the scope, cost, time, safety and quality through a well thought-out contract strategy.

In 33% of the sample responses the Owner's contract manager acts as the key person in the project team to be responsible for contract planning and design. He proactively coordinates engineers in all disciplines and encourages participants from all disciplines to present issues, discuss, understand and accept responsibilities.

Finally, in about 25% of the cases the Owner, Engineer, and other contractors jointly develop the contract strategy. In this situation, each party involved has equal power to represent the interests and concerns of his group. This fair contracting environment creates and articulates common goals, objectives, success criteria, and incentive schemes, etc. It also facilitates shared information, clear understanding, and adequate communication.

Surprisingly, the contract strategy is not developed at the executive level or by senior management. This differed from the researcher's perception that the executives had a high influence on contract strategy development. It also demonstrates the increasing

appreciation of the collaborative contributions across disciplines in an organization and among different interest groups.

6.1.2 Key Issues in Contract Strategy Design - Emergence of Trust

This research identified sixteen key factors that need to be considered in designing and developing a contract strategy. The definitions of the key contracting factors are summarized based on the analysis of interviewing records, and review of literature. These definitions are largely accepted by the participants, and also help the participants to understand the meaning of those factors more precisely. (See the definitions of the key contracting factors in *Table 6-1*.) The rankings of the sixteen key contracting considerations are developed as well. The results present a high degree of consensus among the participants in viewing the importance of the contracting factors. (See *Table 6-2* for detailed ranks.) The rankings were generated by SPSS, and presented with descriptive statistic analysis. (See *Appendix VI* for details.)

Definitions of Key Factors in Contract Strategy Design	
1.	***Alignment***: The bringing of separate parts into line. This may refer to physical parts or to notional parts such as goals and objectives. It includes two levels: horizontal and vertical alignments. Reach common understanding across contracting parties, and down to the lowest level of the individual project team participant.
2.	***Allocation of Risk:*** The process of allocating risk onto an activity or a specific contracting party. (e.g. identify risks, analyze risk mitigation plan, and allocate risk to the right party.)
3.	***Contract Form:*** The formal legal agreement that is signed by the parties that gives effect to the contract. It can be classified as: a letter of agreement, short form of contract, long form contract and form for profession service.

Definitions of Key Factors in Contract Strategy Design	
4.	***Contract Framework:*** A customer-prepared breakout or subdivision of a project typically down to level three which subdivides the project into all its major service or product elements, integrates the customer and Engineer effort, provides a framework for the planning, control, and reporting. (e.g. flexible vs. tightly structured, broad vs. narrow structured)
5.	***Contract Type:*** The various forms of contracts by which goods/services can be acquired. Such as "Cost plus fixed fee", "Cost plus incentive fee", "Cost plus percentage of cost", "Firm fixed price", "Fixed price plus incentive fee", and "Unit price contracts".
6.	***Contractor Selection Methods:*** This involves obtaining information (bids and proposals) from prospective sellers, the receipt of bids or proposals, and the application of the evaluation criteria to select a provider. (i.e. pick the correct selection method to meet the correct contract model.)
7.	***Contractual Relationship:*** A logical or natural association between parties secured by contract. (e.g. respective contractual relationship in conventional contract, evergreen contract, preferred supplier, strategic alliance, partnership)
8.	***Control Mechanism:*** A set of specified procedures for controlling (e.g. project time, resources, quality, safety program, reporting, documenting, auditing).
9.	***Dispute Resolution Mechanism:*** An informal or formalized system for dealing with grievances and administering corrective justice as part of collective negotiating agreements. (e.g. consistent change order management processes.)
10.	***Incentive Scheme:*** A scheme by which the Engineer will receive extra pay or other rewards if certain targets or objectives are achieved. The targets are usually expressed as a certain quantity in a certain time, cost and safety criteria. (e.g. formulation of the incentive distribution among participants from different disciplines and parties from different organizations.)
11.	***Legal Awareness:*** An awareness of the relevant legal duties, rights, and processes, which govern in a particular project situation. It may cover potential causes of disputes, liabilities, breaches of contract, means of resolving a dispute, and legal basics of industrial relations. (e.g. Influence of the legal department to the design of contract strategy.)
12.	***Negotiation Methods:*** The art and process of achieving, to the greatest extent possible, what you want from a transaction while leaving all parties sufficiently content that the relationship subsequently works well. (e.g. Define the 'non-negotiable' part of contract vs. on-going negotiable part of the contract.)
13.	***Project execution strategy:*** A plan which normally consider factors such as: (1) strength, expertise and experience in similar projects of mother company, (2) working environment of partners, (3) project environment or scene, (4) project characteristics: size, complexity, geographical location, stakeholders, technical requirements and project constraints, and (5) Project Objectives: targeted performance standards, cost, schedule, quality, safety.
14.	***Risk Allocation:*** The process of allocating risk onto an activity or a specific contracting party in response to threats. All parties to a project are at risk to some extent, whatever the contract between them. (e.g. identify risks, analyze risk mitigation plan, and allocate risk to the right party.)

Definitions of Key Factors in Contract Strategy Design	
15.	***Scope Definition***: A breakdown of deliverables into smaller manageable parts, which is to ensure better control. (e.g. broad vs. detailed, service vs. product.)
16.	***Trust:*** An expectancy of positive (or nonnegative) outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty. Trust is having the confidence that the other party will not exploit one's vulnerabilities.

Table 6-1 Definitions of Key Factors in Contract Strategy Design

From the results, project related factors such as project execution strategy, scope definition, alignment of parties and risk allocation between the parties are the major prerequisites to other contract related factors such as the Engineer selection methods, contract form, and contract type etc. Generally speaking, project related factors provide the project scenario to a particular contract, where the contract strategy should evolve within that framework.

The contract specified factors are ordered in a sequence according to their importance and influence level in developing a contract strategy. Details of the rankings of the key contracting factors in designing a contract strategy are shown in the ***Table 6-2.***

In the ranking of the key contracting factors, trust emerges as the fifth most important factor to be considered in laying out the contract strategy. It demonstrates the importance of taking trust into consideration when designing a contract strategy.

Contracting Considerations	Number of Respondents	Ranking	
Project Execution Strategy	12	1	Project Specific Issues
Scope Definition	12	2	
Alignment	12	3	
Risk Allocation	12	4	
TRUST	**12**	**5**	* Bridge
Contractual Relationship	12	6	Contract Specific Issues
Company Characteristics	12	7	
Control Mechanism	12	8	
Contracting Framework	12	9	
Contractor Selection Methods	12	10	
Contract Type	12	11	
Contract Forms	12	12	
Dispute Resolution Mechanism	12	13	
Incentive Scheme	12	14	
Negotiation Methods	12	15	
Legal Awareness and Involvement	12	16	

Table 6-2 Rankings of Key Factors in Contract Strategy Design

The emergence of trust also has the causal relationship with the results of 'who took the leading role' in designing a contract strategy. The requirement of trust corresponds to a successful joint effort in developing a contract strategy. Trust is required to tie together different disciplines within the organization and to connect different interest groups to adhere to the mutual objectives as well. Trust can support the development of semi-formal working relationships outside the boundary of the formal contractual setting. Also, trust can enhance the efficiency of the formal contractual relationship through the mutual understanding of all parties.

On the other hand, there is a slight difference in the valuation of trust between the Owners (Oil and Gas companies) and the Engineers (EPC firms). The Owners rank trust as the seventh important consideration, while the Engineer position trust as fifth out of the sixteen factors. It shows that the Engineers, who act as the suppliers of engineering services, present higher value on trust than the Owners, who are the buyers of engineering service. This finding is consistent with other research findings of Ellram (1995), where suppliers pay more attention to the trust relationship than the buyers do. (See *Table 6-3* for details.)

Ranks / Contracting Factors	General Result [a]	Oil & Gas Company [b]	EPC Firm [c]
Project Execution Strategy	1	2	1
Scope Definition	2	1	2
Alignment	3	3	3
Risk Allocation	4	4	4
TRUST	**5**	**7**	**5**
Contractual Relationship	6	5	8
Company Characteristics	7	6	10
Contracting Framework	8	9	7
Control Mechanism	9	8	11
Contractor Selection Methods	10	10	12
Contract Type	11	11	6
Contract Forms	12	13	9
Dispute Resolution Mechanism	13	15	13
Incentive Scheme	14	12	15
Legal Awareness and Involvement	15	15	16
Negotiation Methods	16	16	14

Note:

a. No. of Total Participants is 12.

b. No. of Participants from Oil & Gas Company is 8.

c. No. of Participants from EPC company is 4.

Table 6-3 Rank Comparisons Between Oil Companies and EPC Firms

6.1.3 Connection between "Trust Colour Model" and Key Contracting Factors

In a heated market for oil project investment, Oil and Gas Companies sometimes compete for the same scarce resources to implement big investment projects. On the other hand the EPC Firms are trying to show their best to the Owner and look forward to those profitable projects. Thus, due to the fierce competition faced by both the Owners and Engineers, the traditional short-term adversarial contract should be changed into a long-term obligatory contract. The Owners are becoming sagacious in picking the trustworthy Engineers and sharing the risks reasonably and profitably with them. The Engineers are increasingly conscious of having to provide an intellectual service in both a technically competent and organizationally compatible way.

From the first two rounds of the Delphi study, trust emerges as one of the top key factors to be considered in developing a contract strategy. On the other hand, there is a causal relationship between trust and the other key contracting factors.

The results show that, for a particular contracting consideration, there are particular dimensions of trust in "Trust Colour Model" that have the predominant influence and connection. The major results are summarized as follows. Also, see ***Appendix IX*** for statistical details and ***Figure 6-1*** for the presentation.

- The three dimensions of trust proposed in the "Trust Colour Model" have an important influence on the Engineer Selection Methods and Contractual Relationship. The results suggest the necessity of further studying the behaviour and role of trust throughout the Engineer selection process in the main phase of this research.
- Red Trust is viewed as important in achieving alignment among contracting parties. This finding implies that certain chemistry should exist in the relationship in order to create successful alignment among the parties. The alignment process among contracting parties is more like a chemistry testing through proper information sharing, interactive discussion, document exchanges and personal contacts.
- The existence of Blue Trust and Yellow Trust among the parties will greatly influence risk allocation within a contract environment. Results show that the Blue Trust in the other's ability to absorb the risks is highly valued. Also, the Yellow Trust in people's ethical behaviour to take care of the others' interests, and applying the responsibilities laid out in the documents is important to effective risk allocation as well.
- Yellow Trust influences the structure of the Control Mechanism, and the level of legal involvement at the early stages of contracting. This is consistent with the presumption that legal tools and documents are used as a replacement for Yellow Trust, where the ethical behaviour and a care-taking mentality are missing.
- Generally speaking, there is a higher level of recognition of the importance of Yellow Trust compared to Red Trust and Blue Trust. This shows that Yellow Trust has some

level of influence on most of the key contracting factors. Thus, we can see that a care-taking mentality, predictable behaviour, and consistent performance are highly valued by industrial practitioners. With Yellow Trust in place, this creates a stable foundation for the contracting parties to work collaboratively within or outside the boundaries of a contract. It can also smooth the whole contracting process, because there will be less doubt and questioning of the level of the other party's goodwill blocking the communication channels.

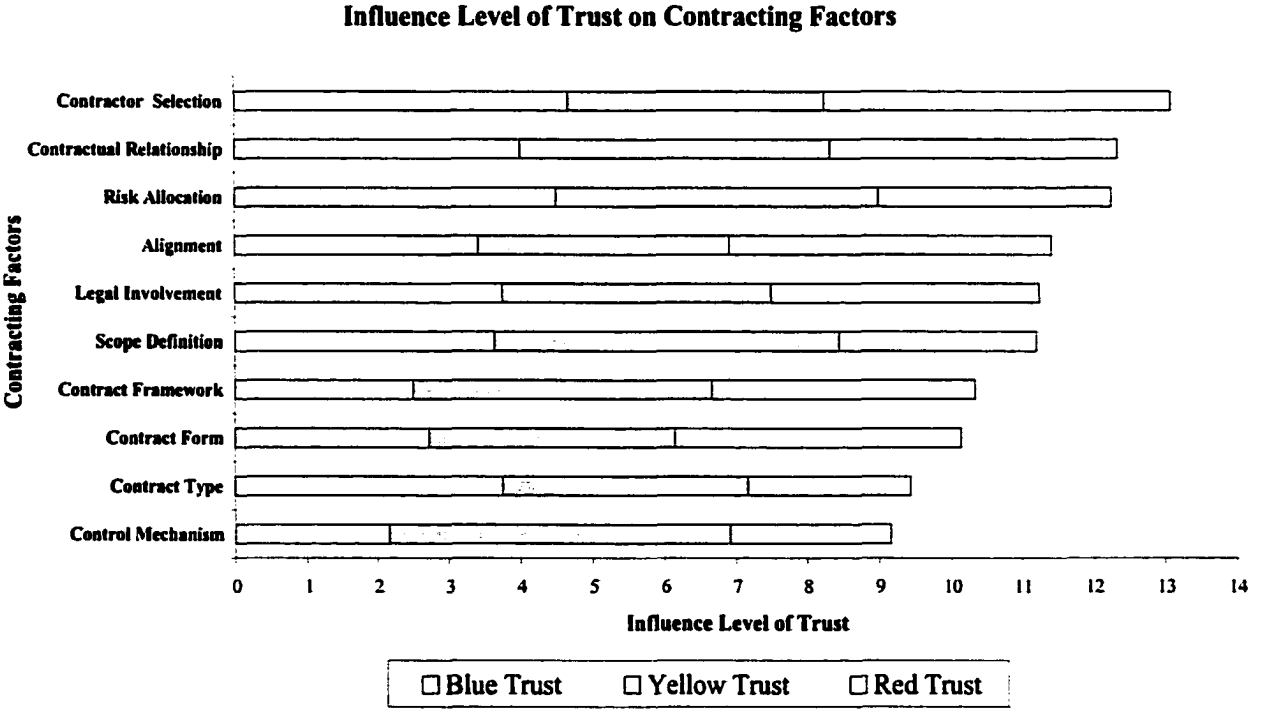


Figure 6-1 Connection of "Trust Colour Model" with Key Contracting Factors

6.2 RESULTS FROM MAIN PHASE – IN-DEPTH INTERVIEWS

6.2.1 Current Engineer Selection Practice in Oil and Gas Industry

6.2.1.1 Engineer Selection Methods

Competitive bidding is the most popular Engineer selection method used by the Oil and Gas companies in awarding an EPC service contract. There are a couple of the reasons for implementing competitive bidding from the Owner' perspective:

(1) Owners generally have had, and still have, the impression that only through competitive bidding can they get the lowest bid, and there is no way to know the real project price without price competition among bidders.

(2) As most projects in the Calgary Oil and Gas industry have a high community visibility, a traceable and auditable Engineer selection process is considered important for the sake of creating proper documentation and visible fairness to the community at large.

(3) The company culture, developed and transformed over the years within its competitive environment, has a relatively significant influence on the Engineer selection process and evaluation criteria. To a certain extent, the history and tradition of selecting an Engineer restrict other alternative selection methods in an Owner organization.

(4) The reliability of a sound social control system, such as a written constitution; local, state and federal laws; and an elaborate system of courts and penal institutions to control and regulate the behaviour is dominant in Canada and specifically in North America generally. Thus the adoption of legally rigid competitive tendering method becomes an obvious preferred and most "proper" method.

In the above situations, the EPC firms are continuously making an effort to improve their services and look forward to opportunities where business can be awarded through sole sourcing. In that mentality, the EPC firms are continuously working on their relationships to create trust with their clients - Oil and Gas companies. Being an agent of the Owner, the EPC firm makes efforts to protect the Owner's benefit as far as possible. On the other hand, it also keeps its own profit at a safe level with the Owner's contribution.

There does exist, however, a self-contradictory attitude when the EPC firms are functioning as the Owner's agent in selecting sub-contractors. In that situation, competitive tendering is commonly the first and last choice of the EPC firms unless the Owner makes an exception. Sole-source generally, is not considered when the EPC firms are selecting their sub-contractors. In that scenario, when the EPC firms have the power in their hands, their behaviours and mentalities are much more similar to the Oil and Gas companies in picking their Engineers.

6.2.1.2 Engineer Selection Process – Competitive Bidding

In this research, the general practice of selecting an Engineer by competitive bidding is identified. This process is described in the diagram laid out in ***Figure 6-2***. In this Engineer selection process, the Owner acts as the bid organizer to manage the bidding process, and the Engineers act as bidders competing for the job. The process, to a large extent, is aligned with the one identified by Walesh (2002) in selecting an engineering consultant, published by the American Society of Civil Engineers. In addition, there are several key issues and critical procedures, which are typical features of the local Oil and Gas industry.

(1) In most repetitive projects the pre-screening starts with direct and indirect reference checking by the Owner organization. Large-scale research of qualified candidates more often is launched for projects requiring new technology, or when the Owner has no assessable database at hand to find the potential candidates.

(2) If the Owner has had any unhappy previous working experience with a particular Engineer, there will be a tendency to avoid that Engineer in long listing. The Owner limits the possibility of repeating a bad experience, in order to build a foundation for good working relationships on the new project.

(3) A bidder conference is held immediately after the short list of prospective Engineers has been created. The early engagement and face-to-face interaction between the Owner and these Engineers will allow a longer period to adapt to each other. The

individual agendas and objectives of the different parties can be presented at the outset. Ambiguities can be clarified, and negative assumption will be avoided. This increases the possibility of having open communication, and engaging in a collaborative working environment between the parties.

(4) Bidder evaluation is a two-phase process: general scoring with predetermined evaluation criteria and interviewing. In the first phase, the bids are evaluated according to the technical and commercial evaluation criteria developed by the Owner. This implies more objective ranking and a mathematical method of analysis.

(5) In the second phase of bidder evaluation, interviews will be held after the objective evaluation score of each bidder has been developed. Generally, all the bidders are invited to be interviewed and to present their proposals. This creates fair treatment for all the bidders. Further, the bidders will gain the sense that the Owner trusts each of them by giving them a fair opportunity. This is a significant difference with other selection processes, where only the best bidder was invited to interview (Walesh 2000). Also in this interview, the key project personnel will interact with the Owner's project team to assess the chemistry and determine whether there could be a meeting of the minds. The bidders' proposals can be further explored through the formal presentation and discussion with the bidder. Some synergistic and valuable solutions can emerge from this interviewing process.

(6) Finally the objective evaluation results will be adjusted and reconsidered together with the subjective results from the interview evaluation. The final award decision will be a combination of objective and subjective evaluation results.

In summary, there are some differences in the amount of information released and the degree of openness in communication, between the practices of competitive tendering in the Oil and Gas industry community covered by this research, and that normally accepted elsewhere. In the competitive bidding – examples noted in this research, there are more opportunities for both the Owners and Engineers to have face-to-face contact. Also, there are higher requirements for both parties to interact in a trustworthy way.

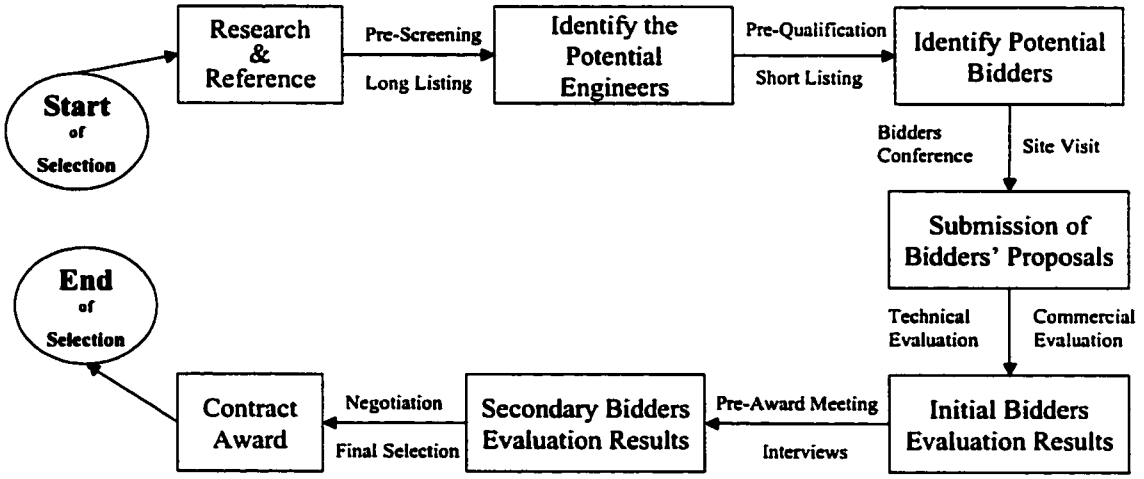


Figure 6-2 Engineer Selection Process – Oil & Gas Industry

6.2.2 Understanding of "Trust Colour Model"

Generally speaking, the behaviours and roles of the three dimensions of trust proposed in "Trust Colour Model" are recognized in the practice of Engineer selection. Findings of this research show that every dimension of trust in the "Trust Colour Model" will influence the decisions in the Engineer selection process to some extent. The following section summarizes the key findings regarding the general performance of "Trust Colour Model".

- The literature review shows that trust is recognized as important for contract execution, but not necessarily in the initial contracting stages. However, the findings of this research show that without making the effort to create a trust relationship or environment from outset, the foundation for a good working relationship and a trust-based relationship is absent, thus impacting the subsequent contract implementation. Furthermore, a longer adaptation period for both contracting parties will already have been missed when parties enter the contract implementation stage.

- Results of this research strongly suggest that Blue Trust is well recognized as a thermometer of the trust relationship in an established high trust relationship. Blue Trust is viewed as more important in a declared high trust relationship. Thus, both contracting parties put a lot effort into creating and testing the existence of Blue Trust.

- In a low trust relationship, Red Trust is normally missing. Typically no effort is exerted in developing Red Trust. When Red Trust is missing, the parties no longer feel right about the project or contract. In those situations where Red Trust is missing, parties simply believe that no trust exists between them anymore. Lack of effort in building Red Trust, a necessary ingredient in a high trust relationship, will result in a low trust relationship instead.

- Yellow Trust is the turning point between the beliefs of 'trust' and 'distrust'. 'Care-taking' is an important ethical element of project contracting, which is also an indicator of Yellow Trust. Thus, the existence of Yellow Trust between contracting parties becomes critical to the status of the trust relationship between the contracting parties.

- Red Trust is regarded as the primary trust dimension that influences the relationships and behaviour, when individuals from different contracting organizations interact with each other. In other words, Red Trust more often has an influence at the individual level. This is because when human beings meet somebody for the first sight, they tend to use intuition and raw emotion to judge people and to assess whether they feel right to each other.

- The results of this research strongly suggest that Blue Trust is well recognized as an indicator of a recognized high trust relationship. While in a low trust relationship, Red Trust is missing, and no explicit effort appears to be exerted on developing it.

- Generally, in a declared high trust relationship, all the three trust colours will be present in a balanced way. More importantly, it is the existence of Red Trust that makes both parties feel good and declare high trust level. However, the credit of creating a high trust relationship is often wrongly attributed to Blue Trust. This is simply because Blue Trust is auditable and very visible to the communities at large.

- In a deemed low trust relationship, the three trust colours don't exist in a balanced way. More often Red Trust is ranked or assessed lower than the other two dimensions. There may still be a high level of Blue Trust and Yellow Trust in the relationship. But in that situation, the existence of the Blue Trust and Yellow Trust are not well recognized, while more blame is put on the missing Red Trust. As a result, it causes more frustrate in the minds of the parties.

6.2.2.1 Performance of Blue Trust

Image of Blue Trust

Blue Trust answers the question, "Can you perform or do the task?" It can be interpreted as reliance on the competence of the other party as a basis on which to do business. This

type of trust can be transferred through references, track record, reputation and other traceable and auditable vehicles. In other words, we look for tangible evidence in some form that helps us to build a knowledge-based picture of that party's capability (Hartman and Romahn 1999; Hartman 2000).

- Most participants view Blue Trust as having a solid status.

A company earns Blue Trust over many years of industrial practice. It is the accumulation of the in individual engineers' competence. It is the result of success in numerous previous projects, a good reputation in the industrial community, and competitiveness in the market place. As the Blue Trust can only be developed over years within a company, it creates a solid and collective image in particular project circumstances.

- Blue Trust is cumulative in nature, and the level of Blue Trust that one company earned from others is an accumulated result from different sources.

In Engineer evaluation, one Engineer may have earned a higher level of Blue Trust in a specific technical area, while in other areas only a lower score for Blue Trust can be obtained. In another case, certain key personnel join a prospective Engineering contractor may have earned a high level of Blue Trust with the Owner, while for other personnel there is only a medium or low level of Blue Trust. Thus in the Engineer evaluation and selection process, the single final evaluation score should represent the

Engineering firm's overall capability to deliver the work, based on the level of trust in both the corporate and individual competence.

Behaviour of Blue Trust

- In competitive bidding, the structure of the Engineer selection process and evaluation criteria primarily focuses on assessing the degree of Blue Trust that the Owner has for each of the bidders.

More specifically, most of the written evaluation activities and criteria are based on quantifying this traceable, and auditable information. These evaluation activities start with searching for the potential qualified engineers, literature search (reviews of past projects and search for engineering expertise), and reference checking. They are aimed at examining the experience and capability of a bidder on similar projects. Afterwards, more effort is put into investigating the detailed engineering resources of the EPC firms, size and time frame of previous implemented projects, locations of the projects and so on. In the formal proposal evaluation process, detailed checklists and rigid scoring systems are typically applied to assess safety records, quality of delivered projects, quality of engineering services, and client references. This evaluation work, to a large extent, is to establish or validate the level of the Blue Trust for the relationship.

- Blue Trust can easily be transmitted from one party to another.

Blue Trust can be passed on between parties even without a 'trusting medium' – a person to whom both the trust sender (trustor) and receiver (trustee) have a high level of confidence(See *Figure 6-3*). Written proof, formal document and reference checks are all effective tools and channels by which Blue Trust can be conveyed. Quite often written documentation acts more efficiently than any 'trusting medium' in passing on Blue Trust from the trustee and trustor. This phenoma is decided by the nature of Blue Trust, which normally requires a significant traceable and auditable trail of evidence rather than personal experience and word of mouth.

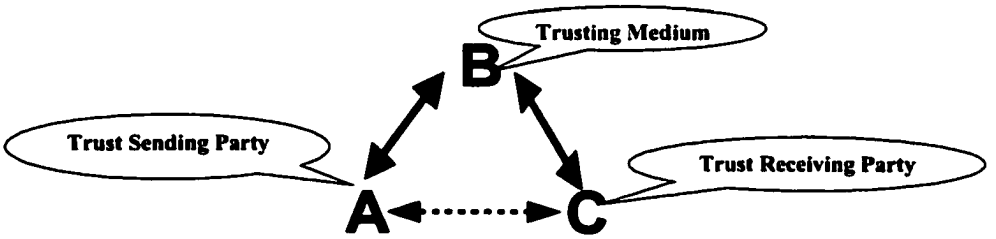


Figure 6-3 Trust Transferring Triangle

6.2.2.2 Performance of Yellow Trust

Image of Yellow Trust

Yellow Trust addresses the answer to the question: "Can I rely on you to care for my best interests and will you behave consistently?" It represents our ability to rely on others to preserve our interests. It normally requires some direct experience in a relationship before

we are comfortable with the level that we are willing to work with. In the contracting environment, selecting the right Engineer who can not only provide the required service well, but can do so in a professional way and with good will, are the fundamental objectives. Only if the parties are able to perform consistently according to relevant codes of ethics and regulations in a way that is agreed upon by both sides, can the integrity and care-taking behaviour of the parties be perceived and responded to. In other words, an intent to perform the required obligations and the consistency of the contractor's performance are critical to any contracting process (Hartman and Romahn 1999; Hartman 2000).

- Yellow Trust can be boiled down to two components: performing consistently and taking care of the other party's interests.

Through the interviews, most participants will boil the definition of Yellow Trust down to two components: 1) take care of the other party' interests and 2) perform consistently. In other words, Engineer's previous performance with an Owner created the consistency through repeated business. The Engineer's delivery of satisfactory service, demonstrates an attitude of care to the Owner.

- Yellow Trust is highly dependent upon consistent performance.

In Yellow Trust, once one party's performance becomes inconsistent this type of trust is broken or significantly damaged. The level of Yellow Trust earned prior to that point is

essentially lost. In order to recover from this, and regain Yellow Trust, the journey has to be restarted. The parties to the contract have to work at recovering the lost Yellow Trust. Generally, more sincere and visible care-taking behaviour is required not only to recover the other party's trust but to boost the confidence level as well.

Furthermore, the more often Yellow Trust is broken, the longer it takes and the harder it is to recover. As the frequency of breaking Yellow Trust increase, the parties start questioning the existence of this type trust, and a level of doubt will inhibit or stop recovery.

- Yellow Trust is classified as liquid rather solid.

Yellow trust is tangible but not in quite the same way as same as the more solid Blue Trust. Yellow Trust can be maintained if enough effort and attention are given to doing so. However, Yellow Trust is sensitive to external factors, which might more readily change its status. Consistent performance can easily be broken by external influence, thus the Yellow Trust is not that stable.

Behaviour of Yellow Trust

Throughout the Engineer selection process, the Owner aims to select a reliable Engineer to deliver a successful project. The potential Engineer's interest in the project and willingness to cooperate and comply with the Owner's expected standards for

professional integrity, become important in convincing the Owner to choose Engineer A instead of Engineer B.

- Yellow Trust cannot be developed within a short time frame, simply because consistent performance needs to be assessed over time.

Thus, the Owner can only draw upon past experience with a particular Engineer on a different project, and transfer that level of Yellow Trust into the current project. Some interviewees from the Owner side point out they will give credit for Yellow Trust at the long-list stage in the selection process of a current project to evaluate the Engineer with whom they are familiar. That is to say, they will subconsciously screen out those Engineers in whom they have low level of integrity (Yellow) trust. Thus, the Engineer who has not earned a significant high level of Yellow Trust from the Owner will be out of the game immediately.

- Yellow Trust functions as an unpublished and often subconscious evaluation criterion.

Results of this research show that there are few explicit Engineer evaluation criteria used to assess the level of Yellow Trust between the contracting parties. One obvious criterion, however, is previous working experience with the Owner. More often Yellow Trust is assessed through undocumented and even subconscious evaluation criteria, which are

applied by individual project managers. To a certain extent, these criteria are not open to the bidders.

- Yellow Trust can be developed faster through referral.

Yellow Trust can also be developed quicker through certain 'trusting medium'. Such a medium is typically the person with whom both the trust sender (trustor) and receiver (trustee) have a high level of Yellow and Red Trust. Some amount of Yellow Trust that the 'trusting medium' has with the trust sender can be transferred to the trust receiver through personal experience and word of mouth or other recommendation from the 'trusting medium'. Thus the trust receiver can develop a level of Yellow Trust within a shorter period through reliable referrals.

- Yellow Trust will be questioned in facing long and complex contract documents.

EPC firms will question the level of Yellow Trust when they receive long and complicated contract documents from an Owner. The perception is that there must be a lot of unfair, high-risk terms and conditions existing in such documents. Such contract documents from an Owner send out the signal that "I am not going to take care of your interest, but only mine." In this situation, although the initial contacts before the issue of contract documents may be good and some Yellow Trust has been developed, the inconsistent care-taking behaviour demonstrated by issue of such a large, complex contract significantly damages any Yellow Trust earned to that point.

6.2.2.3 Performance of Red Trust

Image of Red Trust

Red Trust answers the question: "Does it feel right?" Red Trust can be divided into two sub categories "Raw Emotion" and "Rapid-Processing". Raw emotion is our immediate response to a situation based on prejudices, biases, education, DNA, culture and the myriad of factors that build our character and personality. The second part, 'rapid processing' relates to a person's subconscious recognition of situations or patterns and it is a learned or trained response. This is the very fast thinking that we do without being conscious of it. "Gut reaction" is a term often used to describe how we behave with Red Trust (Hartman and Romahn 1999; Hartman 2000).

- The time required to form Red Trust is short.

As the development of Red Trust is closely linked to 'gut reaction', the creation process is extremely short. It is based more on rapid processing of accumulated experience in response to certain phenomena. More accurately, human beings generally do this processing subconsciously. In most cases, Red Trust will be established within a couple of minutes after start of a meeting, or after the first couple of meetings between parties. Generally, if Red Trust does not develop in the short term, it is probably impossible to establish in the long run.

- Red Trust can have tremendous influence on the selection decision.

As Red Trust is composed, partially, of 'raw emotion', it sometimes can have uncontrollable influence on decisions. Emotion is generally viewed as a wave. When it happens and in what kind of form cannot be predicted. It comes with some power that can swamp other thoughts. Thus, interviewees agreed that it is good to avoid developing the portion of Red Trust that is affected by raw emotion. Rather, it is better to rely more on experience of past situations and certain phenomena when following "gut feel".

- Red Trust is unstable.

Red Trust functions more like the gas, which expands rapidly and can blow out of a container under a small temperature increase. By its very nature, Red Trust is extremely volatile, so is easy to lose and sometimes may be impossible to recover. Red Trust is not like Blue and Yellow Trust that is earned and lost in a relatively predictable and manageable way. Rather it emerges as a wave and can diminish forever in a flash.

Behaviour of Red Trust

- Red Trust starts to be developed in the first kick-off meeting, interview, on-site visit, and other encounters.

In the competitive bidding process, Red Trust generally develops in the first few meetings between the buyer and prospective vender. A large amount of Red Trust can be obtained within the first several interactions; some amount can be developed over longer

period of contacts, and in a few situations Red Trust can never develop between the parties. Sometimes, Red Trust simply cannot be improved by the amount of effort that both parties put into the relationship. This suggests that to develop Red Trust requires a certain amount of the right "chemistry" between the parties to allow them to feel right.

- Development of Red Trust is more determined by individual's past experience and knowledge.

The 'rapid processing' portion of the Red Trust relates largely to an individual's experience and knowledge. The value of a qualified and successful project manager lies, in no small part, in his ability to apply rapid processing-based decision-making at a critical moment. Interviewees agreed that it is important to pick the project manager who can easily develop Red Trust with the Owners, and properly use his gut reactions according to the circumstances.

- Red Trust is very difficult to describe, audit and transmit.

Unlike Blue Trust and Yellow Trust that have at least some form of traceability, Red Trust is neither tangible nor auditable. This can be attributed to several factors. There is a need for the right 'chemistry' between contacting parties. This chemistry is linked to both 'raw emotion' and 'gut call' parts. Generally, only the interacting parties can experience the chemistry part of Red Trust, through direct contacts, conversations, and body

language. Even with a 'trusting medium' between the potential trust sender and receiver, it will be impossible to transmit Red Trust properly.

6.2.3 "Trust Colour Model" at Interpersonal and Interorganizational Levels

In this research, the understanding of the three dimensions of trust in "Trust Colour Model" is extended to both the interpersonal and interorganizational levels. Generally, Blue Trust is cumulative in nature, which more often is developed over long-term interactions between two organizations. On the other hand, Red Trust mainly functions at the interpersonal level and influences the individuals' behaviour. The following sections provide detailed discovery of the behaviour of the "Trust Colour Model" at both the interpersonal and interorganizational level.

6.2.3.1 The "Trust Colour Model" at the Interorganizational Level

Blue Trust at the Interorganizational Level

Blue Trust shows its presence more often at the interorganizational level. Generally, big Owner companies will rely more on Blue Trust in Engineer selection. The bidder's company profile, track record and references are evaluated through the paperwork. Normally these traceable records are developed over a long period through accumulated experience in different projects, and experience with certain parties.

Yellow Trust at the Interorganizational Level

Yellow Trust between the parties is highly influenced by the primary contracting documents issued by the Owner organization. In the business environment, the contract document has strong impact on regulating the working relationship. The content of the contract language and contract terms will send out signals of trust and distrust. The thick and complex contract documents from one party can arouse the other party's doubts regarding the good will of the contract's author. The parties start to question 'Do they really intend taking care of our interests? Is this the proper way of showing their good will?' In extreme cases, and in the absence of Yellow Trust, large, complex and rigid contract documents can function as a substitute for Yellow Trust between the organizations. The care-taking behaviours are presumably secured by the terms and conditions laid out in the contract.

Red Trust at the Interorganizational Level

In the first stages of the Engineer selection process, namely, the long listing, short listing, and bid evaluation, the Owners reported that Red Trust doesn't significantly influence decision-making. In the above stages, there is generally less need for face-to-face interaction between parties. Normally, for the Owner, a large amount of paperwork and objective evaluation replaces any subjective evaluation. More often parties believe that direct contact and relationship development are only necessary after they have objectively understood the Engineer's capability and experience. In ignorance of the role

and significance of Red Trust, the Owner sometimes simply picks a capable and experienced Engineer, even though both parties could not really work together later on.

However, at the later stages of the Engineer selection process, where Blue Trust and Yellow Trust have already been developed and are in place, Red Trust between corporations can subsequently evolve. At that time, both parties interact through face-to-face meetings, interviews and negotiations in order to complete the "chemistry test", and thus develop at least an adequate level of Red Trust.

6.2.3.2 The "Trust Colour Model" at the Interpersonal Level

Blue Trust at the Interpersonal Level

The project team is a collective body of people from different backgrounds with different skill sets. The requirements of skill for every team member are varied. Generally, parties will require a minimum level of Blue Trust between the key project personnel, but not necessarily with all the other project participants. Sometimes the Owner will favour a particular EPC firm when he has a high level of Blue Trust in an individual project manager or project engineers.

Generally Blue Trust, at the interpersonal level, will not significantly influence the decisions in bid evaluations. However, Blue Trust in key project personnels' strong and

unique competence can only help the company these people work for in the final evaluation results.

Yellow Trust at the Interpersonal Level

Some small companies will pay significant attention to Yellow Trust in certain key project individuals when searching for qualified bidders. Small Owner companies are more inclined to award a contract because of the existence of the particular favourite project engineers or managers in that EPC firm. Those Owner companies have less rigid Engineer selection processes and regulations and also less complicated evaluation criteria. So in the fast-paced oil market, for small Owner companies to survive, it is important to get the key project personnel and resources committed to their project, and to start the project on time.

Normally small companies will start the Engineer selection process by contacting several favourite engineers or project managers with whom they have been working on previous projects. A positive working experience arouses willingness from the Owner team to continue that relationship, and also to further develop that relationship. In this situation, the Owner saves a lot of time in testing the existence of Blue Trust, where the individuals have already shown their competence through past collaborations. Also, from the previous positive experience, the Owner already knows the integrity behaviour of those

individuals. As a result, there is already a certain level of Yellow Trust automatically credited to the individuals from this previous project experience.

Connection between Interpersonal and Interorganizational Yellow Trust

There is also some connection between Yellow Trust at the corporate level and the individual level. If the integrity behaviour of the corporation as a whole is acknowledged, the individual representatives of that organization will automatically get a certain amount of credit for Yellow Trust from the company they work for. If the individual's behaviour is of high integrity, he will get extra credit regarding his own level of Yellow Trust. However, if his performance is not consistent with the company's integrity, the level of Yellow Trust he originally had will go down immediately. It functions more like a 'trust credit account'[70]. In most situations, individual engineers need to pass a credit check for the existing amount of Yellow Trust. The Owner does this check. This basic credit normally stems from the mother company's pervious satisfactory working relationship with the Owner. Then the account will start with a certain amount of credit for Yellow Trust, within which the individuals can operate with some freedom. As the transactions go on, if the individuals do well, the credit line of Yellow Trust will increase, and the credit line will go down if the individual engineer performs badly and looses Yellow Trust.

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[70] Ren, L. (2001). Interview Transcripts with Martin Gough. Calgary, University of Calgary.

Yellow Trust is always based on behavioural consistency. Once consistency is broken, there is a possibility that Yellow Trust will immediately diminish or disappear. Yellow Trust at the interorganizational level, because of the close identity it has to the reputation of the mother company, can be sustained through several blows of low integrity performance. On the other hand, Yellow Trust at the interpersonal level can be easily eliminated because of a one-time careless inappropriate performance. Interpersonal Yellow Trust is easier to question than the interorganizational form, because of the high recognition and requirement for an individuals' integrity by regulated professional societies such as provincial engineer associations.

Red Trust at the Interpersonal Level

Red Trust at the interpersonal level was well recognized by most of the research participants. As a human being, the test of 'does it feel right?' is always the first unconscious reaction in an initial face-to-face interaction. For senior management, apply their knowledge and experience to analysis of problems, and successfully using their "gut feel" to make decisions is one of their key assets. The value of a good project manager lies, in no small party in using his "gut feel" properly, and creating a higher possibility of success in decisions. With the help of "gut feel", managers will feel right about a relationship with a new counter party in a short period.

Some of the research participants from EPC firms emphasized the importance of Red Trust in working with the Owners. A certain amount of effort is put in to select the senior management people with good interpersonal skills and trust-building traits to work with the Owner, in order to develop adequate levels of Red Trust with the Owner. It was seen as more effective to pick the senior Engineering management people from those who can have better "chemistry" with a particular Owner's project team. The chemistry helps constructively develop the emotional portion of Red Trust between the parties. Furthermore, the appointment of an experienced project manager who can apply this gut feel properly is better able to improve the relationship. With the existence of Red Trust, both parties can share common interests, personal habits, and life experience, which can lead to development of a social relationship outside of the working relationship.

In summary, *Table 6-4* presents the major performance difference of the three dimensions of trust proposed in the "Trust Colour Model" at the interpersonal and interorganizational level:

Performance of "Trust Colour Model"	
Interorganizational Level	**Interpersonal Level**
• Blue Trust takes the first presence • Valuation of Blue Trust is influenced by company image to the industry • Big companies tend to rely more on Blue Trust in Engineer screening, evaluation and final selection	• Blue Trust is automatically transferred to individual from the corporation in initial screening, and verified in the evaluation and interview process • Blue Trust is only important to key project engineers

Performance of "Trust Colour Model"	
Interorganizational Level	**Interpersonal Level**
• Yellow Trust is a significant evaluation consideration in long listing and short listing. • Yellow Trust at the corporate level is difficult to break	• Yellow Trust is well recognized at the individual level by smaller companies • Yellow Trust towards the individuals can be broken after one or two deficient actions • Yellow Trust is a obstacle to development of Red Trust
• Red Trust will subconsciously affect the decisions and evaluation of the Engineer organization. • The interpersonal level of Red Trust influences Red Trust between organizations.	• Red Trust takes the first presence • Yellow Trust and Blue Trust function as back-ups to double check and verify the viability of Red Trust • Red Trust takes presence in pre-awarding presentation, interviewing, site visiting and negotiations

Table 6-4 Performance of "Trust Colour Model": Interpersonal Level vs. Interorganizational Level

6.2.4 Dynamic Trust Cycle throughout Engineer Selection Process

In the above sections, the understanding of the three dimensions of trust proposed in "Trust Colour Model", and the extended understanding of "Trust Colour Model" at both the interpersonal and interorganizational level were described. Based on these findings, the dynamic performance of "Trust Colour Model" throughout the Engineer selection process can be further explained.

6.2.4.1 Perspective of the Owner Organizations

Throughout the competitive bidding process, the Owner is looking for an Engineer who has the adequate resource to deliver the project; who will provide best service to the Owner professionally; and who can understand and meet the Owner's needs as well. Generally, the Owners hold the following important opinions in trust testing and building throughout the Engineer selection process.

- Yellow Trust subconsciously influences the Owner's decision in long listing of the qualified Engineers.

The Owner will apply a list of developed criteria to search the Engineers at the outset of the project. However, there is a guideline that the Owners always keep in mind: pick the Engineer who is willing and able to deliver a satisfactory service, but will not take any opportunities to make unreasonable profit from them. It is agreed by the Owners interviewed in this study that they will never include any bidders who will potentially or who have in the past hurt the Owners' interest. In other words, the Engineers who did not, or will not, take care of the Owner's interests may not be on the long list for the next project on which they bid.

- Blue Trust is claimed as the most important trust component in long-listing, shorting-listing and the final proposal evaluation process.

The evaluation work in long listing, short-listing, and proposal evaluation are aimed at quantifying the bidders' technical expertise, resource availability, quality management system etc. Most Owner companies have well-organized and laid out manuals for competitive bidding. With these manuals, the Owner is trying to create reasonable selection criteria, and to treat every bidder as fairly as possible. Through this evaluation, the Owner team is trying to convince itself, and build trust, that the Engineers are able to deliver the work according to the project criteria. With detailed evaluation criteria, solid scores for evaluating items, and the bidder's back-up documents, the Owner is almost able to see the level of Blue Trust they have toward certain Engineer.

- Red Trust testing is applied almost in every human contact outside the formal evaluation criteria.

Some interviewees from Owner organizations agreed that they would apply the 'Does it feel right?' test when they meet individuals from the prospective Engineer firms. The Red Trust happens within an extremely short time frame, and can be tested at the Owner's kick off meeting as well as at other early encounters such as bid presentation and interviews with key project personnel.

- Red Trust is an optional trust component for the Owner, in that it "would be nice to have".

Even though Owners apply the Red Trust test and development on occasions, some interviewees still declared that they may not 'feel right about the Engineer' when they decide to award the contract to a particular Engineer. It can be agreed that an organization as a whole is a collective body of various individuals. Through Red Trust testing with the Engineering firm, some senior management personnel and key project management personnel pass the test. Those individuals develop a certain level of Red Trust with the Owner's representative, which will then positively affect the owners' decisions. However, because of the limited time and resources to further develop Red Trust with other project participants, Owners may still not feel quite right about their decisions.

In summary, we can see that some Owners use Yellow Trust as a subconscious filter to screen in the care-taking bidders initially in the long list process. They will then use quantifiable criteria in long listing, short listing and proposal evaluation to test and build Blue Trust with the remaining bidders. Through the process of testing Blue Trust, the Owner will gain confidence in the Engineer's reliability. Also, through the effort of developing alignment between the parties, the Owner and the Engineer will achieve a more common understanding of the goals and objectives of the project. Thus Yellow Trust evolves as a result of having Blue Trust in place. In some cases, Owners will feel right about picking a particular Engineer. Here Red Trust automatically evolves.

However, a significant number of the Owners interviewed claimed they do not necessarily have to have Red Trust with the Engineer. In most cases, it was impossible for the Owner to have Red Trust with a particular Engineer. *Figure 6-4* describes the dynamic cycle of the three different trust colours through the entire Engineer selection process:

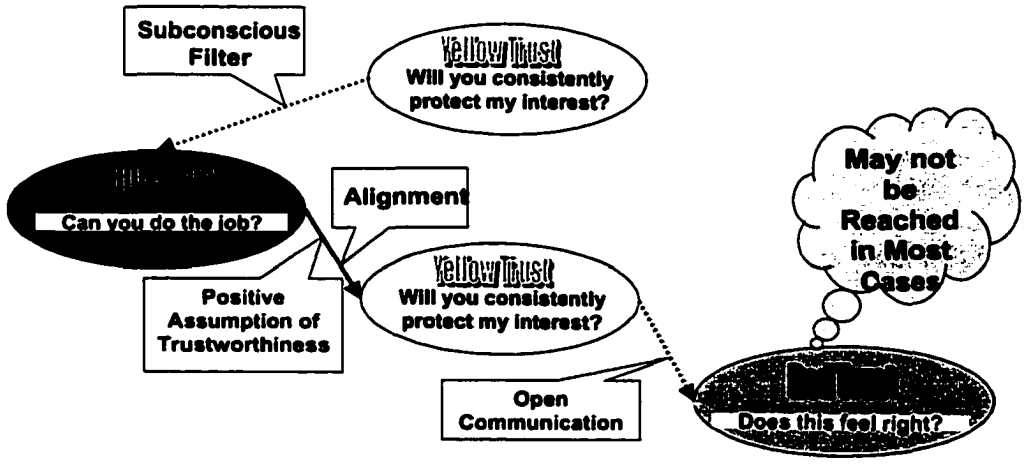

Figure 6-4 Dynamic Trust Cycle: Owner's Perspective

6.2.4.2 Perspective of the Engineering Firms

In responding to the Owner's search for a qualified Engineer through the bidding process, the Engineer is also looking for an Owner that he can happily work with on the project. Through competitive bidding, the engineers are trying to achieve the following things:

- Present their technical capability to deliver the project;

- Convince the Owner about the adequacy of the technical resources allocated to the project in their bids;
- Demonstrate the quality of the engineering service that they are going to provide;
- Convince the Owner that this cooperation will be a happy working experience.

In order to achieve these objectives, the Engineer needs to make an effort to test and build trust with the Owner. However, the presence and importance of the three trust dimensions from the Engineer' perspective changes markedly in two stages: (1) before the issue of request for proposal (RFP), and (2) after the issue of RFP.

Before the Issue of Request for Proposal (RFP)

Normally before the issue of a request for proposal, when the Owner is developing the long list and then a short list, the Engineering firms try to have informal interaction with the Owner. These interactions between the Owner and the Engineers' staff happen outside of the formal and apparently objective evaluation process. They most often are in the form of in-person meetings, phone calls and some informal paperwork about the potential project. These meetings and talks often involve with personal contacts of individual project managers or engineers. The dynamic cycle of the three dimensions of trust before the issue of RFP is presented in ***Figure 6-5***. Here is a rationale to explain the creation of this dynamic trust cycle.

- Test Red Trust first before doing any thing else.

EPC firms ask the question 'Does it feel right?' as the first response to the Owner's initial contracts. When the Engineer initially received a call or fax in talking about the new project opportunity, the senior project manager will ask himself the question 'Does this feel right?' and answer it based on quick processing of his own experience on similar projects or with that particular Owner.

A senior project manager generally can feel the Owner's real interest level in getting his Engineering firm involved in this project, and the Owner's attitude toward the Engineers' advice. In the talks over the phone and in person, there are more cues developed based on verbal signals and body language that the parties communicated "between the lines". There is a certain amount of "gut feel" and emotional testing that comes into play to assess whether both parties are speaking the same language and have the common goals.

The Engineer will also think about the Owner Company's culture, and bid evaluation styles, etc. The Engineer's effort to find the best fit of company culture and mentality throughout the Engineer selection process can enhance the future relationship development between parties.

- Study Blue Trust with the Owner's company immediately after finishing the Red Trust test.

EPC firms will look at the sophistication of Owner Company in delivering similar projects in the past. The Owner's sophistication in designing and delivering similar projects are important for the Engineer's success. The Owner's ability of laying out a well thoughtout conceptual design, knowledgably understanding the Engineer's suggestions, and reasonably accepting the Engineer's advice will influence future cooperation.

At this stage, the Engineer spends little effort in detailed checking of the Owner's financial status, and the technical criteria of the projects. The assessment of the Owner's technical capability and financial stability are roughly assessed by the individual senior managers and project managers based on their own analytical understanding and experience.

- Question Yellow Trust as the third step.

Once the Engineer has gained a certain level of confidence in the Owner's technical and financial resources, the Engineer will start looking at the words in the written documents, and other material such as faxes. The Engineer will ask the question 'Does the Owner care for my interest?' In the mean time, the Engineer will keep talking with the Owner, carefully look through the correspondence documents to find clues that can help them established and address their concerns and thus continue pursuing the job. The Engineer

tries to make sure that there are not a lot of risks associated with the project and that the Owner does not have a tendency to shift the risks onto him.

- Confirm the existence of Red Trust.

After finishing the test of Blue Trust and Yellow Trust, the Engineer will ask the question 'Does it still feel right?'. This is to affirm a satisfactory level of Blue and Yellow Trust that he has with the Owner.

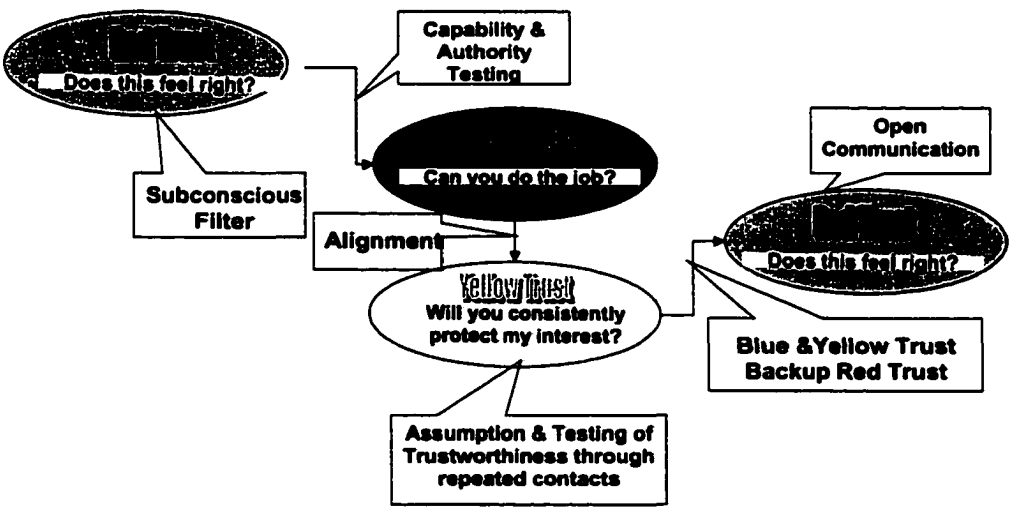

Figure 6-5 Dynamic Trust Cycle (Engineer's Perspective) - Before Issue of RFP

After the Issue of the RFP

The Owner has formalized RFP and prepares to issue them to qualified bidders whom he screened through the long-listing and short-listing process. At this point, the Engineer has earned the Owner's trust in his technical qualification and ethical professional service.

The Engineer has understood the Owner's requirement for the service standards, and constraints in cost, schedule and project quality. The Engineer has already established trust in the Owner's ability to successfully deliver, and his financial ability to finish the project. The Engineer's confidence and desire for further pursing this project is somewhat established up to this point. Thus, the performance of the three trust colours is slightly different from the previous stage. See the details in *Figure 6-6* and the following sections.

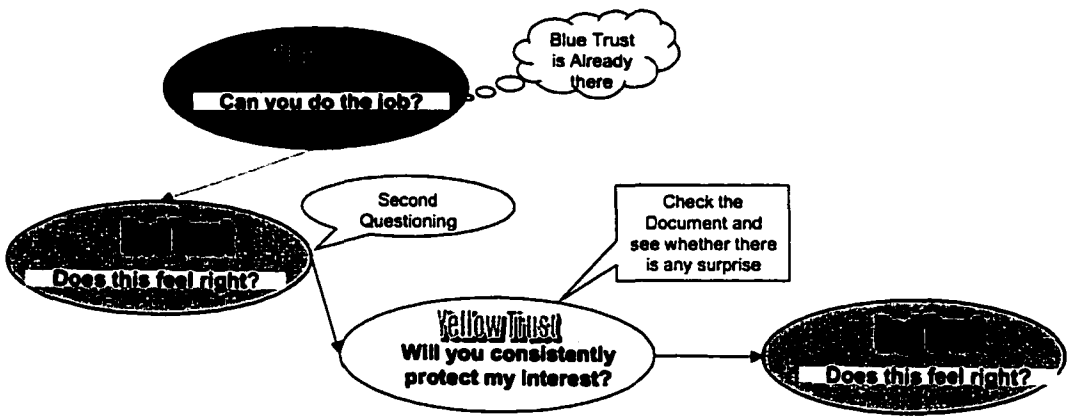

Figure 6-6 Dynamic Trust Cycle (Engineer's Perspective) - After Issue of RFP

- Certain level of Blue Trust existed already

Based on previous contacts regarding the project plan, funding sources, engineering resources, design details through the long-listing and short-listing process, the Engineer has gained a level of trust in the Owner's ability to successfully carry out this project. Thus a foundation for Blue Trust has been created.

After accepting the tender documents, the Engineers try to test, verify and confirm the level of Blue Trust through the layout of project specifications, project scope description, and details of engineering design in the tender document. These documents will give the Engineer a deeper understanding of the Owner's sophistication in delivering similar projects.

- Second questioning of Red Trust

To invest more money and engineering resources to further pursue the work, the Engineer has to ask himself again about 'feeling right with the Owner'. The Engineer observes the behavioural differences in the Owner's attitude before and after issuing tender document. This second test will be based more on rapid processing by an individual experienced contract manager, project manager or by senior management personnel.

- Carefully questioning Yellow Trust

In the interview process, Engineers agree that they will re-asses the level of Yellow Trust through the thickness and content of the tender documents, and standard contract terms and conditions. Generally an unreasonably thick contract document indicates low Yellow Trust by the Owner organization. No matter what kind of terms and conditions are really included in the contract, the Engineer will definitely question 'Do they care for my interest, or their own?' as a first response to such a document.

The general assumption is 'there must be something in that thick document'. Thus, an abnormally thick document immediately sends out the low Yellow Trust signal to the Engineer. No matter what the level of Yellow Trust they had before, it will certainly drop in response to a thick and complex contract.

However, an exception happens where the Engineer has been working with the Owner over several previous projects, and acknowledges that a 'thick boilerplate contract' is typical for that Owner Company. In that case, the level of Yellow Trust between the Owner and Engineer will not diminish.

- Create the Red Trust as a final result.

Again, when Blue Trust and Yellow Trust are both in place, Red Trust comes out automatically. It is consistent with the evolution of Red Trust in other situations as well.

6.2.4.3 Performance Matrix of the "Trust Colour Model"

Trust is not an all-or-nothing situation (Cufaude 1999)[71]. Through this research, it has been identified that specific dimensions of trust in the "Trust Colour Model" will have a dominant influence at particular sub-stages in the competitive bidding process. Furthermore, the "Trust Colour Model" performs differently at the interorganizational and interpersonal levels throughout the competitive bidding. Thus, a performance matrix of the "Trust Colour Model" is developed as *Table 6-5*:

Contracting Stages / Trust Color	Long Listing	Short Listing	Tendering & Evaluation	Negotiation & Pre-Awarding Meetings	Final Selection
Company Level	Yellow **Blue**	**Blue** Yellow	**Blue** Yellow	Yellow **Red** **Blue**	**Red** Yellow
Individual Level	Yellow **Red**	Yellow **Blue**	**Red** Yellow **Blue**	**Red** Yellow	**Red**

**Note: Order of Trust Color at each stage is presented in the priority of the different Trust Colors

Table 6-5 Performance Matrix of "Trust Colour Model"

A detailed demonstration of the performance matrix of "Trust Colour Model" is summarized below.

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[71] Cufaude, J. (1999). "Creating Organizational Trust." Association Managemetn **51**(7): 26-34.

- Blue Trust has influence at the organizational level at the quantification evaluation stage.

Detailed evaluation of auditable records, such as technical capability, technical resources, similar project experience, quality management system, and availability of key project engineers, etc. are typically applied under a rigid scoring system. Thus, a level of tangible Blue Trust in regard to the Engineer's capability in delivering the project is developed.

- Blue Trust at the interpersonal level takes a lesser role throughout the competitive bidding process.

In contrast to the emphasis on Blue Trust at the interorganizational level, Blue Trust at the interpersonal level is paid less attention at the bid evaluation. First, there are fewer evaluation criteria relating to testing the individuals' competence than the company's ability to deliver the project. Second, the requirements for the individuals' professional service quality is more often tested through the dimension of Yellow Trust, which has more to do with integrity and ethical behaviour.

- Yellow Trust is the backbone of the three trust dimensions in "Trust Colour Model" throughout the competitive bidding.

Clearly, from the 'Trust Performance Matrix', Yellow Trust is present, significantly, at every sub-stage of the competitive bidding process at both the interorganizational level and the interpersonal level. This finding is aligned with the objective of competitive

bidding – to find a reliable, consistently performing, and ethical Engineer. Yellow Trust implies the consistence of performance, and willingness to take care of the other party. It is necessary that this be tested and developed through the Engineer selection process.

Yellow Trust is required both at the organizational and personal level. The organization generally is evaluated based on its historical records of successful projects and its experience with the Owner. Furthermore, the level of Yellow Trust towards certain key project managers and engineers is also critical. Having Yellow Trust in the individual's spirit of professional engineering service, and quality of individual engineers' service and suggestions are all critical in determining the project's potential for success.

- Red Trust is present mainly at the later stages of competitive bidding at the interorganizational level.

In the early stages of competitive bidding, a lot of emphasis is placed on quantitative evaluation of the Engineer's organization. After the necessary auditable evaluation, and rakings, the emphasis is shifted to test the potential level of effective collaboration between individuals and organizations. The Owner starts to look at the working styles of the Engineer, the fit of the two organizations, and the contracting philosophy in order to test Red Trust.

- Red Trust is always a consideration, and more often is the only consideration, in the final selection.

Because Red Trust is always the first to jump into human being's mind in an interaction, it becomes influential at the interpersonal level in competitive bidding. 'Does it feel right?' is always the final measure to test the relationship and the propriety of the decision. The final result of competitive bidding should be to pick an Engineer, that the Owner believing has the ability to deliver a successful project. The Owner should also be confident in the integrity of the professional service and feel comfortable in dealing with Engineer's project leaders and engineers. The level of comfort towards individual engineers or managers will smooth the working relationship between parties in the future. Reduced work in double-checking the service quality and concerns over integrity of the engineers will help improve the working efficiency and reduce transaction costs.

6.2.5 Trust Building in the Initial Contracting Stages

6.2.5.1 General Approach for Trust Building

From the opinions both of the Owner organizations and Engineer firms in the study, there is some common understanding about the approaches that they can use to build trust. Findings of this research suggest taking the whole process of Engineer selection as an adaptation period for both parties. Through this process, each party can make sure that it can thoroughly understand the mutually agreed conditions for satisfaction. Using the

selection process for adaptation can significantly improve the efficiency of both parties' relationship in subsequent contracting stages.

- **Find the best culture fit at both the interorganizational and interpersonal levels.**

First, companies should seek the best fit at the corporate level. Both Owners and Engineers agree that it is important to find the best fit between the organizations for a particular contract. This will reduce the generic conflicts and problems in the relationship, and increase the efficacy of the working relationship.

However, it is not common that an organization can always find the most suitable party for a contract. Sometimes the Engineer is in need of projects to survive, and cannot choose the Owners. The same story can happen to the Owner when it operates in a seller's market and there is a shortage of engineering resources. In such a situation, the contracting parties have to seek out the internal resources to find the best cultural fit among individuals to work on that project.

Second, both parties should try to find the best fit of individuals in the organization to work better with the other party. The Engineering firms have less freedom to choose an Owner when pursuing profitable work. However, the Engineer still makes an effort to select the best fit of key engineers when assigning them to an Owner's project.

Quite often those subtle differences in individuals' traits will create incredibly high trust level with the Owner. On the other hand, smaller Owner companies do give higher credit of trust to individual key engineers instead of trust with a particular Engineering firm. Small companies are flexible in contracting regulations and processes. So there are higher requirements for developing trust to bind parties together and work smoothly in a less structured working relationship.

Third, reorganize the corporate regulations and processes as far as is practical, in order to keep both contracting organizations aligned. Based on the understanding of the organizational difference between the parties, and individual differences in the project teams, some operational changes should be considered throughout the process of Engineer selection and possibly afterwards too. Both parties should try to avoid 'we-you' confrontation or a 'master-servant' attitude in any specific project setting. On the contrary, both parties should create a unique project identity by mixing and integrating each other's corporate culture.

- **Three Likely Steps for 'Trust Building'**

From the interviews, there are agreements existing among participants regarding the general steps of trust building, which can be applied in the Engineer selection process. The detailed steps are summarized as follows.

First, assess the possibility of 'collaboratively working with somebody'. Experienced contract or project managers should draw on their experience and apply their "gut feel" to evaluate the potential for a future happy working relationship. This requires the development of some Red Trust with the other party at the outset.

Second, don't put in place too much protection against risk. Trust is always associated with a willingness to become exposed to risks. In seeking a trust relationship, there is a need to be vulnerable to the other party. However, if there isn't enough mental preparation to accept risks, the resistance to being vulnerable will be a significant barrier for trust building. In trust building, it is necessary to take further risks in order to look after the other party's interest in addition to your own. Parties need to work on the relationship all the times, but prepare for the risks at any time.

Third, after taking the first step, get rapport and 'walk the talk'. Parties should work on 'Trust You' rather than 'Trust Me' in order to earn trust. It has been long agreed that each party should take the first step in order to earn trust from the other. Parties should announce the trust level they had toward the other party at the beginning of the relationship. They should also make clear what level of trust they want out of a particular relationship, and work on achieving this target trust level all the way through.

It is wise to let actions not the words speak for themselves. Instead of putting too many nice trust labels on the relationship, such as 'Alliance' and 'Partnering', it is wiser to make a real effort to improve the quality of the relationship.

6.2.5.2 Owner's view vs. Engineer's view

The Owner and Engineer represent different interest groups and have different power positions in contracting practice. They have slightly different views and approaches to build trust with the other party in the relationship.

- The Engineer believes the Owner should involve lawyers as late as possible.

It is the opinion from the Engineer's side that lawyers should be involved as late as possible. In a situation where 'the second people we talk to after the project manager is the lawyer', the Engineer will question 'Will they look after my interest?' The early involvement of lawyer sends out a signal that the Owner doesn't trust the Engineer and will not take care of his interest. On the signal-receiving end, the Engineer doesn't really feel that the Owner will look out for their interests if he uses the lawyer as a lever to shift the risks.

It is wise to keep lawyers out until later, and prevent them from consulting with top management whether to enter an agreement or not, and assure their role is to draw up sound documents that protect both parties and set solid collaborative foundations (Botkin and Matthews 1992).[72]

- The Owner sometimes searches for the best culture match with the Engineer

Small Owner companies are willing to understand themselves and find the best matched corporations or individuals from a cultural perspective, in order to create a common foundation for developing Red Trust. A lot of pain can be saved in the future adaptation of the parties if the Engineering contractor and Owner are culturally matched from the beginning. These cultural matching factors include company history, company expertise, targeted market section, philosophy in business development, and organizational structure, etc. These considerations can help contracting parties understand each other's position and direction of future development.

- The Owner treats Red Trust as an end product that evolves automatically out of the existence of Blue and Yellow Trust, while the Engineer first develops Red Trust independently.

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[72] Botkin, J. W. and J. B. Matthews (1992). Winning Combinations: The Coming Wave Of Entrepreneurial Partners Between Large And Small Companies. New York, John Wiley & Sons.

Owners first put their effort into testing and developing Blue Trust and Yellow Trust with the Engineer. They seek a certain level of confidence in the Engineer's capability and integrity in professional services as the first requirement. Once they have the Blue and Yellow Trust in place, the Owners will move on and spend their effort in understating the Engineer's organization and developing Red Trust.

On the other hand, Engineering firms will first test and develop unilateral Red Trust with the Owner Company. The Engineering Firms will make little effort in pursuing a project if he does not feel right about Owner's behaviour. The Engineer generally will have a high level of anxiety in developing a meeting of the mind with the Owner, which shows him to be the best choice among other candidates, and convinces the Owner that he is the right Engineer to pick.

6.2.5.3 Trust Building at Interpersonal and Interorganizational Level

When speaking of building trust at the interorganizational level, it is important to take into account the social structures in which the firms evolve (Mayer, Davis and Schoorman 1995). Also there is a requirement for trust building at the interpersonal level in order to complement the trust at the interorganizational level if it is to function well. Thus this creates a vertically integrated system for trust building between the interpersonal and interorganizational levels.

Trust Building at Interpersonal Level

- **Treat your business partners as human beings from the outset.**

In every face-to-face interaction, it is important to remember to treat each individual as a human being. Within a project team, regular team building practice should be highly promoted. It can create opportunity for human contacts outside of the working relationship and develop a trusting environment within the team as well.

- **Find the 'Hot Button' of individuals in order to build Red Trust.**

In building Red Trust at the interpersonal level, there is a significant amount of effort associated with understanding the individual's personality, hobbies, education background, working experience and motivation factors. Each individual has certain special interests and concerns in a particular period, and the specific objectives of job achievement out of a project as well. Thus, it will be necessary to understand those individual drivers first. The contracting party then can design a tailored plan to approach the individuals in order to build Red Trust.

- **Maintain stability of the key project personnel.**

Because key project managers, contract managers, and engineers lead the project team, it is important to keep these key personnel longer in a project in order to maintain consistent performance of the project. With the stability of key personnel, the following objective can be reached:

(1) Maintain the same level of understanding in project objectives among different disciplines and management levels.

(2) Keep the consistency in project team member's vision and behaviour through the project lifetime.

(3) Maintain the solidity of the foundation for creating trust relationships through different trust dimensions.

Trust Building at Interorganizational Level

- **Adjust the requirements for trust levels according to corporate business structure.**

In the Oil and Gas industry, there are different business structures that can be applied to a project, such as joint ventures, alliances and partnerships. Normally the type of business structure for the project will require different levels of collaboration in the working relationships, as well as different levels of trust. Different business structures will also have different emphasis on specific dimensions of trust within the relationship. After identifying the business structure of the project, the contracting parties can use the Engineer selection process to adjust their behaviour to meet the requirements for trust on that project.

- **Develop conditions of satisfaction early on.**

The Engineer usually desires to understand the Owners' wishes and objectives for a project from the very beginning. The Engineer normally is willing to spend time with the Owner to identify important and critical issues for both parties. The Engineer should also keep communicating with the Owner and talking in an honest way. On the other side, the Owner is required to be attentive, open, and flexible to the Engineer's suggestions. As a result, the Owner will obtain an efficient communication channel and adequate information for proper decision-making. After all, both parties are trying to develop the commonly accepted conditions of satisfaction for a project.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the key conclusions of this research and the major contributions to academics and industry. This research found that trust is one of the key factors to be considered in the early stages of project contracting, specifically in the Engineer selection process. By investigating every step in the Engineer selection process, the dynamic behaviour and the roles of trust in different situations were discovered. The presence and influence of the three dimensions of trust proposed in the "Trust Colour Model" were also explained. The findings also explain the different views of the "Trust Colour Model" from the perspectives of the Owner and the Engineer in the selection of the Engineer. This understanding can help project managers understand each other's priorities and objectives from these different perspectives. This chapter further provides the recommendation that project managers should pay close attention to the influence of trust in their decision-making when selecting the Engineer. Project managers are encouraged to properly apply the mechanics of the "Trust Colour Model" in decision-making in order to improve the quality of their decisions. Project managers should also pay attention to the difference in performance and influence of the "Trust Colour Model" at the interpersonal and interorganizational levels when they act both as individuals and as representatives of their organizations.

7.1 Application and Extension of Results

Throughout the Engineer selection process, the Owner tries to identify and select the most capable Engineer. The Owner will need to have confidence in the selected Engineer and his ability to deliver a successful project. The Owner will also need to trust in the Engineer's willingness to commit to his responsibilities, and his goodwill in taking care of the Owner's interests and understanding the Owner's objectives. To some extent, the Engineer selection process plays a role in assessing, testing and developing the trust relationship between the Owner and candidate Engineering companies.

The research findings suggest that the three dimensions of trust will have greater or lesser influence at different sub-stages of the Engineer selection process. In brief, Yellow Trust is applied as an unpublished evaluation criterion before long listing of the candidate Engineers. Blue Trust dominates earlier in the long-listing and short-listing stages. Red Trust starts to have some significant influence later in face-to-face meetings, interviews and subsequent negotiation stages. In reacting to these phenomena, firstly, both contracting parties should acknowledge the impact of different trust dimensions present at each sub-stage of the selection process. Secondly, they should prepare measures to respond to, and manage, the particular trust influence in a particular sub-stage. Thirdly, project managers can modify their decision-making behaviours in order to avoid the pitfalls resulting from misunderstandings and neglecting the particular influences of trust.

This research discovered that the "Trust Colour Model" helps us understand the impact of trust at both the interpersonal and interorganizational levels when the Owner and Engineer organizations interact in the Engineer selection process. A project manager should be able to distinguish and manage his role as an individual when interacting with the other party's project manager and engineers, and also as a representative of his organization when dealing with the other party's project team. Project managers should understand that Red Trust has its most significant impact between individuals, not between organizations. It would be unreasonable for a project manager to put effort into developing Red Trust with all the project team members. Blue Trust between two organizations is generally well recognized as stable and cumulative in nature, whereas Blue Trust between two individuals is paid less attention. The project manager should be able to represent his organization with a proper level of Blue Trust to the other party as a top priority. Meanwhile the Blue Trust level of the project manager, acting as an individual, as perceived by the other party becomes relatively trivial. Yellow Trust is required for a sustainable relationship at both the interpersonal and interorganizational levels. Yellow Trust becomes a backbone component of the trust relationship between the Owner and the Engineer. The project managers of both the Owner and the Engineer need to work on this trust type, in particular, throughout the relationship development process.

Furthermore, both the Owner and Engineer should acknowledge that quite often they are operating on a different wavelength when evaluating the different dimensions of trust in a

particular situation. Owners more often start testing trust with Blue Trust – in order to determine which Engineers are most qualified for the work. Quite often the Owner will also pay attention to Yellow Trust in order to seek out the most reliable Engineers, with whom some level of Blue Trust has already been established to some extent. The Owner will normally care about the existence of Red Trust when, and only when, there are high levels of both Yellow and Blue Trust in the relationship with that Engineer organization. On the other hand, the Engineer first begins with testing and developing Red Trust with the Owner. The Engineer is more inclined to look for an Owner with whom he feels right before starting to invest his corporate resources on a project or proposal. In other words, the Engineer will always test Red Trust first before he moves on to assess Blue and Yellow Trust. Thus project managers on both sides should consider the other party's initial focus and objectives, and work with them in order to satisfy the other's specific requirements for trust.

7.2 Conclusions and Recommendations

This research confirmed the presumption that trust in the relationship between contracting parties is one of the key factors to be considered in the early stages of the contracting process, particularly in the Engineer selection process. Furthermore, this research presented empirical evidence that the different dimensions of trust proposed in the "Trust Colour Model" do have distinct behaviours and influences throughout the Engineer selection process. By introducing the mechanism of trust through the multi-

dimensional "Trust Colour Model", project managers are able to identify particular trust phenomena in different situations and connect these trust behaviours with specific trust dimensions as well. The findings of this research show that project managers do apply different dimensions (colours) of trust in the trust-building process, and use trust as an undisclosed or informal evaluation criterion to assess the other party in various situations. Quite often the trust related evaluation criteria that are applied by the Owner are unpublished and are not relayed to the Engineer. Sometimes trust related evaluation criteria are not consciously developed or applied by individual project managers and may even not be consistent from one project to another.

The results of this research also indicate that understanding of the "Trust Colour Model" can be extended to both interpersonal and interorganizational levels. In a given stage of, or situation of the Engineer selection process, parties will have different objectives for developing trust with the individual engineers and between the contracting organizations. The Owner and Engineer will have different measures and objectives for assessing, testing and managing the trust relationship. These measures for individual engineers are quite often different from the ones for the contracting organizations as a whole. By understanding the particular focus of trust at either the interpersonal or interorganizational level, project managers will be able to adjust their roles and behaviours in order to develop their trust relationships and meet the other party's expectation for trust. Thus, both parties increase the possibility of selecting the right

partner and building a more effective working partnership and the improved results that this implies.

After identifying the behaviours of trust in the Engineer selection process, some practical suggestions to improve contracting practices through a better understanding of trust relationships have been developed. Project managers or contract managers can apply these guidelines to assist in their decision-making and thus in selection of the best partner with which to contract. These guidelines are now discussed.

- **Define the objectives of the Engineer selection process: "What is the desired project?"**

Through this research, interviewees suggested that the Owners should also think about what the final project or service is that they want and then work on the Owner-Engineer relationship in order to achieve project success accordingly. Normally, in order to have a different end project or service, Owner companies will apply different contract structures, such as a joint venture, alliance or partnering, to successfully deliver the project. Project managers should be able to adjust their attitude and expectation toward the trust relationship in each contract structure to ensure the successful project delivery. In each of these contract structures, there are different requirements upon particular dimensions or levels of trust in the relationship from the Owner companies as well. Thus the requirement for trust levels and dimensions is highly associated with the Owner's desired

end project and services. Here is one question that the Owner should also answer: "What else, in addition to price, performance, people and schedule can competitive tendering be about?"

Before starting the Engineer selection, the Owner must develop a set of objectives that are determined based on the desired end results for a particular project. There are several questions that have to be clearly answered by the Owner before starting the process of selecting the Engineer. Three of these questions are as follows.

(1) Does the Owner only want a commodity, which is more standardized and has no particular or unique requirements? In this case, the existence of Blue Trust in the Engineer's competence to deliver the project and meet the requirements of cost, time and quality will be enough.

(2) Does the Owner need a product, which should be specially designed and manufactured in order to maximize the functional and economic objectives, and meet the specific requirements of the Owner? To meet such a project objective, the Owner not only requires Blue Trust with the Engineer but also a measurable degree of Yellow Trust with the Engineer. For such a product, the Engineer should be able to take the Owner's needs and be reliable on his agreement to take care of the Owner's interests and meet the Owner's particular requirements as well.

(3) Does the Owner expect a professional service in developing and delivering the end product? This implies much higher demands of the Engineer in understanding the Owner's need, in addition to the Owner's requirements of a tangible product. Further, the Engineer needs to do this in line with his own objectives, and create a level of comfort for the Owner as well. In such a case, there is a requirement for Red Trust in addition to Blue and Yellow trust. There is a need to create a level of compatibility between the two contracting organizations as well as between key individuals in order to define, share and reach the mutual objectives and achieve the necessary meeting of minds to do this.

After recognizing the desired end project, the contracting parties are able to develop trust to an expected level without over or under emphasizing the importance of the trust relationship. Understanding the required level of trust between the Owner and Engineer, can further improve the efficiency of the Engineer selection process.

- **Develop trust related evaluation criteria for the Engineer selection.**

In the literature, most of the evaluation criteria for selecting the Engineer relate to the Engineer's technical competence for project delivery. Some of the criteria assess the Engineer's project management expertise. Review of the literature showed that there was a lack of understanding in evaluating trust in the working relationship between contracting parties. On the other hand, in this research the importance of a trust relationship between the Owner and Engineer has been already identified by industry

practitioners. Research findings show that industry professionals from the Owner Companies are subconsciously applying trust as an unwritten criterion to evaluate the relationship and selecting the best Engineer.

Because of the limited academic understanding of trust evaluation criteria and the industry needs in developing these criteria, Owner Companies should design the criteria in order to assess the possibility of future improvement in project cost, schedule and performance by considering the influence of the "Trust Color Model". For instance, the evaluation of potential improvement such as cost saving, schedule comparison, and quality assurance can be applied. In this case, Yellow Trust is introduced into the evaluation. These evaluation criteria are designed based on the Engineer's willingness, demonstrated efficiency in cost and time saving, and competent project delivery in previous projects. The competence and consistency of past performance are both evaluated through these criteria. Thus, it is possible to provide a foundation for predicting potential improved performance in a current project.

Another example of an evaluation criterion would be to subjectively assess the Engineer's organizational adaptation to the Owner's organization. Possible subjective criteria can be: 1) the ability of the Engineer's project team to reach a concensus and shared vision with the Owner's team, and 2) the compatibility of key project personnel,

both from the Owner's and Engineer's organizations. From these criteria, the Red Trust between parties in a project can be assessed.

- **Divide the one-shot large investment project into a series of smaller capital projects.**

From this research, interviewees from the Owner Companies kept emphasizing that large project investments significantly limited the freedom to develop trust in the working relationship. Under the vast community visibility of the one-shot large investment project, the project is often constrained with a relatively tight schedule and budget. In that situation, project parties have less time to adapt to each other, cerate a mutually comfortable project culture, and develop a shared vision of the objectives. The Owner companies also suggested that repeated interactions with the Engineer Firms through a series of major projects can create familiarity and good trust development environment between the Owner and the Engineer.

If a large investment project can be divided into a series of smaller capital projects where less investment is required for each individual component, there will be more opportunities and time within each of the capital projects to build trust relationships under decreased community visibility and less stressful working environments. Thus, trust can be developed and enhanced through repeated cooperation between the Owners and Engineers through a series of projects.

- **Test trust early on, before the Engineer is selected.**

In this research, the research participants agreed that trust in the relationship between the Owner and the Engineer should be considered early in project contracting. Participants agreed that early trust development could result in significant benefit and efficiency for the future working relationship in a project.

In such a case, both the Owner and the Engineer should treat the Engineer selection process as an adaptation period in order to identify the opportunities for better trust development. Through frequent contracting interactions, parties should try to assess trust in the relationship from different perspectives. Contracting parties should also test trust between key project team members, and between the contracting organizations as well. In the adaptation period, both parties can understand the level of trust that exists in the relationship, and predict and monitor the direction of trust development. Both parties can develop a 'trust barometer' to measure the level of trust between contracting parties at different stages of the Engineer selection process, which can serve as indexes to the heath of trust relationships throughout the project lifecycle.

Interviewees even suggest that it is appropriate to create some confusion and chaos between the parties in order to test the viability of trust through the early contracting interactions. These efforts significantly increase the opportunities to examine real trust

levels between parties, and assess the proper trust level required in a future working relationship.

- **Get key project personnel into a project as early as possible to create trust.**

This research showed that there is a significant amount of interpersonal trust that exists between the key project personnel of both the Owner and the Engineer. This trust at the personal level is beneficial in creating a cohesive working relationship between team members.

The Engineering firm should assign key project personnel to the Owner's project before the project is physically awarded to him, in which case the best trust development period can be established. Only through proper handling of the initial "honeymoon" period for trust development between project individuals, can a sustainable trust relationship be achieved for the future. While encouraging a personal commitment to building trust, the corporate support to substantialize individual's commitment is also required. The corporate should give the project managers adequate freedom and flexibility within the organizational structure in order to nurture and maintain trust in the working relationship.

- **Project managers should trust their 'gut feeling' and apply it to where it is needed in order to build the "Red Trust" component in relationship.**

The interviewed project managers suggested that they will wisely use their "gut feel" to make judgments at proper times when developing trust with the other contracting party. On the other hand, today's Oil and Gas industry in Alberta, there are a limited number of large Oil and Gas companies and EPC firms in existence. This creates a relatively consolidated and mature industry. Hill and Jones (2001)[73] argue that, in a mature industry, there are brand loyalty, a minimized likelihood of price wars and low-cost operations existing. These factors constitute significant barriers to entry and the threat of entry by potential competitors is diminished. It means only limited visible competitors exist in the industry. So in a mature industry, like the Oil and Gas industry, the recognition of industrial patterns can be achieved. Project managers' knowledge in pattern recognition based on their experience can be easily transferred from project to project, and applied to other similar project circumstances as well. While connecting with the "Trust Colour Model", the ability to recognize patterns and good intuitive thinking, based on project managers' knowledge and experience, will support the development of Red Trust. In other words, project managers can apply their gut feelings and intuition to a larger extent in order to create Red Trust with their partners in the Oil and Gas industry.

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[73] Hill, C. W. L. and G. R. Jones (2001). Strategic Management: An Integrated Approach, MeansBusiness Inc.

One important practice that the project manager should consider is to record the success rate of making sound judgments to which he has applied "gut feel" to build trust relationships. Only project managers with a good record in using their intuition to solve problems can effectively create proper Red Trust with the opposite party.

- **EPC firms should attempt to work with sub-contractors on a trust basis in the same way that they wish to work with the Owners on trust-based contracts.**

Generally, EPC firms attempt to earn trust from the Owner and win projects directly from the Owner through single sourcing, rather than through competitive bidding. However, the EPC firm still has a strong mentality of applying competitive tendering methods in order to sub-contract projects to other contractors, when they are functioning as the Owner's representative. In the latter case, EPC firms quite often neglect the importance of trust building with the subcontractors.

EPC firms should exert as much effort in developing trust with subcontractors as they do with the Owner. EPC firms should work with their subcontractors in order to reduce the cost, improve subcontractors' efficiency, and help subcontractors to enhance their competitiveness. Only through such a mind-set change by the EPC firms in viewing trust in their relationship with subcontractors, can an effective contiguous contracting chain among the Owners, EPC Engineers, and subcontractors be created.

7.3 Contribution to The Body of Knowledge

The major contributions to the body of knowledge of project management can be summarized in the following six areas. The related research findings supporting the following contributions can be found in Chapter 6: Result Discussions.

(1) This work identified and confirmed the important influence and role of trust in the early stages of project contracting. This has broadened the scope of project management body of knowledge in that trust is an area that needs further research and understanding.

(2) This research understood and analyzed the Engineer selection process through the perspective of trust in the Owner-Engineer relationship. This research studied the Engineer selection process from a new angle – namely trust in project management.

(3) This study obtained a broad set of exploratory findings related to the multi-dimensional mechanics of trust on the boundaries of organizational management, project management, and contract management.

(4) This research extended the understanding of trust. More specifically, the "Trust Colour Model" was seen to apply at both the interpersonal and interorganizational levels. This enriches the understanding of trust in project management within a two-level contracting relationship context.

(5) This research further provide a dynamic "performance matrix" of trust influence in decision-making throughout the Engineer selection process, which can be applied as a guide for project managers to understand the influence of trust at different stages. The

"trust performance matrix" helps the project managers understand: When will a particular trust type have major influence on their decisions? How will a particular trust type behave at the interpersonal and interorganizational levels? And what are the typical symptoms and phenomena of trust in the Engineer selection process?

(6) Finally, the research explored a modified Delphi method in implementing research relating to contract and project management.

The major achievements and contributions of this research are explained in detail as follows:

- This research developed a list of ranked key factors to be considered in designing a contract strategy, which is suitable to the Oil and Gas industry in Alberta, Canada.
- Among these key contracting factors, TRUST has emerged as important in the early stages of project contracting, particularly in the Engineer selection process.
- This research depicted the general process of selecting an Engineering firm in the local Oil and Gas industry. The findings also explained the advantages and disadvantages of this process by considering the development of trust. The mapped picture of the Engineer selection process can be applied as a guideline for project managers in the future, in order to avoid similar pitfalls and improve the probability of selecting the right Engineer.
- This research has established the empirical evidence of the trust mechanics in the context of the Engineer selection process. The literature proposed several theoretical

assumptions to address the multi-dimensional and single dimensional trust concepts within an organization or between the organizations. However, little effort was previously taken to study the mechanics of trust, and to understand the behaviours of trust. Empirical studies to verify those presumptions of trust are new to the academic. In this research, empirical data were gained through multi-round questionnaires and in-depth interviews with industry experts in the context of project pre-contracting. The findings support the viability of the proposed "Trust Colour Model", which presents the mechanics of trust in project management practice.

- Findings of this research show that the "Trust Colour Model" helps to explain the mechanics of trust behaviours in project management in general. Participants can easily recognize the manifestation of trust by introducing the three primary trust colours, and connect the different trust dimensions with particular phenomena throughout the Engineer selection process.
- The findings of this research strongly indicate that the three dimensions of trust proposed in the "Trust Colour Model" have their own presence and influence at different sub-phases of the Engineer selection process. For example, Yellow Trust can be applied to identify those candidates who are most likely to demonstrate concern for the Owner's interests before the long listing is completed. Blue Trust more often will have the predominant influence in both long-listing and short-listing of qualified Engineers. Red Trust will gain attention more often in the final stages of the selection process, such as in the proposal presentation and bidder interview phase.

The three dimensions of trust proposed in the "Trust Colour Model" are acknowledged and viewed as valuable in decision-making by most of the research participants.

- This study extended the understanding of the "Trust Colour Model" at both the interpersonal and interorganizational levels. This research identified that trust will have some influence at both the interpersonal level and interorganizational level separately or jointly in the decision-makings leading up to selecting an Engineer. Project managers should be able to manage their roles as individuals or as representatives of their organizations in developing trust more effectively at different levels.
- The findings of this research distinguish the views and attitudes towards trust from different interest groups – the Owner group (Oil and Gas companies) and the Engineer group (EPC firms). Generally, the Owners will start testing and verifying Blue Trust when they are searching for the qualified candidates. Meanwhile the Engineer will start testing and developing Red Trust in order to make the Owner feel he is the right Engineer to work with.
- The modified Delphi Method was applied in the pilot phase in order to narrow down the research topic and select the proper data collection method for the following phase of this research. Following the interviews and questionnaires in three rounds, the important connection between trust and the Engineer selection process was identified, based on the consensus of industry experts. Thus, to understand the

behaviour and role of trust through the Engineer selection process became the focus of this research for the subsequent main phase. Furthermore, in-depth interviews were found to be more effective in exploring sensitive issues, such as trust and contracting than questionnaires (refer to Chapter 5: Research Methods for details). Through in-depth interviews, knowledge, experience and insights of the industry practitioners could be shared to a greater extent with the researcher. Thus this modified Delphi study provided a new alternative research method in the project management area.

7.4 Limitations of Findings

There are several limitations relating to this research together with the various findings from this research.

- Understand the trust behaviours only in the working relationship between the Owner (Oil and Gas company) and Engineer (EPC firm).

The focus of this research was limited to a study of the behaviour and role of trust between a specific trustor and trustee, as defined by Mayer, Davis and Schoorman (1995). This research only looked at the trust in the working relationship between the Owners (Oil and Gas Companies) and the Engineers (EPC Firms). Thus, to study the performance of trust in a larger relationship network is beyond the scope of this research.

- This research tested one particular multi-dimensional trust model – "Trust Colour Model".

This research adopted the "Trust Colour Model", confirmed its viability in the Engineer selection process, and identified the mechanics of trust in project management in general. However, there are other ways to define and analyze the mechanics of trust as well, which can be explored by applying different trust models proposed in other academic areas or industry disciplines.

- The study concentrated on one particular contracting phase – the Engineer selection phase – in order to study the relevant issues in greater depth.

This research only studied the behaviour and roles of trust during the Engineer selection process – assuming some form of competitive bidding process. This was due to the limited time frame for this research. However, more effort is required to study trust in contract implementation, dispute and claim resolution, and contract close out, where there are more frequent interactions between different contracting parties and likely higher requirements for trust.

- Small samples of industry participants were selected by using the snowball sampling method. The sample was limited to the Oil and Gas industry in Alberta, Canada.

Snowball sampling in this research is composed of a limited number of participants from the Oil and Gas industry in Calgary, Canada. A potential drawback of this sampling

technique was that it could limit the diversity of the informants (Taylor 1997). Samples are more like homogeneous representative groups to a certain extent. Thus, the understanding of trust performance throughout the Engineer selection processes can be applied in the Oil and Gas industry, but cannot necessarily be generalized to other industries.

7.5 Suggested Areas of Future Research

This research verified the existence of multi-dimensional trust, identified the behaviours and roles of the trust proposed in the "Trust Colour Model", distinguished the different understanding of trust from the Owner and Engineer perspectives, and extended the understanding of "Trust Colour Model" to both the interpersonal and interorganizational level. However, there are requirements to implement further research in order to understand trust and contract management to a deeper and broader extent in the project management arena. Suggested areas for further research are as follows:

- **Develop measurement or tool to evaluate the performance of different trust dimensions that are present in the early stages of project contracting.**

This research identified that different dimensions of trust in the "Trust Colour Model" separately or collectively had a dominant influence at different stages in the Engineer selection process. Further research effort can be exerted on developing measurements to evaluate the performance of each dimension of trust in the Engineer selection processes.

With quantitative or qualitative measurements, project managers will be able to assess the level of trust and be aware of the problems of trust in the relationship. It will also provide the project managers with some guidelines when they take trust into consideration in order to make proper decisions.

- **Develop a trust-based Engineer selection process, and evaluation criteria for picking the best Engineer.**

Empirical research can be designed in order to improve the Engineer selection process by introducing trust, based on the findings of trust performance from this exploratory study. A modified selection process can nurture, test, maintain and enhance a trust relationship between the contracting parties. Additionally, trust related evaluation criteria can also be designed in order to help the Owner assess the Engineer's trustworthiness in delivering a satisfactory project by meeting the project targets of cost, schedule and performance. These trust related criteria can function complementarily to the modified Engineer selection process in order to help the Owner pick the right Engineer in a project.

- **Implement research in order to understand the behaviours of trust in the relationship between the Engineers and the Subcontractors who provide the construction service and material, etc.**

It was identified in this research that there is a different mentality of valuing trust between the Owner-Engineer relationship and the Engineer-Subcontractor relationship.

Further research can be implemented to study the performance of trust in the Engineer-Subcontractor relationship, and compare it to findings of this research in the Owner-Engineer relationship.

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Appendix I Interview Schedule – Round-One Delphi Study

Dear Sir or Madam:

I would like to invite you to participate in this investigation into identification of considerations in designing contract strategies. My name is Liwen Ren and I am conducting research in partial fulfillment of the requirements for a Master of Science degree in Project Management Specialization at the University of Calgary. Under the supervision of Dr. Francis Hartman, I am investigating the potential improvement of contract performance through the initial design of contract strategy. To date, this promising area has not been investigated to great length as literature search shows. The goals of this three-round phased study are to identify critical factors to be considered in designing a contracting strategy, the evaluation criteria to contract strategy performance, and viable trust relationships in the contract strategy design stage, through the technical implication, business environment and societal issues.

- Contract strategy – is the contractual framework, which defines how the project is to be implemented, and which project needs can be best met by obtaining service or product inside or outside the project organization. It involves considerations of how to get the product and service, what to get, how much to get, and when to get it.

- Technical implication – helps us understand the significance of the decisions that we make in terms of technology, such as preliminary cost, schedule estimates, quality management plans, safety management system, cash flow projection, fund availability, term of payment, tendering options, risk management and so on.

- Business environment – determines how to set a contract in context of the business strategy of the company or organisation. Typically they are market condition, competitor analysis, potential benefit to the company, business relationship with vendors, stakeholder happiness, quality of the services, and reputation of the company and dispute resolution.

- Societal issues – are the potential impacts to a larger environment, such as regulatory system, political status, societal stability and so on.

This is a three round, Modified-Delphi study for which I am asking for your assistance. This elite group comprises of you and other people who contribute to the project management profession. Your insights in contracting and project management are sought in this research. The Modified-Delphi process is a method to collect and distil the judgements of experts in an iterative manner using a series of questionnaires interspersed with feedback.

Instruction

The first round of this Delphi study begins with three open-ended questions provided below and is to identify who designs the contract strategy, what the design should be, and how trust behaves. Your first round answers will be returned to you, with follow up questions in rounds two and three. Your answers and reasoning underlying your answers will be requested. Your reasoning will contribute to an understanding and a deep discussion of contract strategy design. Your answers will be summarized and used to develop the second round questionnaire that will be returned to you shortly thereafter. During the second round, you will have the opportunity to re-evaluate your original response in light of the group's responses. Issues will be clarified, areas of agreement and disagreement be identified, and a list of identified considerations and viable trust relationships in contract strategy design stage will be presented to you for verification.

Modified-Delphi Questions - Please Answer:

Who takes the leading role in designing a contract strategy?

- The purpose of this question is to identify power level behind the initial process of project contracting. Various levels of management can take the leading role in it, (e.g. project managers, program mangers to senior managers). It also can be identified in term of contracting mechanism: (e.g. standard contract form, company regulation or policy, and legal department).

What are the factors to be considered in designing a contract strategy, which are critical to project success?

- The intent of this question is to identify the possible considerations in designing contract strategy from the perspectives of project management. They principally are from the technical, business and societal dimension of the project management.

What are the acceptable levels, types and forms of trust in project contracting practice?

- This intent is to identify the reasonable trust relationships in project contracting practice that are recognized by project management professionals.

Conclusion

These three research questions may seem ambiguous; they are intended to be broad enough to identify the insightful understanding of project contracting and designing of contract strategy. For this reason, we are seeking both your answers to these questions, and your underlying rationales as well. Therefore, please answer each question and provide your rationales.

Thank you for your participation. This first round is perhaps the most challenging part of your participation. Please read the attached Consent Form prior to your interview. It is explained in the Consent Form, among other things, that we are interested in your professional opinions and that you have the right to withdraw from this study at any time.

If you have any questions as you are completing the surveys, please contact me by email at: lren@ucalgary.ca

Thank you for your participation.

Liwen Ren
MSc. Student, Project Management Specialization
University of Calgary

Appendix II Consent Form

This consent form, a copy of which has been given to you is only part of the process of informed consent required by the University of Calgary Ethics Committee. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Please take the time to read this form carefully and to understand any accompanying information.

Invitation to Participate

I am researching improving contracting performance and you are invited to participate. My name is Liwen Ren and I am a MSc. student at the University of Calgary, Department of Civil Engineering. This research study is being funded by the Project Management Specialization Program and is in partial fulfillment of the MSc. requirements.

Research Purpose

Through this study I will identify the key factors to be considered in designing contract strategy, and the roles of trust relationship in the selection of contracting factors within certain project contractual context. Understanding the rationalizations in contract strategy design will improve the contracting performance and finally attain project success.

You were selected as a possible participant in this study because of your knowledge and experience in contracting or project management. If you decide to participate in this three-round Delphi study, you will be one of between 30 to 50 participated experts in project contracting and management.

Research Method

If you decide to participate, we will interview you directly at a time and place that is convenient for you. The face-to-face interview will take around one hour. The interview will be tape recorded onto audiocassette, and then transcribed onto paper. The interviews will yield data about top considerations in improving the contract strategy design. Some interview participants will be contacted following the initial interview to verify the results.

Your Professional Opinion

You will be asked for your professional opinions about project contracting and management. The research results will be shared with the research participants in an anonymous and confidential way. The research results may be beneficial to research participants in many ways such as an improved understanding of how to design contract strategy in an entity, through the technical, business and societal dimensions of project management.

Confidentiality Anonymity Security

If you decide to participate, your identity as a participant in this study, and any other personal information gathered about you during the study will be kept strictly confidential and will never be made public. All data containing personal information from which you could be identified will be stored in a locked file cabinet in my office during the study. Electronic data will be password protected. When the study is completed, I will destroy all data containing personal information. The published results of the study will contain only statistical or group data from which no individual participant can be identified.

Okay To Say No

You are being asked to make a voluntary decision whether or not to participate in this study. Please read and think about the information given above. If there is any part of the information you do not understand, please ask me to explain it. If you would like to consult with someone not associated with this study that will be all right, too.

If you decide not to participate, or if you later decide to discontinue your participation, your decision will be respected. It will not affect your present or future relations with the University of Calgary. Upon request, a copy of the information, data, and results will be made available to you. You will always be free to discontinue participation at any time, and all data collected up to that time as a result of your partial participation will be destroyed without being used in the study.

If you decide to participate, please provide your signature as indicated below. Your signature below indicates that you have read, considered, and understood the information provided above, and that you have decided to participate.

What Your Signature Means

Your signature on this Consent Form indicates that you have understood and satisfied with the information regarding participation in this research project and agree to participate as a participant.

In no way does this waive you legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time. Your continued participation should be informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have any further questions concerning matters related to this research, please contact:

Contact Information

Liwen Ren
Project Management Specialization
Dept. of Civil Engineering, University of Calgary
Telephone: (403) 282-3168
Email: lren@ucalgary.ca

If you have any questions concerning your participation in this project you may also contact the Office of Research Services and as for Patricia Evans, (403) 220-3782.

Signature of Participant _____ Date _____

Print Name: _____

Signature of Investigator _____ Date _____

◆◆◆◆

A copy of this consent form has been given to you for your records and reference

Appendix III Questionnaire — Round-Two Delphi Study

INTRODUCTION

This survey as the second round of the Delphi study is seeking to get consensus upon answers from round one interview. It is to identify the critical issues or factors in contract strategy design. It is also in search for identifying the behaviour of trust in initial contract strategy design.

The purpose of this document is twofold: first, to provide an overview of study results to date, and second, to present the questions of second round based on the answers from first round. The Delphi survey questions in each round are selected in part, as to their ability to contribute to answering my research questions.

GENERAL INSTRUCTION

There are three questions in the questionnaire, which is seeking for further understanding based on the results from round one interviews. Description and definition of key terms are given in the section following each question. Please review the entire questionnaire and complete the questions thoroughly. ***Please consider all your answers in terms of the SPONSOR'S project as opposed to individual sub-components of the project.***

CONFIDENTIALITY

All responses are strictly confidential. Company's specific information will remain protected at all times. The results of survey will be tabulated and pooled information will be made available to you in the future. The aggregated data collected will be used in support of research undertaken at The University of Calgary.

It is anticipated that the questionnaire will take 30 minutes of your time.

We thank you in advance for your time and effort. We highly evaluate your cooperation and participation.

Question One: Please read the following summarized answers to the question *'Who takes the leading role in designing a contract strategy?'* and the rationale behind each answer. Tick the ONE answer that has the ***HIGHEST*** chance of occurrence based on your project management or contracting experience, and give a ***percentage*** probability of occurrence that corresponds to your selection.

☐ **Answer A: Executive Level, Probability of Occurrence _____ (%)**

Reasons given for the answer:

- Members of steering committee from the mother company of the project
- Consistent execution strategy and contracting strategy within individual project
- Consistent contracting application or execution in organization through aspects such as quality, cost, schedule, safety, satisfaction of end user.
- Consistent contract structures for different parties in the project or across projects
- Better-performed project team provided by the contracting company, who has common expertise, approach, philosophy and understanding of business.

☐ **Answer B: Contract Manager, Probability of Occurrence _____(%)**

Reasons given for the answer:

- Key person from the project team in responsible for contract planning and designing
- Proactively coordinate with engineers or representatives in all disciplines
- Let participants from all disciplines present issues, discuss responsibilities, understand and accept responsibilities to be written into the contract.

☐ **Answer C: Project Manager, Probability of Occurrence _____(%)**

Reasons given for the answer:

- Key person who is to take final responsibility for the outcomes of the contract and project
- Consult with project team members from various disciplines (e.g. engineering, procurement, legal department), get concurrence from senior management, and make a final decision.
- Update and monitor all the changes concerning scope, cost, time, safety and quality to be reflected in the contract strategy.

☐ **Answer D: Joint Development among Contracting Parties**

Probability of Occurrence _____(%)

Reasons given for the answer:

- Each party involved in a specific contract has relatively equal power to be represented through the design of contract.
- Create common goals, objectives, success criteria, and incentive schemes, and enhanced relationship etc.
- Enforce clear understanding, share information and achieve fluent communication.

☐ **Answer E: Others (pls. Specify) _____**

Probability of Occurrence _____(%)

- Please provide your rationale to support your answer.

Question Two: Please rank the following key considerations identified in Round One of this Delphi Study in response to the question *"What are the factors to be considered in designing a contract strategy, that are critical to project success?"* For clarity, please refer to ***Definitions*** of specific terms on the following page.

Key Considerations	Ranking *
Alignment (Vertical & Horizontal)	
Company Characteristics	
Contract Forms	
Contract Type	
Contracting Framework	
Contractor Selection Methods	
Contractual Relationship	
Control Mechanism	
Dispute Resolution Mechanism	
Incentive Scheme	
Legal Awareness and Involvement	
Negotiation Methods	
Project Execution Strategy	
Risk Allocation	

DEFINITIONS

No single definition is likely to suit all purposes; perhaps some of the following definitions may differ from other published definitions. These key definitions used in this Delphi have been developed over time and through different sources. The Oxford Dictionary (1997), Max Wideman's online project management glossary, the PMBOK® Guide, a small library of psychology, management and project management books and papers, as well as through your description of constructs in the Delphi phase of this research. It is intended that the following definitions are used within the context of this research, for most projects, most of the time.

1 ***Alignment***: The bringing of separate parts into line. This may refer to physical parts or to notional parts such as goals and objectives. It includes two levels: horizontal and vertical alignments. Respectively they are to get common understanding across contracting parties, and down to the bottom of the individual project team participant. It will most probably cover issues of condition of satisfaction, common objectives, mutually acknowledged risks and constraints. Tools such as kick-off meeting, memorandum of understanding, term sheets can be adopted to enforce win-win philosophy in contracting.

2 ***Company Characteristics:*** industrial characteristics, visibility to the community, company culture, contracting philosophy, business position, organizational structure, distribution of power level (among project management, contract management and legal department), senior management support and understanding of the project,

3 ***Contract Form:*** The formal legal cover sheet that is signed by the parties that gives effect to the contract. It can be classified as, letter of agreement, short form of contract, long form contract and form for profession service.

4 ***Contract Type:*** The various forms of contracts by which goods/services can be acquired. See "Cost plus fixed fee", "Cost plus incentive fee", "Cost plus percentage of cost", "Firm fixed price", "Fixed price plus incentive fee", and "Unit price contracts". Some industries or companies will have preference on certain contract types.

5 ***Contracting Framework:*** A customer-prepared breakout or subdivision of a project typically down to level three which subdivides the project into all its major service or product elements, integrates the customer and contractor effort, provides a framework for the planning, control, and reporting. (e.g. flexible vs. tight structured, broad vs. narrow structured)

6 ***Contractor Selection Methods:*** It involves obtaining information (bids and proposals) from prospective sellers, the receipt of bids or proposals, and the application of the evaluation criteria to select a provider. (i.e. pick the correct selection method to meet the correct contract model.

7 ***Contractual Relationship:*** A logical or natural association between parties secured by contract. (e.g. respective contractual relationship in conventional contract, evergreen contract, preferred supplier, strategic alliance, partnership)

8 ***Control Mechanism:*** A set of specified procedures for controlling the performance of the contract (e.g. project time, resources, quality, safety program, reporting, documenting, auditing).

9 ***Dispute Resolution Mechanism:*** An informal or formalized system for dealing with grievances and administering corrective justice as part of collective bargaining agreements. (e.g. consistent change order management processes.)

10 ***Incentive Scheme:*** A scheme by which the contractor will receive extra pay or other rewards if certain targets or objectives are achieved. The targets are usually expressed as a certain quantity in a certain time, cost and safety criteria. (e.g. formulation of the incentive distribution among participants from different disciplines and parties from different organizations.)

11 ***Legal Awareness and Involvement:*** An awareness of the relevant legal duties, rights, and processes that govern in a particular project situation. It may cover potential causes of disputes, liabilities, breaches of contract, means of resolving a dispute, and legal basics of industrial relations (e.g. influence of the legal department to the design of contract strategy.). Legal department's responsibility and involvement in turning inputs from different project disciplines into legal language.

12 ***Negotiation Methods:*** The art and process of achieving to the greatest extent possible what you want from a transaction while leaving all parties sufficiently content that the relationship subsequently works well. (e.g. Define the 'non-negotiable' part of contract vs. on-going negotiable part of contract.)

13 ***Project execution strategy:*** It normally will consider factors such as [1] sophistication of organization: i.e. strength, expertise and experience in similar projects of mother company [2] working environment of partners: e.g. organizational structure of the project [3] project environment or scene e.g. market competition, resource availability [4] project characteristics: project constraints, size, complexity, uniqueness, geographical location, stakeholders, technical requirements and financing accessibility [5] Project Objectives: such as targeted performance standards, cost, schedule, quality (results vs. behaviour), safety.

14 ***Risk Allocation:*** The process of allocating risk onto an activity or a specific contracting party in response to threats. All parties to a project are at risk to some extent whatever the contracts between them. (e.g. identify risks, analyze risk mitigation plan, and allocate risk to the right party.)

15 ***Scope Definition*** : It is to break down a deliverable work into smaller manageable parts to ensure better control. (e.g. broad vs. detailed, service vs. product.)

16 ***Trust:*** Trust is an expectancy of positive (or nonnegative) outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty. Trust is having the confidence that the other party will not exploit one's vulnerabilities.

Question Three: Please ***check*** in the appropriate squares along the scale to indicate your agreement with the answers from the question *"What are the acceptable levels, types and forms of trust in project contracting practice?"* in round one interviews.

	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree
1. A high degree of trust and cooperation is the optimal way of working together.	☐	☐	☐	☐	☐
2. A minimum level of trust in competence is required in contracting.	☐	☐	☐	☐	☐
3. After selecting a contract, owner will help him improve the competence level during contract implementation.	☐	☐	☐	☐	☐
4. As trust increases, so does the flexibility of the contracting strategy.	☐	☐	☐	☐	☐
5. Competition enforces trust.	☐	☐	☐	☐	☐
6. Contract drives people's behaviour. (i.e.: It is impossible to expect trust be in place as contract words tell 'we can not trust each other.')	☐	☐	☐	☐	☐
7. Contract strategy is *not* a proper reflection of the trust relationship between the parties to the contract.	☐	☐	☐	☐	☐
8. Contract terms imply mistrust, yet behaviours on the project are based on the existence of trust.	☐	☐	☐	☐	☐
9. Contractors are selected based on consistent performance on previous projects.	☐	☐	☐	☐	☐
10. It is easier to develop a trust relationship with a competent contractor.	☐	☐	☐	☐	☐
11. Most of the contractors will take short term dollar advantage first at the expense of losing trust, and manage the consequence later.	☐	☐	☐	☐	☐
12. Most practitioners trust their gut in developing contracting strategies. They don't stand back, but do not rush to make any judgements either.	☐	☐	☐	☐	☐
13. Professionals will work on professional-based trust where turst at the personal level is missing.	☐	☐	☐	☐	☐
14. Real trust level is hard to identify in a normal contract strategy.	☐	☐	☐	☐	☐
15. Show your trust to the contracting party first, then assess their trustworthiness before proceeding.	☐	☐	☐	☐	☐
16. The choice of contract language, the intent and form of the contract model will reflect the level of trust between buyer and vendor.	☐	☐	☐	☐	☐
17. The contract is *not* an appropriate place to show trust relationship, and a trust relationship cannot be a substitute for a good legal relationship.	☐	☐	☐	☐	☐
18. There is no trust between two companies, but only the legal relationship.	☐	☐	☐	☐	☐

19. To obtain extradinary perfromance, non-traditional contract formats, such as partnering or allaince are required.	☐	☐	☐	☐	☐
20. Trust improves competitiveness in pricing.	☐	☐	☐	☐	☐
21. Trust is important: it will be more effective in contract implementation to show this trust relationship through the wording of contract.	☐	☐	☐	☐	☐
22. Work out and demonstrate trust to the contracting parties through behaviour.	☐	☐	☐	☐	☐

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☐ Yes, I am interested in feedback from this round, and interested in participation in the next round of this study.

Thanks For Your Valued Contribution!

Appendix IV Questionnaire – Round-Three Delphi Study

INTRODUCTION

This questionnaire is the third round of the Delphi study. It seeks to clarify the results from previous rounds and gain further understanding of the responses from participants. The 'Trust Colour Model' developed by Dr. Francis Hartman is briefly introduced in the following section of this questionnaire.

This round survey concentrates on the behaviour and mechanism of trust in different aspects of project contracting. It can help project managers to properly evaluate the contracting relationship, develop more effective contracting strategy, and rationalize their decisions in contracting.

It is anticipated that the questionnaire will take **30 minutes** of your time.

TRUST COLOUR MODEL

What does TRUST look like in project management and project contracting?

You may already have your own understanding and explanation of trust in specific project environment based on individual experience. You may also read articles that give you various definitions of trust from different management perspectives. You may have been searching for an integrated but simplified system to identify trust behaviour, that can properly categorize the performance of different trust types in project management practice.

In this research the **"Trust Colour Model"** developed by Dr. Francis Hartman, will be adopted and tested. This model devolves trust into three primary colours: Blue Trust, Yellow Trust, and Red Trust. The following summary will help you understand this model.

(1) **BLUE TRUST** answers the question: *"Can you perform or do the task?"* It can be interpreted as the reliance on competence of the other party as a basis on which to do business. This type of trust can be transferred through reference, track record, reputation and other traceable and auditable vehicles. In other words, we look for tangible evidence in some form that helps us to build a knowledge based picture of that party's capability.

(2) **YELLOW TRUST** addresses the answer to the question: *"Can I rely on you to care for my best interests and will you behave consistently?"* It represents our ability to rely on others to preserve our interests. It requires direct experience in a relationship before we are comfortable with the level that we are willing to work with.

(3) **RED TRUST** answers the question: *"Does it feel right?"* Red trust can be divided into two sub categories "Raw Emotion" and "Rapid-Processing". Raw emotion, is our immediate response to a situation based on prejudices, biases, education, DNA, culture and the myriad of factors that build our character and personality. The second part, 'rapid processing' relates to a persons subconscious recognition of situations or patterns and it is a learned or trained response. This is the very fast thinking that we do without being conscious of it. "Gut reaction" is a term often used to describe how we behave with red trust.

Question One:

Here are some statements which describe how different types of trust influence the considerations of the factors in developing a contract strategy (summarized from round two study). Please indicate your agreement or disagreement. Check ONE answer for each statement. There are no right or wrong answers to these questions. Just give your opinion.

		Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree
(1)	It is more efficient to tell the client what the project should be and provide a comprehensive packaged engineering service.	☐	☐	☐	☐	☐
(2)	We still will prepare a formal contract even though we are quite comfortable with a contractor through initial contacts or past experience, because we are not sure about their competence or that they will necessary protect our interests.	☐	☐	☐	☐	☐
(3)	In dealing with contractors who delivered quality work and satisfactory service to us through previous projects, we are more willing to negotiate with them without a formal tendering process.	☐	☐	☐	☐	☐
(4)	In a case when we anticipate that the contractor will not do the contracted work well or perform ethically, we will take measures to shift risks to the contractor.	☐	☐	☐	☐	☐
(5)	It is good to understand and meet the client's needs and customize the service or product to directly address those needs.	☐	☐	☐	☐	☐
(6)	In meeting a contractor who is technically strong and able to do the work, we still will find it a challenge to get them to buy in, understand our needs and work towards our mutual objectives.	☐	☐	☐	☐	☐
(7)	When we have never dealt with a certain contractor before, we definitely will have a significant involvement of the legal department through key parts of the contracting processes.	☐	☐	☐	☐	☐
(8)	There will be a higher chance to award a contract through negotiation (e.g. single-sourced contract), only with certain contractors who can or have established a positive relationship and confidence with the owner.	☐	☐	☐	☐	☐
(9)	We will use a lump-sum contract with a contractor when we are quite satisfied with its track record and the reference obtained, even though we have no experience with him.	☐	☐	☐	☐	☐
(10)	We appreciate a contractor's understanding and focus on our objectives and interests, and preference will be given to this, even though it is not the top vendor in terms of technical competence.	☐	☐	☐	☐	☐
(11)	We are more willing to single-source work if history has taught us that the particular contractor would most likely come out on top in a vendor analysis or tendering analysis.	☐	☐	☐	☐	☐
(12)	If the relationship has the right feel, we won't waste too much time nailing down the scope; instead we will start work and define the scope as we work together to implement the project.	☐	☐	☐	☐	☐
(13)	If we had a healthy relationship with a particular contractor before, we would expect to have the same good relationship on this project at least.	☐	☐	☐	☐	☐
(14)	The track record of the contractor will make a great difference in selecting a contract form, where the business ethical behaviour of the other party can not be assessed in the selection process.	☐	☐	☐	☐	☐
(15)	We are not concerned about the contract type so much, as long as we believe that the experience of the contractor can contribute to the project in meeting all the objectives we establish at the outset.	☐	☐	☐	☐	☐
(16)	The contractor will be more willing to report problems to the owner, where the owner demonstrates a willingness to support the contractor's interests.	☐	☐	☐	☐	☐
(17)	There will be higher chance of having a successful project, if we simply award a contract to the party who has been working with us for a while and has already demonstrated that they have taken care of our interest in the past.	☐	☐	☐	☐	☐

(18) We are more willing to work with the contractor who has the right chemistry for us and understanding our objectives, issues, and concerns. It will significantly shorten the alignment period and reduce the possibility of future failure.	☐	☐	☐	☐	☐
(19) When the track records tell us a contractor's good performance in the past, but we never had personal experience with them, we will tend to be inflexible in development of the contract framework in order to protect ourselves.	☐	☐	☐	☐	☐
(20) Less attention or emphasis will be given to reporting of project progress and issues, where the owner is comfortable and satisfied with the contractor's performance.	☐	☐	☐	☐	☐
(21) A cost reimbursable contract can be adopted if we enter into a deal with a contractor who had been working with us for a while and did not take advantage of us in the process.	☐	☐	☐	☐	☐
(22) If we are confident that the contractor will be able to deliver quality work, it will be easier to have a good working relationship based on the mutual professional respect and understanding.	☐	☐	☐	☐	☐
(23) We have no personal experience with certain contractor, and cannot find any flaw after checking this record , but we simply cannot convince ourselves to feel comfortable of the is contractor. In this situation, we will still spend a lot of effort to make sure the contract is legally sound.	☐	☐	☐	☐	☐
(24) Detailed inspections and frequent reporting will not be necessary if the contractor has a good performance record in similar projects.	☐	☐	☐	☐	☐
(25) We feel safer sharing risks with a contractor who had taken care of our interests well in previous projects with us.	☐	☐	☐	☐	☐
(26) If we feel there is a mutual understanding between us and a contractor, we will use a more flexible contract framework to increase the chance that we can collaborate on the contract through close cooperation.	☐	☐	☐	☐	☐
(27) When we are confident about a contractor's technical ability to deliver the project, but not so sure of their ethical behaviour, we will have more legal involvement in the commercial portion of the contract.	☐	☐	☐	☐	☐
(28) We are inclined to use simpler form of contract with the contractor we know, because we believe that we are not taking additional risks but save significant cost and effort in contracting.	☐	☐	☐	☐	☐
(29) If we feel good about a certain contractor through initial contacts, we will look forward to starting some formal contractual relationship with him.	☐	☐	☐	☐	☐
(30) We are more willing to enter into a contract when we are confident that the other contracting party has the ability to manage risks and avoid them happening or mitigating the outcome.	☐	☐	☐	☐	☐
(31) We are more content to set flexible and compatible contract framework to guide the contractor to achieve success, if that contractor has taken care of our interests on previous projects.	☐	☐	☐	☐	☐

Question Two:

Please refer to the following summary of "Ranking of Key Factors in Designing a Contract Strategy" which is a summary of the results from the second round of this Delphi study. In this summary you can see that 'trust' ranks sixth out of the fifth factors identified from the first round. See the following table.

Descriptive Statistics

	Number of Respondents	Most Important (Lowest Ranking)	Least Important (Highest Ranking)	Mean	Std. Deviation	
Scope Definition	14	1.00	10.00	2.8571	2.6270	Project Specified General Hard Issues
Project Execution Strategy	14	1.00	7.00	2.9286	1.9400	
Alignment	13	1.00	7.00	3.5385	1.8081	
Risk Allocation	14	1.00	10.00	4.9286	3.1247	
TRUST	**13**	**1.00**	**12.00**	**5.8462**	**3.2621**	* Bridge
Contractual Relationship	14	1.00	12.00	5.8471	3.3709	Contract Specified General Hard Issues
Company Characteristics	14	1.00	15.00	7.0714	4.7307	
Control Mechanism	13	1.00	13.00	7.6154	3.6409	
Contracting Framework	13	2.00	14.00	7.6923	3.4493	
Contractor Selection Methods	13	2.00	16.00	8.4615	5.0599	
Contract Type	13	2.00	16.00	8.6154	4.5376	
Contract Forms	13	3.00	16.00	9.6154	4.4072	
Dispute Resolution Mechanism	13	5.00	16.00	10.1538	3.3627	
Incentive Scheme	13	3.00	15.00	10.3846	4.2138	
Negotiation Methods	13	4.00	16.00	10.5385	3.7331	
Legal Awareness and Involvement	14	2.00	16.00	10.7143	4.3222	

**Note the large Std. Deviation and range of responses on some items is suggesting a relatively low level of agreement from respondents.

One hypothesis that we can propose is ***"Project related hard issues such as, 'project execution strategy', 'scope definition', 'company characteristics' and 'risk allocation' will take effect through 'trust' on the assessment of all the other factors ranked behind 'trust'."*** Thus trust becomes a focal point to the performance of other contracting related factors.

With respect to the differential influence of TRUST on other contracting related factors, questions such as **"Will trust have *MORE* influence in the selection of *contract type* than on the status of a *contractual relationship*?"** can be answered through the paired comparison on next page. (An example of paired comparison is given as following.)

EXAMPLE

Which of these pair-comparisons is more important?

	Tick here for choice on the left		Tick here for choice on the right	
Cost	☐	*OR*	☑	Schedule
Quality	☑	*OR*	☐	Performance
Performance	☐	*OR*	☑	Cost

Please pick the ONE factor in the pair-comparison that has HIGHER impact from trust between you and the other contracting party.

(Tick your choice as in the example on previous page.)

Contract Forms	☐	*OR*	☐	Contract Type
Control Mechanism	☐	*OR*	☐	Legal Awareness and Involvement
Contracting Framework	☐	*OR*	☐	Contract Forms
Contractual Relationship	☐	*OR*	☐	Control Mechanism
Contract Forms	☐	*OR*	☐	Contractor Selection Model
Legal Awareness and Involvement	☐	*OR*	☐	Contractual Relationship
Contractual Relationship	☐	*OR*	☐	Contract Forms
Contract Type	☐	*OR*	☐	Contracting Framework
Contract Forms	☐	*OR*	☐	Control Mechanism
Contractor Selection Model	☐	*OR*	☐	Legal Awareness and Involvement
Control Mechanism	☐	*OR*	☐	Contract Type
Legal Awareness and Involvement	☐	*OR*	☐	Contract Forms
Contractual Relationship	☐	*OR*	☐	Contracting Framework
Contractor Selection Model	☐	*OR*	☐	Contract Type
Control Mechanism	☐	*OR*	☐	Contractor Selection Model
Contract Type	☐	*OR*	☐	Contractual Relationship
Contracting Framework	☐	*OR*	☐	Contractor Selection Model
Legal Awareness and Involvement	☐	*OR*	☐	Contracting Framework
Contractor Selection Model	☐	*OR*	☐	Contractual Relationship
Contract Type	☐	*OR*	☐	Legal Awareness and Involvement
Contracting Framework	☐	*OR*	☐	Control Mechanism

*Note: This question helps identify whether trust will influence the assessment of the considerations in contract strategy design. It can create consistent understanding of the results of previous rounds, where trust may influence more on some considerations than others in contracting.

Question Three:

Based on the summarized results from the second round questionnaire, please compare the following paired statements. Please check one and only one statement in each pair that you agree with more than the other.

(1) ☐ Competent contractors are more likely to be selected in tendering process.
☐ The contractor is selected based on consistent performance in previous projects.

(2) ☐ A minimum level of trust of a contractor's ability to deliver a satisfactory job is required in contracting.
☐ A positive track record and references for a contractor are essential to successful and sustainable contracting.

(3) ☐ High trust is not necessary in order to have a good working relationship.
☐ A high degree of trust and cooperation is the optimal way of working together.

(4) ☐ Show your trust to the contracting party first, and assess their trustworthiness afterwards.
☐ Work out and demonstrate trust to the contracting parties through your behaviour towards them.

(5) ☐ Trust relationships between the contracting parties should be properly reflected through the initial design of the contract strategy.
☐ The contract strategy is not an appropriate place to show a trust relationship, and a trust relationship cannot be a substitute for a good legal contract.

(6) ☐ As trust increases, so does the flexibility to considerations in developing a contract strategy.
☐ The level of flexibility in a contracting strategy will influence the trust relationship between contracting parties.

(7) ☐ Performance of contracting parties will not be influenced by the language or wording of contract strategy.
☐ The contract strategy will drive the resulting behaviour of contracting parties.

Please *E-mail* or *fax* this completed summary to:

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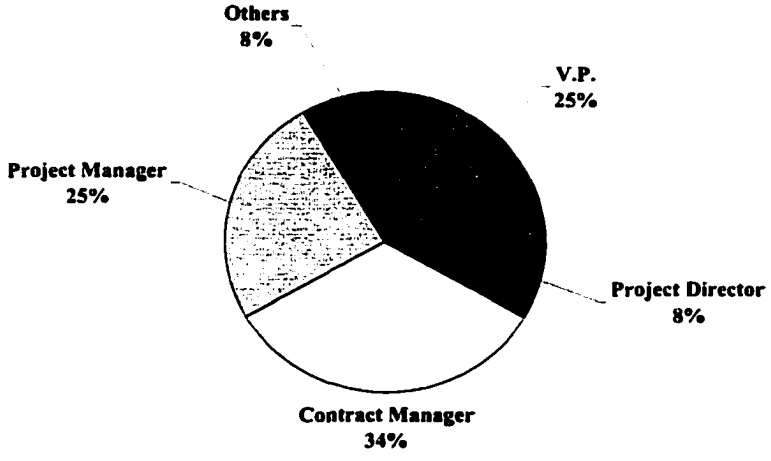
☐ Yes, I am interested in feedback from this round.

Thanks For Your Valued Contribution!

Appendix V Sample Characteristics – Pilot phase

Positions of Interviewees

Position Profile of Interviewees in Delphi Study



Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	V.P.	3	25.0	25.0	25.0
	Project Director	1	8.3	8.3	33.3
	Contract Manager	4	33.3	33.3	66.7
	Project Manager	3	25.0	25.0	91.7
	Others (Poject Control Manager	1	8.3	8.3	100.0
	Total	12	100.0	100.0	

Years of Experience and Years in Contract Management

Descriptive Statistics

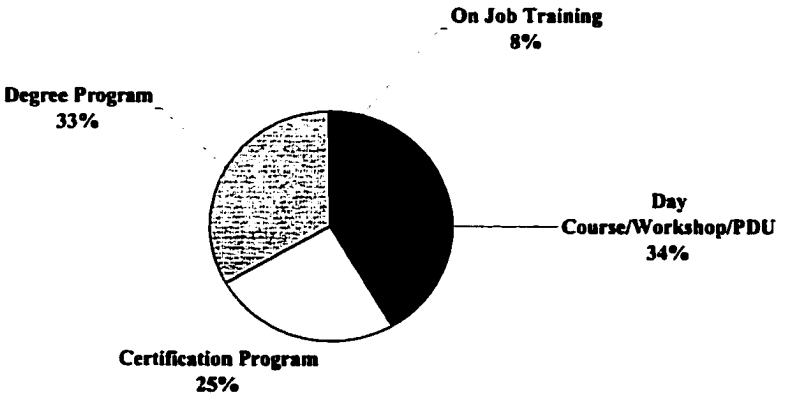
	N	Minimum	Maximum	Mean
Year of Experience	12	15.00	33.00	27.9167
Years of Experiece in Contract Administration	12	4.00	28.00	16.5000
Valid N (listwise)	12			

Type of PM Training of Interviewees

Type of PM Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	On Job Training	1	8.3	8.3	8.3
	Day Courses/Workshop/PDU	4	33.3	33.3	41.7
	Certification Program	3	25.0	25.0	66.7
	Degree Program	4	33.3	33.3	100.0
	Total	12	100.0	100.0	

Type of PM Training of Interviewees



Appendix VI Ranks of Key Factors of Contract Strategy Design

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Project Execution Strategy	12	1.00	7.00	3.0000	2.0000
Scope Definition	12	1.00	10.00	3.0833	2.7784
Alignment	12	1.00	7.00	3.7500	1.7123
Risk Allocation	12	1.00	10.00	5.0000	3.0451
Trust	12	1.00	12.00	6.0833	3.2879
Contractual Relationship	12	2.00	12.00	6.2500	3.3337
Company Characteristics	12	2.00	15.00	6.9167	4.1661
Contracting Framework	12	2.00	14.00	7.5833	3.5792
Control Mechanism	12	1.00	13.00	7.8333	3.7132
Contractor Selection Model	12	2.00	16.00	8.3333	5.2628
Contract Type	12	2.00	16.00	8.4167	4.6799
Contract Forms	12	3.00	16.00	9.0833	4.1442
Dispute Resolution Mechanism	12	5.00	16.00	9.9167	3.3967
Incentive Scheme	12	3.00	15.00	10.2500	4.3719
Negotiation Methods	12	4.00	16.00	10.8333	3.7376
Legal Awareness and Involvement	12	4.00	16.00	11.1667	3.7376
Valid N (listwise)	12				

Appendix VII Statistical Analysis of Performance of "Trust Colour Model"

Descriptive Statistics

Trust Colour and Contracting Factors	N	Minimum	Maximum	Mean	Std. Deviation
R-Contractor Selection	12	4.00	5.00	4.8333	0.3892
Y-Scope Definition	12	4.00	5.00	4.8182	0.4045
B-Risk Allocation	12	4.00	5.00	4.7500	0.4523
Y-Control Mechanism	12	4.00	5.00	4.7500	0.4523
B-Contractor Selection	12	3.00	5.00	4.6667	0.6513
Y-Risk Allocation	12	4.00	5.00	4.5000	0.5222
R-Alignment	12	4.00	5.00	4.5000	0.5222
Y-Contractual Relationship	12	1.00	5.00	4.3333	1.1547
Y-Contract Framework	12	2.00	5.00	4.1667	0.9374
R-Contractual Relationship	12	3.00	5.00	4.0000	0.7385
B-Contractual Relationship	12	2.00	5.00	4.0000	0.9535
R-Contract Form	12	1.00	5.00	4.0000	1.4142
R-Legal Involvement	12	2.00	5.00	3.7500	0.8660
B-Contract Type	12	1.00	5.00	3.7500	1.4848
Y-Legal Involvement	12	1.00	5.00	3.7500	1.2881
B-Legal Involvement	12	1.00	5.00	3.7500	1.3568
R-Contract Framework	12	1.00	5.00	3.6667	1.1547
B-Scope Definition	12	1.00	5.00	3.6364	1.2060
Y-Contractor Selection	12	1.00	5.00	3.5833	1.0836
Y-Alignment	12	2.00	5.00	3.5000	0.7977
Y-Contract Form	12	1.00	5.00	3.4167	1.3114
Y-Contract Type	12	1.00	5.00	3.4167	1.0836
B-Alignment	12	1.00	5.00	3.4167	1.3114
R-Risk Allocation	12	1.00	5.00	3.2500	1.5448
R-Scope Definition	12	1.00	5.00	2.7500	1.2154
B-Contract Form	12	1.00	5.00	2.7273	1.2721
B-Contract Framework	12	1.00	4.00	2.5000	0.9045
R-Contract Type	12	1.00	5.00	2.2727	1.2721
R-Control Mechanism	12	1.00	5.00	2.2500	1.5448
B-Control Mechanism	12	1.00	4.00	2.1667	0.9374

Note: 1. It shows the respective relationship of Blue, Yellow and Red Trust with different contracting factors.
2. B- is Blue Trust, Y- is Yellow Trust and R- is Red Trust.

Appendix VIII Interview Schedule: In-depth Interviews of Main phase

Memo:

1. Questions were classified into three types towards different interviewing scenario. Questions prefix with **O** are for Oil & Gas companies, questions with **E** are for Engineer Procurement and Construction (EPC) firms. Questions with **O&E** are for both the Oil and Gas companies and EPC firms.
2. Questions were laid out in three levels.
   (a) Questions in **BOLD** font are the main questions.
   (b) Questions prefixed with * following the main question are the probing questions.
   (c) Lines in BULLET format are the possible hints to interviewees in order to stimulate the interviewees' thoughts.
3. The main questions will be finished one by one through interview. The probing questions will NOT be all covered in the interviews depending on the circumstance.

PROJECT AND CONTRACTING RELATED QUESTIONS

1. Please briefly describe the last project that your were involved with a project value between $10 million and $100 million.

O&E* Please briefly describe this project/contract.
- Why did the parent organization initiate this project?
- What was the connection between this project and company profile?
- Project visibility to the community

O&E* When did this project start?
How long have you been working with the contracting parties on this project?

O&E* How many parties were involved in this contract?

O&E* What were the main considerations in choosing contracting approach?
Answers could be around the critical contracting factors such as:

- Dollar value of contract
- Project size
- Market conditions – resource availability
- Safety issues
- Risks
- Contractual relationship
- Engineer selection method
- Alignment
- Constraints to success by considering Dollar value, Time, and Performance
- etc.

O&E* How has the performance of this contract been so far?

2. Tell me about your experience in starting a contracting process.

O&E* How would your organization typically start contracting with the contracting parties?
- Procedure,
- Company regulation, policies, and procedures...
- Repeated experience

O&E* From your experience, how would you get all contracting parties together to contribute to the project at the early stages of contracting? Can you explain the level of their participation?

3a. How did you select this contracting party?

O* Through which processes did you select this Engineer? E.g. formal tendering, single-sourced contract or negotiated contract? Please describe this process in details.

O* If it is by tender: Why was this Engineer was picked? If it is negotiated or single-sourced: Why did you plan to award this contract through negotiation?

O* Did you have any previous working experience with the Engineer on other projects? If yes, how would you comment on that experience? Were you happy about it?

E* Did the owner's selection process, and awarding mechanism affect your decision to pursue this project?

E* Do you know the reasons why the Owner picked you?

E* Have you had good experience with this client on other projects before?

3b How did you make up your decision to sign the final deal with the contracting party?

O* Were there any changes in the evaluation criteria at the last stage of Engineer selection? If yes, what were the changes?

O* Have you ever been in a situation where you could not easily choose one Engineer among several others with similar technical qualifications?

E* What were your reactions to the changes in evaluation criteria?

E* Did you propose any supplementary conditions when you were in the final stage before you were awarded of the contract?

O&E* Did the contacts with the contracting parties change your initial judgement of them? How did those contacts affect your decision?

4. How was the scope of this contract defined when you start the Engineer selection?

O&E* What does a complete scope definition look like?

O&E* Were you comfortable with the scope definition when you started the Engineer selection process? Would you say I am very comfortable, somewhat comfortable, neutral, somewhat uncomfortable, or very uncomfortable with the scope definition?

5. Could you briefly describe the relationship between you and the other contracting party?

O* How willing were you to share information of changes at the beginning of contracting processes?

E* Were you willing to offer a solution of to certain issue without additional considerations in addition to the base of the contract form?

O* Did you feel free to make contact with the contracting parties?

E* Did you hesitate to tell the Owner about your constructive suggestions/problems?

Whom did you normally communicate with?
- PM from EPC companies
- Team members from the EPC companies
- Others

How would you inform the Owner about your suggestions?
- Go and talk to the Owner
- Send messages through engineers, or client representatives
- Others

O&E* Did you have any other connection with the other contracting party outside of this contractual relationship? Did you seek the relationship out of the boundary of this contract?

TRUST AND CONTRACTING RELATED QUESTIONS

6. What will a trusting environment look like when you are involved with the other party at the early stages of contracting?

- Open communication
- Relationship (contractual, social, personal...)
- Mutual understanding, and alignment
- Willingness to share profit or benefit
- Willingness to take responsibility and make commitments and deliver them

******Introduce "Trust Colour Model" Here******
CRITICAL THAT THIS IS CAREFULLY EXPLAINED esp. RED TRUST!

7. How do you see the reflection of 'Trust Colour Model' in contracting environment?

O&E* Can you make the connection of 'Trust Colour Model' with project contracting practice?

Tell me about your experience and give me ONE example of the performance of Blue, Yellow, Red trust in contracting respectively?

- Select competent parties
- Give repeated business
- Follow 'gut feeling'

O&E* From your perspective, will trust influence your decision in the process of Engineer selection? Please describe the situations in details.

O&E* Do the actual trust levels between the contracting parties affect your final decisions towards the other contracting party? Why?

O&E* In which way does different "Trust Colour" influence your decision-making?

8. How will different trust colour influence contracting parties' reaction to the uncertainties of scope in the Engineer selection process?

O&E* How will you react to the uncertainties in the scope when you are in the selection process, if you were in a higher trust relationship?

Will you feel comfortable about scope uncertainty and continue your involvement in that particular project? Why?

O* How would you act differently, if you were in a lower trust relationship? What would the difference be?

E* How would you act differently, if you were in a lower trust relationship? What will be the difference?

O&E* Will any type of 'trust colour' dominate in your reaction to the other parties in facing the uncertainties of the scope? Why?

9. How will 'Trust Colour Model' influence the decision on the Engineer selection methods and processes?

O&E* Will you use different Engineer selection methods (i.e. tendering, negotiation, single-sourced) in coping with different trust level between potential contracting parties?

O&E* Will a particular trust colour influence your decisions at a specific sub-phase of the selection process?

O&E* Will you see a particular trust colour act differently at the personal and organizational levels in a specific situation?

O&E* Does trust influence your final decision on selecting this specific contracting party? How does trust influence your decision? Please describe the specific situation.

O&E* Do you feel that 'There are contracting parties who are more easily trusted than others?' How do those trustworthy parties differ from the others?

O&E* Will considerations such as 'taking care of my interests', and 'having consistent and predicable performance', have positive influence on your decision of picking a certain contracting counter party? How?

10. How will TRUST influence the health of contractual relationship in the selection process?

O&E* How would you say the contractual relationship is healthy at the Engineer selection stage?

- Would you expect open communication in a healthy contractual relationship?
- Is there a clear line between the legal contract and social contract, if you have a healthy contractual relationship?
- Will you expect the other contracting party to provide additional satisfactory service or information if you are in a healthy contractual relationship?

O&E* How would you say there is trust existing in the relationship with the other party? What are the symptoms?

- Exchange problems without excessive concerns
- No we-you confrontation
- No special concerns about contract, just deliver the agreed work

O&E* How would you agree with the statement that 'the competence level of the contracting party is a pre-requisite to a healthy contractual relationship?'

11. How will trust help you achieve alignment among different contracting parties?

O&E* Will it be easier to get agreement on certain contracting issues, if there is trust in place among contracting parties? Why?

- Problems are identified up front
- No surprise
- No assumption
- Mutual understanding
- Acquaintance

O&E* If trust is important to alignment, which trust colour will have more influence compared with others?

- Competence, and resource availability
- Care-taking for others
- Chemistry
- Recognition of similarity based on rapid processing

O&E* Please recall one successful alignment among parties on a recent project. What contributed to this successful alignment?

- Does trust have a presence in this successful alignment?
- Which 'Colour' of trust did you see is most useful in helping parties to reach agreement easily?
- Chemistry
- Care-taking for others
- Recognition of similarity based on rapid processing

FUTURE IMPROVEMENT OF CONTRACTING PRACTICE

12. How would you take TRUST into consideration in the selection process?

O&E* What will be the areas having high influence from trust? Will you pay attention to them? Why?

- Would you modify the selection process or criteria to reflect trust among contracting parties?
- Would you take trust into consideration earlier and try to improve the working relationship in the subsequent contract execution as well?

13. O Will your interests be well cared for and protected if you give credit to TRUST between you and the Engineer? Why?

- Interests: dollar value, project profile and visibility, quality, safety record, political scene, social issues

E **Do you think you are able to reach the original project objectives of a contract if you nurture TRUST between you and the Owner? Why?**
- Project objectives: profit, reputation, better working relationship with the owner, repeated business.

14. O&E If you had a chance to re-design previous contract strategies, what could be improved? Why?
- Scope definition/alignment
- Contract type
- Engineer selection methods
- Commercial terms
- Tone for the relationship setting

INTERVIEWEE DEMOGRAPHICS

1. **Companies you are presently employed in:** ☐ Oil and Gas Companies ☐ EPC Companies

2. **Fuctional area you are currently in :** ☐ Senior Management ☐ Project Management ☐ Contract Administration ☐ Othrs (specify) _____

3. **Position:** ☐ V.P. ☐ Project Director ☐ Project Manager ☐ Project Team Player ☐ Other (specify) _____

4. **a) Total years of working experience:** _____ years
   b) Years of experience in contract administration: _____ years

5. **Type of PM training you acquired:** ☐ None ☐ On Job Training ☐ Day Courses/Workshop/PDU ☐ Certification Program ☐ Degree Program

Thanks for Your Time and Contribution!