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Effect of culture, risk, and trust on the selection of dispute resolution methods in international construction contracts

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Effect of culture, risk, and trust on the selection of dispute resolution methods in international construction contracts

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DEDICATION

To the soul of my father

This dissertation is dedicated to my husband, Tamer Omar, without whose caring support, it would not have been possible, to my mother for her continuous encouragement, my sister for always inspiring me, and last but not least, my lovely sons, Adam and Yassin, for the joy and meaning they bring to my life.

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ABSTRACT

International construction projects provide opportunities for developing countries to advance in the global economy, and for international firms to increase their profit and market share. Despite the attractive opportunities that international construction offers, there are many challenges and difficulties when moving into international markets. These include the many risks associated with differences in culture, economic conditions, specifications/standards, legal frameworks, exchange rates regulations, and productivity levels. All these aspects affect the way contract clauses are drafted, including the dispute resolution clause. Since many risks are associated with international construction, whether external or project-specific risks, the different cultures the company needs to deal with and manage, and the level of trust the international parties share, it becomes necessary to choose an appropriate dispute resolution method (DRM), depending on the conditions for each project. The objectives of this study are to identify factors that have an effect on the choice of DRMs in international construction contracts and to recommend specific DRMs to contractors based in English-speaking countries, who plan to operate in the Middle East or Asia. In this research, a concurrent mixed-method design is employed. Factors affecting the choice of DRMs and the effect of culture, risk, and trust on the current choice of DRMs are investigated, using a quantitative method—surveys. In addition, a Delphi technique is used to obtain the views of experts on factors to consider when choosing a DRM in an international contract and on the effects of culture, risk, and trust. Results from this study show the first two factors affecting the choice of DRMs from both industry and experts' perspectives are related to the country of operation and culture. Both culture and risk, do not have a statistically significant effect on choice of DRMs, while trust does. Arbitration is the most recommended DRM in all project conditions, except in projects with high trust between contracting parties where negotiation is the most recommended. Non-amicable DRMs, such as litigation, mini-trial, and summary jury trial are the least recommended methods. From the results obtained, a DRM-Culture Risk Trust (DRM-CRT) model is developed to assist international contractors from English speaking countries planning to operate in the Middle East or Asia in the choice of the appropriate

DRMs during contract formation; given identified culture characteristics, trust levels, and risk factors.

CHAPTER 1: **INTRODUCTION**

International construction projects provide opportunities for developing countries to advance in the global economy, and for international firms to increase their profit and market share. Despite the attractive opportunities that international construction offers, there are many challenges and difficulties when moving into international markets. These include the many risks associated with international construction, whether external or project-specific risks, the different culture the company needs to deal with and manage, and the level of trust the international parties share. All these aspects affect the way the contract clauses are drafted, including the dispute resolution clause.

However, in most standard contracts, arbitration is still used as the default dispute resolution method (DRM) with minimum thought placed on how the dispute resolution process can be designed to control or lessen both the risk of claims and the cost of disputes that may arise in such an international context (Gebken and Gibson 2006; Seifert 2005). Contractual disputes are time consuming, expensive, and unpleasant. Inevitably, however, they do occur from time-to-time. The Construction Industry Institute (CII) defines twelve contract aspects related to risk allocation; one is dispute resolution. The importance of bringing the dispute to a conclusion as efficiently and cost effectively as possible cannot be overstated. Thus, choosing the most suitable DRM becomes crucial.

There are many types of DRM. An understanding of the various forms of DRMs and their critical factors is of great value in handling disputes. Many studies described the different DRMs and their characteristics (Chan and Suen 2005; Yates and Smith 2007), yet a limited number of studies investigated the basis on which the decision to choose certain DRMs in the contract is made. Some studies recommend the need for a systematic approach to choose DRMs (Chan et al. 2006). Such a systematic approach becomes very crucial when dealing with projects that have different characteristics, such as contracting parties of different cultures, unique project or country risk factors, dealing with parties for the first time, or with parties having very limited experience. All these factors (including the soft management

factors) and many others should be taken into account, when selecting the mechanism for resolving construction disputes that are very likely to occur.

There is a demand for an integrative research process to investigate all factors, including the soft influential factors and their correlations (Chan and Tse 2003). While tremendous focus is placed in management research on new technologies, the social and human factors through which these studies are implemented in an organization are seldom neglected (Shields and West 2003). As per the Rethinking Project Management Network, more emphasis must be placed on comprehending the less tangible management aspects of the construction project, such as building trust, organization learning, and building of an organizational culture able to operate with high uncertainty levels (Atkinson et al. 2006).

An increasing trend in the construction management research is noticed on the less tangible management aspects, including culture and trust in construction; yet, not all aspects of the construction project are addressed. For example, since managing organizations and projects, and handling dispute negotiation involves individuals and their beliefs, culture differences have a huge influence on management success (Hofstede 1983). This is in addition to the environment of the host country, that has a great effect on the operation of the construction project, making it very important for contracting parties to realize others' expectations and priorities to function effectively (Chan and Tse 2003).

Not only is culture considered an important soft management aspect to consider, trust is also proposed by many studies as an aspect that improves the success rate of projects and, thus, should be included within the discipline of project management (Atkinson et al. 2006; Lendra and Andi 2006). With construction projects that mainly aim at achieving a common set of goals through the collaboration of the project participants, it becomes critical for all teams involved to build teams and establish good communications (Swan et al. 2005, 2002). Therefore, it becomes important to study how these teams are built, how trust is developed, and how trust between team members affects the project's outcomes (Romahn and Hartman 1999). The issues of culture and trust were seen to interweave in some studies. For example,

Sennara (2002) explored the cultural risks involved in an international project and the cultural influence on how people perceive trust. It was seen from the results of this study that trust has an impact on the amount of cultural risks encountered in an international project.

Studying culture and trust factors deal with the soft project management aspect, yet it is still important to include the hard management aspects of the project, such as the uncertainties in cost, time, and quality. All of these aspects can be handled by proper risk management practices. It is worth noting international construction projects do not only involve the common uncertainties available in any local construction projects, they also include all types of risks associated with the international markets (Han and J. E. Diekmann 2001). Culture and trust are important to handle deals and negotiations, while understanding the risks involved will make agreements easier to reach (Sennara 2002).

It becomes apparent that culture, trust, and risk are all aspects that affect how the contract should be drafted, how the project should be managed, how disputes should be handled, and, thus, how DRM should be chosen. Figure 1.1 provides a quick glance of the main areas covered in this research. In this chapter, a general overview of the research objective, the research methodology, and the expected contributions will be presented. The chapter concludes with a guide to the dissertation outline.

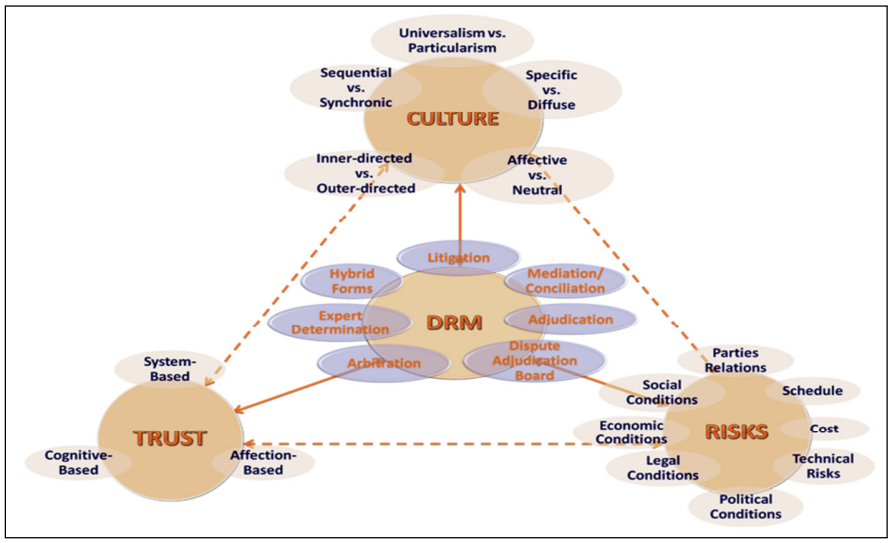


Figure 1.1: Main areas covered in this study

1.1 Research objective

The objective of this study is to explore to explore the effect of culture, risk, and trust on the choice of DRM in international construction projects. The currently employed DRM in international projects and their most significant characteristics will be studied. Based on the culture of the country the construction company is operating in, the level of trust borne between the contracting parties and the level of risk in the country, a Culture-Risk-Trust-DRM (DRM-CRT) model will be developed. It is the aim of this model to help owners and/or international contractors in the selection of the appropriate DRM during contract formation; given identified culture characteristics, trust levels, and risk factors.

1.2 Research methodology

In this research, a concurrent mixed method design is employed, using two methods. The first is a quantitative method, namely surveys, used to generally identify factors currently affecting the choice of DRMs in international contracts and to determine how culture, risk, and trust affect the choice of DRMs. The second is the Delphi technique used to investigate, in detail, the effects of culture, risk, and trust (and their interactions) on the choice of DRMs. Using the Delphi technique results, a DRM-CRT model is developed. This rationale for using the mixed approach is to compare between the current and the recommended practices in the choice of DRMs in international contracts. The DRM-CRT model is validated through follow-up interviews with three experts on the Delphi panel.

1.3 Research contributions

The conclusion of this research is an incremental step to further the understanding of the factors that, in general, influence the choice of DRMs in international contracts and the recommendations of the experts on what factors to consider. Culture, risk, and trust factors' effects on the choice of DRMs is explored, in detail, to reach general recommendations on which DRMs to use when operating in certain cultures with parties with certain trust levels and in projects with certain risk factors. These recommendations are mapped onto a DRM-CRT model that can be used by decision-makers when drafting the contract to decide which DRMs would best fit the contract situation. This would be of great significance and benefit to

contractors just starting their international business and are unaware of the current and recommended practices of DRM choices.

1.4 Reader's guide

1.4.1 Chapter 2-Literature Review

Chapter 2 provides a literature overview of the most significant studies in the area of DRMs, culture, risk, and trust in the construction industry. It first starts by introducing globalization in construction, which has led to increased involvement of construction companies in international projects and the challenges faced, including dispute resolution. The chapter presents a discussion of construction disputes and DRMs used in international projects. This is followed by an introduction and a literature review of the three areas of interest in this study—culture, trust, and risk—and how they relate to construction disputes. The point of departure and the research questions are finally introduced.

1.4.2 Chapter 3-Research Methodology

Chapter 3 establishes the research methodology adapted to conduct this study. It starts with an overview of the different types of research methodology. Then, it provides a justification on the research design chosen. This chapter serves to explain each stage of the research design, and outlines the data collection and analysis mechanism applied, in addition to the validation techniques utilized.

1.4.3 Chapter 4-Results and Analysis

Chapter 4 presents the results and the analysis of the data collected from the survey and the Delphi technique. It covers the statistical analysis used. The Dispute Resolution Method-Culture Risk Trust (DRM-CRT) model is developed from the results presented in this chapter. Follow-up interviews are also reported.

1.4.4 Chapter 5-Conclusions

The final chapter presents the conclusions of the research project. This chapter presents a discussion regarding conclusions and the model developed, and is followed by an

examination of the contributions of this research to the construction knowledge base. Finally, a statement of research limitations and ideas for future research is presented.

1.4.5 Chapter 6-References

This chapter includes a presentation of the references used throughout the document.

1.4.6 Appendices

1.4.6.1 Appendix A: Survey

Appendix A includes the survey instrument developed in the study and the reminder emails sent to the survey participants.

1.4.6.2 Appendix B: Delphi technique questionnaires

Appendix B includes the four rounds of survey questions developed for this study and the reminder emails sent to the panel of experts.

1.4.6.3 Appendix E through Appendix H: Statistical test outputs

Appendices E through H include detailed output of the various statistical tests used in the analysis of the results.

CHAPTER 2: **LITERATURE REVIEW**

2.1 Introduction

2.1.1 Research objective

Many dispute resolution methods (DRMs) are employed in international construction contracts. The objective of this study is to explore the available DRMs used in international projects and their most significant characteristics. In addition, based on the culture of the country the construction company is operating, the level of trust borne between the contracting parties and the level of risk in the country, one DRM or a multi-tiered DRM will be recommended for incorporation into the prime contract document between owner and contractor. It is the aim of this study to help international contractors in the selection of the appropriate DRM during contract formation; given identified culture characteristics, trust levels, and risk level.

2.1.2 Chapter overview

This chapter will begin by introducing globalization in construction, which led to the increased involvement of construction companies in international projects and the challenges they face. One of the most important challenges faced is dealing with construction disputes in a foreign country. An elaborate discussion of construction disputes and DRMs used in international projects will be presented. This will then turn to an introduction and a literature review of the three areas of interest in this study—culture, risk, and trust—and how they relate to construction disputes. From the literature review conducted, this chapter moves to describe the need for this study and accordingly presents research questions to address.

2.2 Globalization in construction

International construction is defined as the industry where a company, a resident in one country, performs work in another country to diversify and expand its market shares. The construction industry is seen to follow the same trend many industries have taken by being dominated by globally-oriented organizations that operate all over the world. It is also suggested, since the demand for construction services in the developed countries is

decreasing significantly compared to the developing and industrialized countries, the developing countries are anticipated to dominate the construction market. Such a global construction environment imposes high competition between companies for a share of this global market (Hall and Jaggar 1997).

Globalization is defined as a situation where political borders become increasingly irrelevant, economic interdependencies increase, and national differences become more obvious, due to dissimilarities in societal cultures and central issues of business. The first move of globalization in construction was in the appearance of international contractors, as a result of the ease of movement of goods/services across borders and communication advancements. These contractors entered the international market in many forms. Most remarkable was the oil-driven economic boom in the Middle East and North Africa that created huge construction demands. Also, the emergence of multilateral agreements between countries (such as the General Agreement on Trade and Tariffs (GATT) and the General Agreement on Trade and Services (GATS), and the establishment of the World Trade Organization (WTO)), and between companies themselves (such as joint ventures and alliances) enabled firms to perform businesses in each other's countries (Hall and Jaggar 1997; Ngowi et al. 2005).

International projects provide opportunities for developing countries to advance, and for international firms to increase their profit and market share (Chan et al. 2006). Since most of these companies come from advanced industrialized countries, they utilize the most up-to-date expertise and knowledge effectively (Chan and Suen 2005; Dikmen and Birgonul 2006; Ngowi et al. 2005). For international firms facing diminishing markets in their domestic developed countries, international projects offer new markets for construction services (Hall and Jaggar 1997). There are many forms of international construction work, such as consultancy, contracting, equipment supply, construction products/materials, and facility management (Dikmen and Birgonul 2006).

Despite the attractive opportunities globalization offers, there are many challenges to moving into international markets. Entering international markets is a critical strategic decision for any company that requires vigorous scanning of the environmental conditions and market risks, determination of weakness and strengths, and deciding whether these weaknesses and strengths match the local environment. Many risks associated with international construction arise from differences in culture, economic conditions, specifications/standards, legal frameworks, and productivity levels (Dikmen and Birgonul 2006). To enter a foreign market, a company must evaluate all aspects affecting the project (Chan and Tse 2003).

With participants from diverse political, legal, economic, and cultural backgrounds, firms should be cross-culturally competent and capable of management in contrasting cultural dimensions (Chan et al. 2006; Chan and Tse 2003). They should know whether the legal system they will be operating under is similar or different than their home country and how the contract is interpreted when governed by the local law (Chan and Tse 2003; Yates and Smith 2007). Companies should also note contracts signed with foreign owners, involving the government or one of its agencies, dictates unfamiliar sovereign powers, such as exchange rates regulations, import/export of goods, labor conditions, and lack of an independent judiciary (Sweet and Schneier 2009). Such comprehension will definitely affect the success of their businesses (Chan et al. 2006). In general, a global strategy should be adapted by these businesses and a good working cooperative relationship among the involved parties is a must to take advantage of the process of globalization (Chan et al. 2006; Hall and Jaggar 1997) .

Many studies have been performed to explore international market entry decisions, based on risks involved (Han and Diekmann 2001), identify and measure international markets risks, and suggest risk mitigation measures (Dikmen and Birgonul 2006; Han and Diekmann 2001; Zhi 1995). Dikmen and Birgonul (2006) studied indicators of the market/project attractiveness, such as availability of funds, market volume, economic prosperity, and country risk rating. Decision support tools, based on the experiences of experts using neural networks were developed to facilitate the critical decision of operating in a foreign country

(Dikmen and Birgonul 2006). Along the same lines, Han and Diekmann (2001) developed a procedure for a go/no go decision to become involved in public sector projects in a foreign country.

2.3 Disputes

In any construction project, disputes occurrence is typically the rule, not an exception (Smith et al. 2009). The different contractual factors, cultural backgrounds, legal and economic factors, languages, technical standards, procedures, currencies, and trade customs involved in international projects make projects even more vulnerable to disputes. International construction disputes represent a significant number of disputes arbitrated in the international commercial arbitration, accounting for almost 20 percent of all disputes referred to the International Chamber of Commerce (ICC) each year (Seifert 2005). If not properly managed, disputes may lead to delays in projects, lower team spirit, increase project costs, and damage business relationships (Chan and Suen 2005). Disputes frequently stop the project's progress, causing major conflicts that affect the performance of the project (Kaklauskas et al. 2008).

Disputes in international construction frequently occur for reasons, such as parties' lack of knowledge and experience in construction law (such as conflicts of laws and jurisdictional problems), different project management practices (local vs. foreign) and/or differences in objectives. It has been confirmed also by many studies that the differences in the factors mentioned above have a recognizable effect on the causation and resolution of construction disputes (Chan et al. 2006; Chan and Tse 2003). They generally affect the way the contract is set up and the selection of the DRMs. Parties are usually concerned about the clarity of local laws and the contract's interpretation governed by these laws (Chan and Tse 2003).

Accordingly, if a decision is taken to venture into international contracting, firms must be aware the international contracts they will sign, although similar to their own domestic contracts, will still include some major additional/modified clauses that address international issues. One of these very critical clauses is the dispute resolution clause. The dispute

resolution clause is a contract clause that specifies the DRMs used for resolving disputes arising under the contract.

2.4 Dispute resolution methods (DRMs)

In the global arena, there are many forms of DRMs adopted, each with its own particular characteristics (Chan et al. 2006). DRMs can be categorized in different ways. One way is to categorize them according to the basis on which the decisions are made—power-based approaches (based on authority or competition), right-based approach (based on rights), interest-based (win-win and all-gain negotiations), or relational approaches (based on maintaining relationships). Another way of categorizing DRMs is according to the way the dispute is seen for resolution; distributive approaches where resources are seen as fixed and splitting solutions are offered, while in integrative approaches parties offer more solutions than the obvious ones and create an all-gain approach (Morris 2002). Also, defining the degree by which parties influence the outcome is another way of classifying DRMs (Sander and Rozdeiczer 2006).

In general, techniques other than litigation are referred to as Alternative Dispute Resolution (ADR) techniques. In construction contracts, most contracts will not go for litigation unless other ADR techniques have been attempted first (Yates and Smith 2007). This is because litigation is very procedural and expensive, enforcing the old saying that "A poor settlement beats a good lawsuit" (Smith et al. 2009). In this section, different types of DRMs used in the construction industry, including litigation and other ADR methods, are introduced with emphasis placed on their main significant characteristics. Table 2-1 shows a comparison of the different characteristics of the DRMs discussed.

2.4.1 Litigation

Litigation is a dispute resolution government run system, involving judges and courts. It is a very complex procedural process following many rules that vary from state-to-state, as well as from country-to-country (Smith et al. 2009). Parties involved need solicitors and barristers to assist them, as they are the only ones permitted to address the court, implying a very

expensive process. The judgment of the court is final and binding. Litigation is public, since anyone can attend the trial. No party has any say on the choice of judge. Given construction disputes are primarily technical and judges making decisions in such disputes usually lack the technical knowledge that may be required, litigation is not the best resort, although sometimes becomes the only one (Layngross.com Construction Disputes Resolution nd).

Compared to other ADRs, litigation does not offer disputants the option to determine the process they will use, leading to less satisfying outcomes and harder decisions to comply. Less cooperation and more competition are involved in litigation compared to ADR methods. Thus, ADR methods compared to litigation help maintain good relationships between parties becomes a key advantage in the construction industry, where parties continue to interact, if not on the same project, at least in future projects after a settlement is reached (Layngross.com Construction Disputes Resolution nd). In the context of large international projects, where there are several parties of different nationalities involved, ADR avoids any conflict of laws difficulties or jurisdictional problems that may arise, since it allows the parties to reach agreement as to how their disputes should be resolved, taking into account national and cultural differences (Chan and Tse 2003). In general, ADR has gained favor over litigation for its low cost, speedy resolution and lower procedural complexity (Chan et al. 2006).

2.4.2 Mediation/Conciliation

Mediation is considered one of the most popular ADR methods (Smith et al. 2009). It is a voluntary non-binding process, where a mediator assists the parties to achieve a negotiated settlement. The parties retain full control over how their dispute is to be resolved, since the mediator's role is to help the parties explore various settlement options. In the end, it is entirely up to the parties to decide whether any of the options suggested by the mediator will resolve the dispute (Layngross.com Construction Disputes Resolution n.d.; Smith et al. 2009; Yates and Smith 2007). The mediation process is strictly confidential and is designed to preserve the relationship between the parties involved (Chan et al. 2006; Yiu and Lai 2009). One of mediation's major benefits is the solution agreed upon may not be in compliance with

the respective contractual rights and obligations of the parties, giving parties more options of solutions to explore (Layngross.com Construction Disputes Resolution nd; Yiu and Lai 2009). For all these reasons, mediation has become one of the most common means of disputes resolution in construction projects (Yiu and Lai 2009).

Most standard contracts list mediation as part of the formal process required before moving to arbitration or litigation, such as the ConsesusDOCS 200, the Engineers Joint Contract Documents Committee (EJCDC), and the American Institute of Architects (AIA) documents (Smith et al. 2009). Unlike mediation, where the mediator facilitates communication between the parties to reach a negotiated settlement, in conciliation, the conciliator recommends a settlement which the parties may accept or reject (Layngross.com Construction Disputes Resolution nd; Yates and Smith 2007) .

2.4.3 Adjudication (Court-appointed arbitration)

The adjudication system is a must in most British contracts. In this process, a neutral adjudicator decides on a resolution of a contractual dispute between the parties within a predetermined time limit. If stated in the contract, the decision is binding on the parties. The time limit for the decision is a very distinguishing characteristic of this process, as a fixed time is set in which the adjudicator should make a decision. However, the parties can still challenge the decision, if they are not satisfied with it, and seek a more lengthy thorough procedure. If the decision reached by the adjudicator is challenged by one of the parties, it is still enforced; yet, the party for whom the adjudicator ruled in favor controls the disputed amount of money during the subsequent disputes resolution procedure. Thus, adjudication becomes most appropriate in cases where time is of the essence, especially in payment decisions or where work is required to continue, while awaiting the decision of a judge or arbitrator (Layngross.com Construction Disputes Resolution nd; Sweet and Schneier 2009).

Table 2-1: Comparison of different DRMs

DRMs / Pt. of comparison	Litigation	Arbitration	Mediation	Adjudication	DAB	Expert Determination
Parties involved in the decision	Judges and courts	Arbitrators	Mediators and Parties	Adjudicator	Panel of experts	An expert
Control level of the parties	None	Minor	Full	Average	Average	Minor
Decision enforceability	Final and binding	Final and binding	Non-binding	Binding, if stated in contract	Non-binding	Final and binding
Privacy	Public	Confidential	Confidential	Confidential	Confidential	Confidential
Relative duration	Very long	Long	Short	Short-set	Short	Short
Relative cost	Very expensive	Expensive	Less expensive	Average	Average	Not expensive
Key points	Technical knowledge compromised	Technical knowledge not compromised	Solution may not follow contract	Decision can be appealed	DAB knowledgeable of project	Preferred in complex technical issues

2.4.4 Arbitration

Arbitration is a non-judicial international forum to settle disputes (Yates and Smith 2007). It is used as an alternative to litigation with prior contractual agreement of the parties (Smith et al. 2009). Arbitration's benefit emerges from the fact that disputes in the construction industry often require the decision-maker to be well versed in relevant technical and industrial matters, in addition to legal issues (Layngross.com Construction Disputes Resolution nd; Yates and Smith 2007). However, this advantage may sometimes lead to the overlook of basic legal principles, such as right of appeal and evidentiary rules (Sweet and Schneier 2009). Many arbitration associations provide lists of arbitrators with construction experience that disputing parties can choose from. An example of popular arbitration organizations is the International Arbitration Association (Yates and Smith 2007). Arbitration is a confidential process in comparison to litigation (Chan and Tse 2003; Layngross.com Construction Disputes Resolution nd). The decision reached is final and binding, and is usually enforced through the courts of any jurisdiction, not necessarily the jurisdiction where the arbitration was held. Such characteristics make it considerably attractive in international disputes (Chan and Tse 2003; Layngross.com Construction Disputes Resolution nd; Yates and Smith 2007).

International contracts usually specify the location of the arbitration proceedings (since local jurisdictions may vary in regulating the arbitration process) and the governing language (Yates and Smith 2007). Sometimes the choice of law may also be included within the arbitration clause. International contracts usually insist on the use of international arbitration to overcome distrust and anticipated problems with local laws. Arbitration decisions are enforceable worldwide under the New York Convention (Sweet and Schneier 2009). However, when arbitration is chosen to resolve disputes, the process ends with a win-lose situation: the arbitrators decide the outcome and the parties lose the power to self-determine the resolution. Though it still remains the most popular DRM in international construction contracts, other DRMs are sometimes favored by the disputants, as arbitration can be overly formalized, time consuming, and expensive (Seifert 2005).

2.4.5 Dispute Adjudication Board (DAB) / Dispute Review Board (DRB)

DAB (also known as Dispute Resolution Boards, or DRB) was developed by the international construction industry in response to the perceived inadequacy of arbitration to provide an efficient and cost-effective means of disputes resolution (Seifert 2005). DAB members are a panel of construction industry experts, who work on a particular construction project, and are familiar with the project's construction contract and progress (Sweet and Schneier 2009). DAB adjudicate quasi-binding disputes that arise from the contract; these are held periodically to ensure smaller disputes do not negatively affect the project's schedule or budget. By using DAB, parties also avoid submitting construction claims (sometimes very technical) to a court and can instead rely on the board to settle matters in a timely manner. In international projects, it is most desirable to have DAB members of the same nationalities, as those of the parties involved. Today, both the World Bank and the FIDIC (International Federation of Consulting Engineers) documents have DABs replace arbitration as the primary form of dispute resolution in construction projects (Seifert 2005). However, the decision issued by DAB is often advisory in nature and not binding; thus, any of the parties can contest the decision by employing any other DRM (Yates and Smith 2007).

2.4.6 Expert determination

In expert determinations, the parties refer the dispute to an expert (usually chosen by both parties), who has the full authority to make a decision solely on the expert's own knowledge and without any of the parties' consultation. The contract may dictate the terms of reference, including the procedure to be followed, expert's power, duties and liability, and the matters of dispute. The expert's decision is usually final and binding. This form is usually used in complex technical issues, where the parties themselves may lack the technical expertise. It is considered a very inexpensive and expeditious form of dispute resolution that requires the parties' confidence in the expert's competence (Layngross.com Construction Disputes Resolution nd).

2.4.7 Early neutral evaluation

Early Neutral Evaluation (ENE) started as a method to be used at an early stage in a dispute to improve the parties' understanding of the strengths and weaknesses of their case, and the probability of success in formal court proceedings. It soon became a technique commonly adopted as a process to assist in the early resolution of disputes. It is voluntary, confidential, and non-binding. Early Neutral Evaluation involves a neutral evaluator not connected to the dispute or any of the parties. The depth of the evaluation will be defined by the time allocated to the process. The parties decide on the process details, whether it is documentary evidence only or includes oral hearings, number, and scope of proceedings. The costs of the ENE process are usually shared between the parties (Royal Institution of Chartered Surveyors (RICS) 2010).

2.4.8 Hybrid methods

There are many forms of hybrid ADR methods. Mediation-arbitration, or med-arb, is an ADR method that involves both mediation and arbitration. In this method, the parties start with mediation and then move automatically to arbitration, if no agreement is reached. The mediator is likely selected and becomes involved early in the project (Sweet and Schneier 2009). With the mediator involved with mediation, he/she gains more knowledge of the case and the parties, leading to a more efficient arbitration process; yet, biases carried from mediation to arbitration are susceptible (Smith et al. 2009).

Other hybrid methods are mini-trials and summary jury trials. In a mini-trial, a nonbinding trial is held before a three-person panel (one senior representative from each corporation and a neutral third party), where the senior representative tries to find a resolution with the help of the mediator. Thus, the parties' representatives act as jury, judge, and negotiators. In the summary jury trial, a nonbinding trial is held before a mock judge and jury, after which the parties negotiate a settlement (Smith et al. 2009). Such a settling helps both parties realize the case's weakness and strengths, and reaches a resolution with no real trial (Smith et al. 2009).

2.4.9 Multi-Tier systems

An increasing number of contracts are moving towards the multi-tier system. This mainly involves moving from one DRM to the other; for example, moving from DRB to Mediation to Arbitration. A multi-tier system usually aims at starting with less expensive and less formal DRMs, and moves to the more expensive and more formal one, if the dispute is not resolved. FIDIC uses a three-tiered system—DAB-amicable settlement and arbitration (Sweet and Schneier 2009).

Figure 2.1 presents a summary of some of the most common DRMs and the escalating levels in hostility and costs associated with them. Note, the steps start with prevention techniques, which aim primarily at preventing the dispute from occurring either by risk mitigation measures or creating a teamwork environment (Cheung 1999).

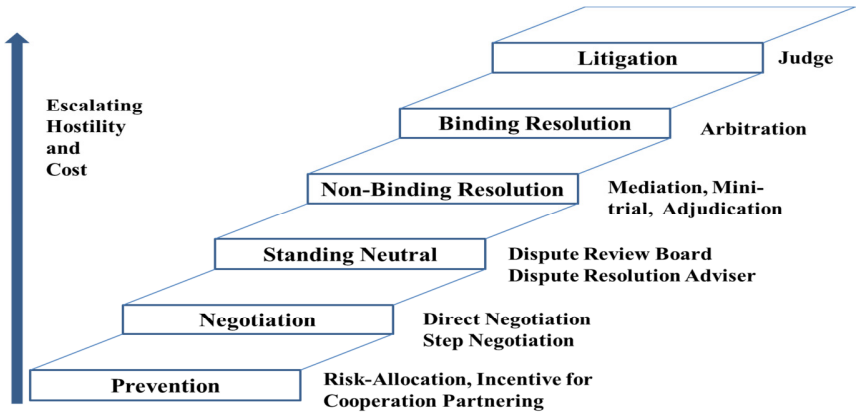


Figure 2.1: Construction dispute resolution steps (adopted from Cheung 1999)

2.4.10 DRMs selection

Choosing among the DRM alternatives is a very challenging problem discussed by many researchers (Chan et al. 2006; Sander and Rozdeiczer 2006). Some addressed it in terms of the most appropriate DRM for a specific dispute, while others attempted to suggest DRMs early on before the dispute exists. The key point, as stated by Sander and Rozdeicze (2006), becomes what process(es) best satisfies the parties' interests. They suggested a

comprehensive system that bases the DRM choice on three main categories—goals, facilitating features, and impediments (Sander and Rozdeiczer 2006).

Goals determine what would happen as a result of choosing a certain DRM, such as privacy, cost minimization, reaching a binding decision, having control on the decision, and maintaining a relationship. Facilitating features define the attributes of the case that make it suitable or unsuitable to solving a case, including the method used, whether the case itself is suitable for problem-solving, and the relationships between the parties and their counsel. Finally, the third factor focuses on the ability of various DRMs to overcome impediments to effective resolution (Sander and Rozdeiczer 2006). Litigation, for example, might destroy good relationships and trusts existing between the parties, forming an impediment to reaching a resolution, while mediation can facilitate communications and enhance problem-solving. There is empirical evidence the results anticipated from using a cooperative versus a competitive strategy vary significantly. Litigation could quickly destroy both a good pre-existing relationship and trust, creating an impediment to settlement later. Mediation can facilitate communications and maximize the parties' chances for a value-creating resolution. Summary jury trial and early neutral evaluation may provide an opportunity to make an early assessment of the strengths and weaknesses of the case, allowing the parties to make a more informed decision about a possible settlement (Sander and Rozdeiczer 2006).

Another study was conducted to develop a dispute resolution selection model, using a multiattribute utility technique (MAUT) to be used in international projects. MAUT's advantage is it considers each dispute resolution option as a valued utility function, which a decision-maker wishes to maximize to reach his selection objective. This helps construction professionals make an informed choice of the selection of dispute resolution method, through studying multiple selection factors in a systematic manner. In this study, seven selection factors were considered for the selection of the dispute resolution method—confidentiality, third party control on the process, preservation of business relationships, reducing the adverse effect due to cultural difference, enforceability, cost reduction and speedy in time. These factors were evaluated by 41 experts, who were barristers, arbitrators, mediators, and

project managers (Chan et al. 2006). Other studies highlighted the influence cultural differences might have on selecting dispute resolution management for international projects in China (Chan and Suen 2005). Thus, there seems to be many factors that can affect the choice of DRM, such as matching a dispute with a process (after dispute occurs), the relationship between parties, the speed, the cost, the relative power of the parties, the relative financial resources of the parties, and culture.

2.5 Culture

Though it was thought in the 1950s and 1960s that organizational management practices are universal, regardless of the national culture, the evident cultural differences that exist among individuals defy this view point. The transfer of management theories without cultural sensitivity has proven to be a failure in many cases, such as the adaptation of American theories in Europe or Third World countries. The effects of the culture differences on organizational management cannot be ignored. Managing organizations involves dealing with individuals and their beliefs, not about moving objects (Hofstede 1983).

2.5.1 Defining culture

Culture is said to be one of the two or three most complicated words in the English language, constituting many topics and processes. It is so complex and divergent in its applications (Hall and Jaggar 1997), that it is defined differently, according to the research field where it is studied. In terms of an organization, Hofstede (1984) defines culture as "the collective programming of the mind which distinguishes one group from another…" Culture describes the social system that a group of people create in which they share common rules, norms, values, beliefs, perspectives, practices, and rituals (Chan and Tse 2003). Studies have shown that organizational culture is largely influenced by national culture, as the shared meaning that results from cultural values and beliefs affect the organization theories implemented (Javidan 2002).

With the increase in competition in the international markets, companies need to gain a better understanding of the cultural issues as they need special attention in every organization in

every industry (Hall and Jaggar 1997). Culture is considered one of the major issues that affect the management of international construction projects. In the construction industry, culture is about "the characteristics of the industry, approaches to construction, competence of people, and the goals, values and strategies of the organizations they work in" (Kivrak et al. 2008). The contextual environment of the host country has a great effect on the operation of the construction project. Thus, it becomes important for professionals involved in international projects with participants from different cultural backgrounds to comprehend others' expectations and beliefs to be able to function effectively (Chan and Tse 2003). This comprehension seems to be limited in the construction industry (Hall and Jaggar 1997).

Understanding, respecting, accepting, and managing cross cultural differences effectively in construction projects can enhance the organization/project's effectiveness and provide a competitive advantage, while ignoring or failing to manage cultural differences may lead to many problems in the project, such as project delays and decrease in productivity (Kivrak et al. 2008). A survey conducted by the Construction Industry Institute (CII) and American Society of Civil Engineers (ASCE) in the United States revealed one of the major concerns of construction professionals is the lack of understanding of foreign cultures, ethics, and languages. Cultural differences affect most, if not all, activities of a construction project whether in the pre-award or post-award contract stage. Problems arising from failure to properly manage the cultural differences, include expatriates' culture shock, unfamiliar local work style, different negotiation style, different professional standards and construction codes, and codes of conduct and ethical standards (bribery and corruption), causing many ethical and moral dilemmas (Hall and Jaggar 1997).

2.5.2 Cultural dimensions

Since culture is an intangible concept that can only be seen through people's behaviors, it becomes necessary to develop a means of making it more concrete. There are two main approaches to studying organizational culture—cultural types and cultural dimensions (Liu et al. 2006). There is little agreement among researchers on how to categorize culture types. Many culture type categorizations are available, such as Wallach (1983), who categorizes

culture organizations as bureaucratic, innovative, and supportive. Other researchers categorize organizational culture in terms of risk-taking and power centralization (Liu et al. 2006).

Culture can also be identified in terms of constructs referred to as culture dimensions. These dimensions map the cultural differences in terms of values and practices embraced by the organization (Ankrah and Langford 2005; Liu et al. 2006). Defining certain cultural dimensions for a nation does not indicate that every individual in this culture falls under this exact same dimension; yet, it is an average pattern of the beliefs and values of the whole nation (Hofstede 1983). Dimensions defined form a continuum that allows a framework for analysis and management of cultural differences (Hall and Jaggar 1997). Many dimensions are proposed by various authors, such as unemotionality, depersonization, subordination, conservatism, isolationism, and antipathy; holographic and ideographic; constructive, passive/defensive and aggressive/defensive; involvement, consistency, adaptability and mission; organizational values, task organization, organizational climate and employee attitudes; leadership, structure, innovation, job performance, planning, communication, environment, humanistic workplace, development of individual and socialization on entry; time, space, human relationships, human activities, and human nature (Ankrah and Langford 2005; Liu et al. 2006), shows the cultural dimensions that some researchers introduced to distinguish cultures (Ankrah and Langford 2005).

Hofstede's (1984) dimensions are considered the most extensively used in many management and organizational behavior studies. For decades, Hofstede's dimensions have been considered a marker post for subsequent researchers (Smith 2006). These dimensions were a result of a study conducted on the national cultures of 50 countries (Hofstede 1983). This seminal work defines four independent dimensions for culture: 1) individualism/collectivism, 2) power distance, 3) uncertainty avoidance, and 4) masculinity/ femininity (Hofstede 1984). "Individualism/collectivism" involves the relationship between individuals, whether loose where the individual's or his/her family's interest has the priority, or strong where an individual is supposed to look at the interest of the whole group. The second dimension, "power distance," involves how the society deals with the inequality

existing between individuals. Power distance was seen as related to the centralization of authority and autocratic leadership (Hofstede 1983).

Table 2-2: Dimensions of culture (adopted from Ankrah and Langford 2005)

Cottle (1967 in Abu Bakar 1998)	Hofstede (1984)	Schein (1985)	Hall and Hall (1990)	Trompenaars (1994)	Gesteland (1999
• Past • Present • Future	• Power distance • Uncertainty avoidance • Masculinity/ femininity • Individualism / collectivism	• Humanity's relationship to nature • Nature of reality and truth • Nature of time • Nature of space • Nature of human activity • Nature of human relationships • Individual/ groupism • Participation and involvement • Characteristics of the role relationships	Monochronic/ polychronic	• Universalism/ particularism • Collectivism/ individualism • Neutral/ affective relationships • Diffuse/ specific relationships • Achievement/ ascription	Deal/ relationship focus

"Uncertainty avoidance" deals with how individuals view the future; by accepting the unknowns involved in the future and taking risks easily, or by trying to beat the future by avoiding risks and creating security through rules and laws. The last dimension is "masculinity/femininity" addresses the division of roles between the genders of the society. Some societies associate certain roles to men or women only with men taking more dominant roles and women more service-oriented roles, while others allow men and women to take all roles. Hofstede assigned each of the 50 countries an index score for each dimension to compare different cultures (Hofstede 1983). In the 1990s, Hofstede added a fifth cultural dimension and called it "long-term orientation". This mainly deals with time orientation; how people view the future, whether they are dynamic and future-oriented (thrift and perseverance) or static and tradition-oriented towards the past and present (respect for tradition and protecting one's face). This dimension was mainly developed from a questionnaire developed by Chinese students to explore the most important Chinese values.

Hofstede also used this dimension to explain the economic growth of nations (Hofstede 1994). However, this dimension was met with a lot of criticism, described as being confusing and not representative (Fang 2003).

As for Trompenaars, every culture distinguishes itself from others by the solutions it chooses to certain problems. Trompenaars studied 40 countries to explore how every culture chooses the solution to problems arising from relationships with other people, the passage of time, and from the environment. This study grouped the ways in which values differ between cultures into seven dimensions—1) universalism-particularism, 2) individualism-communitarianism, 3) diffuse-specific, 4) affective-neutral, 5) achievement-ascription, 6) attitudes to the environment, and 7) attitudes to time (Trompenaars and Woolliams 1999).

The universalism-particularism dimension addresses the significance of rules versus relationships. People in universalistic cultures believe general rules, codes, values, and standards take precedence over particular needs. The universal truth, the law, is considered logically more significant than human-being's relationships. Particularistic cultures view the ideal culture in terms of human friendship, extraordinary achievements, and intimate relationships. The "spirit" of the law is more important than the "letter" of the law. The laws in particularistic cultures merely codify how people relate to each other. Dilemmas accordingly arise between legal contracts or loose interpretations, emphasis on globalism or localism, and extending rules or discovering exceptions (Trompenaars and Woolliams 1999).

As for the individualism-communitarianism dimension, people in individualistic cultures are more concerned about their personal growth. Communitarianism cultures are more concerned about the overall good of the group. Individualism increases rewards to individuals (also penalties), while communitarianism shares both success rewards and failure blames. Dilemmas arising, include personal freedom or social responsibility, competitiveness or cooperation, and personal growth, and fulfillment versus public service and societal legacy (Turner and Trompenaars 2000). The specific versus diffuse dimension is about the superficial or deep relationship involvement. Some cultures stick to the facts of the situation,

while others want to know people better before doing business. Interactions in specific cultures between people are highly purposeful and well-defined. Specific individuals concentrate on hard facts, standards, and contracts. In diffusely-oriented cultures, all relationship elements are related to each other. Dilemmas arising, include stressing facts or relationships, preference of data or concepts, and bottom line or general goodwill. For example, in the U.S., the culture is more specific compared to the U.K., which is a more diffusely-oriented culture (Trompenaars and Woolliams 1999).

The affective versus neutral dimension deals with emotions' concealing or showing. In an affective culture, people do not object to the display of emotions. Affective cultures may interpret the less explicit signals of a neutral culture as less important. In a neutral culture, it is incorrect to express feelings overtly. Neutral cultures may think the louder signals of an affective culture too excited and over-emotional. In neutral cultures, showing excess emotions may erode the power to interest people. Dilemmas arising, include detached or enthusiastic, long pauses or frequent interruptions, and professional or engaged dialogues. For example, in the U.S. compared to East Asia, the culture tends more towards being affective (Trompenaars and Woolliams 1999).

As for the achievement-ascription dimension, achievement cultures believe that any position should be attained through demonstration of expertise, while in an ascription culture, it is the individual's connections that influence success. Dilemmas arising, include what you have achieved or who you are, and your track record or your potential connections. The inner-directed versus outer-directed dimension explains the differences in perception to whether people control the environment or vice versa. The way people relate to their environment is linked to how they control their own lives and destiny. Internalistic people see nature as a complex machine controlled with the right expertise. They do not believe in luck or predestination. Externalistic people see mankind as one of nature's forces, so they should operate in harmony with the environment. They do not believe they can shape their own destiny. Dilemmas arising, include being driven by conscience or responding to outside

influence, and creation of one's own strategy or diffusing with others (Trompenaars and Woolliams 1999).

The sequential versus synchronic time dimension describes if things are completed one after the other or altogether. Every culture has developed its own response to time. In a sequential approach, time moves forward in a straight line with one thing achieved at a time. Time commitments are a must and plans are rigid. In a synchronism approach, time moves round in cycles, with people doing several things at a time. Time is flexible and plans are easily changed to complete interactions satisfactorily. Promptness depends on the type of relationship (Trompenaars and Woolliams 1999). For example, British, Americans and Germans are considered sequential versus Asians, Latin Americans, and Arabs, who are more synchronic. If those two cultures work together on projects, significant problems may arise (Kivrak et al. 2008).

Similar to Trompenaars' approach of defining cultural dimensions, Schwartz (2004) defined three bipolar culture dimensions that represent alternative solutions to three main problems confronting all societies, based on data collected from many countries around the world. The first is the nature of the relation or the boundaries between the person and the group, which he labeled embeddedness versus autonomy. Autonomy cultures express their own preferences, ideas, and feelings, while embeddness cultures identify with the group and strive towards shared goals. The second problem is guaranteeing responsible behavior that preserves the social fabric, labeled hierarchy versus egalitarianism. Hierarchy is based on the hierarchical systems to insure responsible behavior; thus, unequal distribution of power, roles, and resources is seen as legitimate. Egalitarianism seeks to enhance the concepts of moral equals, cooperation, and concern over everyone's welfare (Schwartz 2004). The last is how people manage their relationship with natural and societal worlds, and is defined by mastery versus harmony. Mastery encourages individuals to master, direct, and change the natural and social environments to accomplish goals, while harmony encourages individuals to understand and appreciate rather than to change. Schwartz's approach was different from

other researchers, since it assumed the cultural dimensions form an integrated system and, thus, are interrelated to one another (Schwartz 2004).

In addition to the cultural dimensions proposed by various authors, the Global Leadership and Organizational Behavior Effectiveness (GLOBE) Research Program conducted a study over 11 years on 1,000 organizations in 62 countries to investigate cultural factors that affects leadership and organizational practices (Chhokar et al. 2007). These researchers grouped the 62 societies into 10 societal clusters. Cultural clusters form countries that share many similarities (Javidan 2002). Cultural similarity is the most among countries in one cluster. As shown in Figure 2.2, as the clusters become further apart, the differences between them increases, such as the Anglo cluster being most dissimilar compared to the Middle Eastern cluster (House 2004).

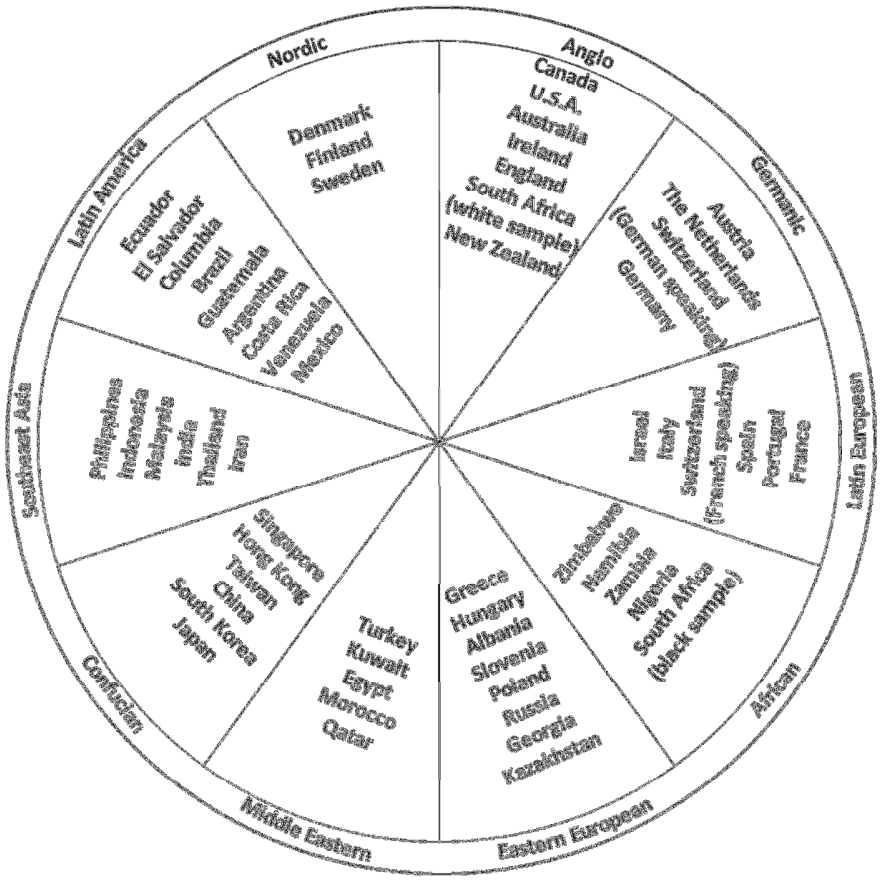


Figure 2.2: GLOBE study country clusters (adopted from House 2004)

The GLOBE study builds on the cultural dimensions developed by researchers, such as Hofstede, Schwartz, Smith, Inglehart, and others. It established nine cultural dimensions that make it possible to capture the similarities and/or differences in norms, values, beliefs, and practices among different societies. They were used as the unit of measurement—some are well-known, while others are developed (Table 2-3). These dimensions were conceptualized in two ways—practices (as is) and values (should be). Thus, individuals were asked to rate themselves simultaneously in actual practice and how they should be according to their values (Chhokar et al. 2007).

Table 2-3: GLOBE study dimensions (adopted from House 2004)

Cultural dimension	Description
Power distance	The degree to which members of a collective expect power to be distributed equally.
Uncertainty avoidance	The extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate unpredictability of future events.
Humane orientation	The degree to which a collective encourages and rewards individuals for being fair, generous, caring, and kind to others.
Collectivism I	(Institutional) The degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action.
Collectivism II	(In-Group) The degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families.
Assertiveness	The degree to which individuals are assertive, confrontational, and aggressive in their relationships with others.
Gender egalitarianism	The degree to which a collective minimizes gender inequality.
Future orientation	The extent to which individuals engage in future-oriented behaviors such as planning and investing in the future.
Performance orientation	The degree to which a collective encourages and rewards group members for performance improvement and excellence.

A comparison between four of the most remarkable and most commonly referred to studies that introduced different cultural dimensions—Hofstede's, Trompenaars. Schwartz, and the GLOBE study—show some dimensions are central to understand cultural differences (Table 2-4). Similar dimensions from the four studies can be grouped into seven categories. The first three categories were covered by all four studies, the fourth through sixth categories were covered by three studies, the fifth was covered by two studies, and the sixth and the seventh were covered by a study each. The first category dealing with group versus individual is addressed by all four studies and seemed to have enjoyed the greatest popularity

in cross-cultural studies. However, the Globe study divides this category into two dimensions—one concerned with the institution and the other with the in-group collectivism.

Table 2-4: Comparison of various cultural dimensions

Category	Hofstede	Trompenaars	GLOBE	Schwartz
1. Group attachment and relations	Individualism/ collectivism	Individualism/ communitarianism	Collectivism I: (Institutional)	Embeddedness/ autonomy
2. Authority and status accorded	Power distance	Achievement/ ascription	Power Distance Performance Orientation	Hierarchy/ egalitarianism
3. Uncertainty and rules	Uncertainty avoidance	Inner-directed/ outer-directed Universalism/ particularism	Uncertainty Avoidance	Mastery/harmony
4. Gender roles and assertiveness	Masculinity/ femininity	Specific/diffuse	Gender Egalitarianism Assertiveness	
5. Time and future orientation	Long-term orientation	Sequential/ synchronic time	Future Orientation	
6. Emotions		Affective/neutral		
7. Caring for others			Humane Orientation	

The second category of unequal distribution of power and how success is achieved is also addressed by all four studies. Again, the Globe study addresses power distance in one dimension that deals with how power is equally distributed and addresses the status accorded in the "performance orientation" dimension that deals with how performance and excellence are encouraged. As for Trompenaars' authority view, since status is accorded by nature rather than achievement, as per the "achievement/ascription" dimension, willingness to accept power distances is partially reflected in this dimension. The third category dealing with uncertainties and setting rules to regulate them was also discussed by all four studies.

Hoftstede, Trompenaars, and the Globe studies all addressed uncertainty and the significance of rules, while Schwartz dealt with managing uncertainty only.

The fourth category dealing with gender roles and assertiveness was discussed by three studies—Hofstede, Trompenaars and the Globe study. Trompenaars' "specific/diffuse dimension" can somehow lie under the assertive category as it is related to masculinity and femininity where masculinity is more assertive and aggressive (facts) versus femininity, which is more caring (relationship). The fifth category of "time" was discussed also by three studies—Hofstede, Trompenaars, and the Globe study. However, their view of time seems somehow different, while Hofstede and the Globe study were looking at the time aspect in terms of how people plan their future, look at their present and past, and Trompenaars was dealing with specific events and tasks relative to time. The last two dimensions covered by one study each were the affective/neutral by Trompenaars and the humane-oriented by the Globe study. From the discussion above, it seems the first five categories dealing with group attachment, authority and status, uncertainty and rules, gender roles and assertiveness, and time are considered the most central to understanding cultural differences.

2.5.3 Research on culture in construction

Culture and cultural differences are increasingly addressed in many research areas in construction. Some researchers focused on organizational cultural differences in the construction projects (Ankrah et al. 2009), such as comparing architects to contractors' organizations (Ankrah and Langford 2005; Ankrah 2007) and comparing organizational culture of construction enterprises from different geographical locations in China (Liu et al. 2006). Others addressed the significance of understanding culture diversity and proper management of culture differences on the success of the organization/project (Chan and Tse 2003; Hall and Jaggar 1997; Kivrak et al. 2008) .

Chan and Tse (2003) explored the major differences between the Western and Eastern (Asian) cultures and the effect on the contractual arrangements, causes of conflicts, and the selection of dispute resolution methods in international contracts. Their study focused on Hong Kong, London, and Sydney. Surveys were administered to professionals involved in

international construction. Results from these surveys showed international construction projects are more prone to disputes compared to domestic projects, which were attributed to cultural clashes and inappropriate contract arrangements. The least significant factors, as indicated by the survey, were the DRMs not listed in the contract and the incompatibility of the local law with international practice. It was also observed the Eastern cultures prefer informal DRM compared to Western cultures (Chan and Tse 2003).

Kivrak et al. (2008) aimed at studying the effect of cultural diversity on construction management practices and how this could impact the success of a project. From interviews conducted with senior managers in the United Kingdom, it was seen in international projects, knowledge sharing, innovation, and problem-solving are key elements to project success. Miscommunication, language problems, and prejudices are major challenges and may lead to conflicts, if not properly managed. Having local offices with local employees is considered important to establish a good relationship with the government and public. Human resources, knowledge, communication, safety, and time management can significantly be influenced by culture. Hall and Jaggar's (1997) work also pointed out some of the obstacles that construction firms operating in foreign countries face and the adverse effect they may have on the construction project.

2.6 Trust

Just as with culture, trust is a very broad topic that can be viewed and researched from different perspectives. This study aims at only addressing trust areas related to construction. While the success of a construction project depends on the ability to manage its technical components and the ability of the project's parties to work effectively as a team, the former is the component extensively researched in construction project management (Chinowsky et al. 2008). The construction industry is mostly based on the collaboration among contracting parties to accomplish project goals. Construction projects involve relatively large numbers of people from different organizations—all working towards one goal. Thus, it is crucial to quickly build teams and establish good communications between team members (Swan et al. 2002).

Trust has been determined by many studies as an excellent determinant to successful projects (Lendra and Andi 2006). It is crucial to build the integrated project team in construction projects (Swan et al. 2005). However, the trust level in traditional construction projects is not optimal, although more efficiency is anticipated with more trust, especially with the high uncertainty and complexity involved in construction (Kadefors 2004; Karlsen et al. 2008). Thus, successful trust building between the project's parties would definitely improve the project's outcome (Swan et al. 2002). Since trust has been mostly acknowledged and seldom examined, it has become one of the most important research areas in construction management (Swan et al. 2005). Trust is not understood as well as other hard project management tools. Project managers must understand how trust is developed and how it affects project outcomes (Romahn and Hartman 1999).

2.6.1 Defining trust

With trust being intensively researched in many disciplines, it has different tailored models and definitions (Romahn and Hartman 1999). It is an ambiguous complex phenomenon, whose definition depends largely on the discipline of interest (Kadefors 2004). There is no one single accepted definition of trust (Swan et al. 2005). Different disciplines approach trust from different views. Based on the discipline, trust may be defined as an individual or group behavior, an expectation, a phenomenon, a climate, an ethical duty, an economic necessity, or a social virtue, among others. Psychologists focus on the interpersonal aspect of trust, social scientists on trust within and between groups, and political scientists on trust in politicians, leaders, and government (Romahn and Hartman 1999). Trust can be viewed from different angles, depending on the context; it can viewed either as a calculated weighing of predicted gains and losses or as an emotional response based on interpersonal identification (Rousseau et al. 1998).

However, from the literature reviewed, there seems to be an agreement that trust is a psychological state involving vulnerability, where a belief exists that the individual/organization on whom we depend will meet our positive expectations rather than

our fears (Jing and Ling 2005; Kadefors 2004; Lau 2001; McAllister 1995). The Oxford Dictionary defines trust as the belief that one can rely on the goodness, strength, ability of somebody or something (Oxford dictionaries 2010). Trust also involves common shared community norms of a mutual expectation that partners will not take advantage of any vulnerability in the process and, thus, will behave in an acceptable manner (Lau 2001). Therefore, it is the willingness to be dependent on others and rely on their actions, which makes it an exchange-based concept (Swan et al. 2005). The more interdependencies between parties, the more the need for trust to improve efficiency and performance (Kadefors 2004). With trust come various traits—honesty, integrity, reliability, fairness, competence, loyalty, and openness (Romahn and Hartman 1999). Although trust and cooperation are directly related (Bijlsma and Koopman 2003), trust is not equivalent to cooperation as a party can meet our expectation induced by coercion rather than trust (Kadefors 2004).

Construction projects and contracts are mostly based on confrontations that lead to mistrust (Zaghloul and Hartman 2002). Contract clauses usually reflect the trust level the parties have for each other; a party displays trust the other party will perform what is agreed upon in the contract (Kadefors 2004; Zaghloul 2003). Although some scholars view contracts as a legal document whose main objective is to avoid risk, others see the contract as a basis for mutual trust between parties (Rousseau et al. 1998). Thus, there is a mutual expectation/contractual trust that promises made are kept. A contract is a demonstration of trust through written or verbal guarantees. Trust is not only formed when the contract is signed, it occurs at all stages of a contract—negotiation, execution, and closeout (Lau 2001).

Not only does trust reflected in the contract clauses affect the relationship between the involved parties, it also has a significant effect on increase of the total cost of a project (Zaghloul 2003). Also, with trust comes costs that are either direct costs for building it, costs that may arise out of trust breach, or costs of inefficiency due to excessive trust (Kadefors 2004). In legal terms and law, trust is used in the context of assigning a person as the trustee to look after the trustor's property for the benefit of another person called the beneficiary (Lau 2001). However, this is out of the scope of this research.

It is important to note that individuals can only grant trust, not organizations. Thus, when the term "inter-organizational trust" is used, it means that individuals within the organizations trust the organization the other individual is a member. This can be attributed to proven technical competence and a good reputation (Blois 1999).

2.6.1.1 Building trust

Trust is seen as a dynamic process with three distinct phases: 1) building, which is the formation or reformation stage of trust, 2) stability, where trust continues to exist, and 3) dissolution, when trust starts to decline (Rousseau et al. 1998). Trust is influenced by previous experiences and chances of future interactions (Bijlsma and Koopman 2003). People usually start from a baseline of trust which is enhanced during the course of the project (Swan et al. 2002). Several factors help develop the trust relationship, such as the parties' experience working with each other on a daily basis when things go well, as well as when unexpected issues occur and problems must be solved. Also, a common understanding of roles and project objectives, reciprocity through support and reward of the trusting behavior, and reasonable behavior by working fairly and professionally improve the trust relationship (Swan et al. 2002). This is in addition to a common, clear understanding of the risks born by each party, putting time and effort for risk management and contract administration early-on in the project, a negotiation phase before contract execution to build trust between the parties, and a risk-reward system to share the benefits, if the risk does not occur (Zaghloul 2003).

A trust relationship starts either high or low, based on institutional factors. As the project progresses, a relational trust need to be developed between the individuals who interact on a daily basis over the project's duration. For interpersonal trust to be developed, the trustor should believe in the trustee's abilities and skills, benevolence in acting in the trustor's benefit, and integrity. Since reciprocity is preferred in human relationships, one party's actions that demonstrate trust or distrust bring similar behaviors from the other party (Kadefors 2004). In construction, trust development is influenced by the economic incentives

offered, the contractual arrangements, and the informal cooperative relationships between parties (Wong et al. 2008).

However, with the temporariness and large turnover nature of construction projects, trust building becomes more difficult compared to permanent organizations. This is because trust is mainly based on frequent interactions between parties and prior experiences (Karlsen et al. 2008). Formal team building trainings to build trust are usually used in construction projects to overcome this temporariness drawback. This type of trust is termed "swift trust," since usually team members have limited knowledge of other members; yet, they must trust each other for the project to progress (Atkinson et al. 2006).

Just as some actions develop trust, others may communicate distrust and self-interest behaviors, such as close monitoring of other partners in a project work and economic rewards for cooperation (Atkinson et al. 2006; Swan et al. 2005). If the other partner's motives or competence become questioned and more supervision is placed, an opportunistic environment is developed (Kadefors 2004). Thus, trust is very dynamic and changes during the project. It is either reinforced or damaged, depending on the events occurring (Swan et al. 2005).

2.6.1.2 Benefits of trust

The benefits of trust, on an individual, project or organizational level, are unlimited. Trust helps reinforce individuals' willingness, confidence, expectations, beliefs, and behaviors to overcome risk with a belief that others would not take advantage of them (McAllister 1995; Wong et al. 2008). A trustful environment bridges gaps, establishes faith, and reinforces members' strengths in an organization. In the construction industry, trust helps improve the relationship among parties (Wong et al. 2008). In conducting business, it creates advantages, such as voluntary cooperation, improved communication and negotiation, better team building and commitment, acceptance of decisions and effective response to crisis, mutual learning, reduced harmful conflict, lower project cost, shorter project duration, and improved performance (Bijlsma and Koopman 2003; Jing and Ling 2005; Romahn and Hartman 1999;

Rousseau et al. 1998). The importance of trust in sustaining organizational and individual effectiveness cannot be over emphasized (McAllister 1995).

Some conditions must exist for trust to exist—risk and interdependence (Rousseau et al. 1998). In the construction industry, risk is one of the main elements that affect the final cost of a project. With risk and uncertainty, emerges the need for trust or distrust (Bijlsma and Koopman 2003; Romahn and Hartman 1999). Although the decision to trust bears some risk, the decision to distrust means giving up some potential benefits (Romahn and Hartman 1999). Thus, trust constitutes a solution for some risk problems by allowing risk-taking (Bijlsma and Koopman 2003). Trust decreases uncertainty due to better communication, improves risk management between people in the project, increases flexibility and thus better problem solving, leading to time and money spent on a project (Swan et al. 2002). As for interdependence, with more interdependence, more trust is needed as the interests of a party cannot be achieved without relying on the other (Rousseau et al. 1998).

The relationship between trust and control has been addressed by many studies (Bachmann 2001; Man and Roijakkers 2009). Some researchers view trust as a substitute to control, since with a higher trust level, the costs of monitoring and other control mechanisms decrease. On the other hand, other researchers see the increase in trust does not eliminate the need for control. In fact, with more trust comes more vulnerability and risk, and, thus, control measures should still hold (Rousseau et al. 1998). This suggests trust and control are not really substitutes; yet, they complement each other (Rousseau et al. 1998). In fact, a balance between control and trust should be achieved (Atkinson et al. 2006).

It is crucial to note any trust building approach should take the commercial realities of the construction industry into consideration. Since all businesses exist to make profit, trust becomes essential. It generates more profit by decreasing the cost of conflict starting by poor communications, adversarial approaches to problems, and finally expensive dispute resolution mechanisms, if the problem is not solved (Swan et al. 2002). Thus, trust is considered a lubricant to most organizational processes; even when it comes to cost control,

as it lubricates the economic transactions by improving the relationships between parties and reduces transaction costs that may be required for control (Bijlsma and Koopman 2003).

2.6.2 Types and measurement of trust

How can trust be measured and assessed? There are many ways in which researchers have attempted to measure trust in the construction industry. Most studies measured trust levels through categorizing trust into different types. Competence, integrity, and intuition were proposed as interpersonal trust measures (Wong et al. 2008). Other researchers proposed four elements needed to measure the level of trust: 1) exhibiting trust, i.e., the existing trust; 2) achieving results, i.e., conforming to business commitments; 3) acting with integrity, i.e., consistent manner behavior; and 4) demonstrating concern, i.e., respecting others (Lendra and Andi 2006).

Wong et al. (2008) categorized trust into system-based, cognition-based, and affect-based.

1. System-based trust: This trust category mainly addresses the formal and procedural arrangements that do not include any personal aspects. This type of trust is usually developed through the organizational policy, communication system, and contracts/agreements. Organizational policy is the behavior expected from the employees and the level of trust they have for the organization to achieve its goals. Communication system addresses the interaction channels in an organization, which helps in convenient and speedy communications, decreases arguments arising from misinterpretations, and mitigates risks. In the absence of communication, a fear of betrayal emerges, resulting in avoidance of commitment to the team. As for contracts/agreements, they define relationships and obligations between individuals, reducing uncertainties by minimizing, sharing, or shifting risks among the parties.
2. Cognition-based trust: This trust is based on the confidence gained from knowledge of an individual or an organization's cognitive abilities. The competence and the integrity of an individual or an organization are based on the knowledge of their past performance, reputation, organizational role, and financial status.

3. Affect-based trust: This trust is based on the emotional bond that ties the individuals and makes them thoughtful to each other. Such levels of trust at work enhance information exchange and team spirit. The mutual nature of thoughtfulness between individuals improves performance and morale in the working relationship tremendously. This type of trust happens spontaneously without any cognitive effort. Such emotional investments decrease defensiveness, unhealthy competitiveness, and eliminate frictions.

A color of trust model that specifies three primary colors/types of trust—blue, yellow, and red—was also proposed. Blue (competence) trust is about the party's ability and competence to perform what is required. Yellow (integrity) trust is based on the perception of the other party to act ethically and not take advantage of the other party. Red (intuitive) trust is based on the emotional feeling that one party has for the other (Zaghloul and Hartman 2002; Zaghloul 2003). These primary trust colors can be mixed to form the secondary colors that define trust requirements for different relationships and situations as shown in Table 2-5 (Zaghloul and Hartman 2002).

Table 2-5: The color of trust model (adopted from Zaghloul and Hartman 2002)

Trust type	**Color**	**Label**
None	Black	Absence of trust
Primary	Blue	Competence
Primary	Yellow	Integrity
Primary	Red	Intuitive
Secondary	Green (B+Y)	Business
Secondary	Orange (Y+R)	Social
Secondary	Purple (B+R)	Sales
Comprehensive	White (All)	Balanced

Other researchers in social sciences also categorize interpersonal trust as two types—affective and cognitive. Affective trust is based on interpersonal care and emotional bonds, which reflects faith in the intentions of others. On the other hand, cognitive trust is based on a party's belief of the other party's competence, dependability, reliability, responsibility, and capability. Empirical evidence from social psychology supports the distinction between these two types of trust (McAllister 1995; Webber 2008).

Some researchers used trust strength as the basis to categorize trust, such as weak, semi-strong, and strong trust relationship. Others categorized them based on the trust source, such as deterrence-based (expected punishment if trust is breached), knowledge-based (experience), and identification-based (emotions) trust; or simple trust (unchallenged and unquestioned), basic trust (physical and emotional security), and authentic trust (balance between trust and distrust, whereby risk and opportunities are understood) (Romahn and Hartman 1999; Rousseau et al. 1998). In addition, trust was also investigated, based on the relationship between the parties involved; parties of equal or unequal power, trust based on the belonging to specific groups (ethnic, religious, professional association), or based on past parties' relationship. In a business context, researchers address trust issues in business alliances, virtual teams, and international business relationships (Romahn and Hartman 1999).

Other trust types were identified, depending on their source whether calculus-based, relational-based, and institution-based trust. Calculus-based trust is motivated by economic self-interest, based on contractual transactions, in addition to being based on references, certificated, and other tangible information. Relational-based trust emerges between individuals who constantly interact and thus base their trust on personal and direct experiences with the other party. Such a relationship also involves emotional and personal attachments. Institution-based trust addresses the institution role (such as the legal system, societal norms, education systems and professional practice) in defining how trust arises. Thus, how people perceive trustworthiness affects institution cultural rules (Kadefors 2004; Rousseau et al. 1998).

Cummings and Bromiley (1996) developed a survey instrument that can be used to measure organizational trust, called the Organizational Trust Inventory (OTI). Organizational trust means the degree of trust between units of an organization or between organizations. The theory and measurement of forming the OTI instrument was based on the assumption trust is a belief that should be assessed across an affective, cognitive, and an intended behavior.

Therefore, survey items were constructed to reflect these three components of trust. Cummings and Bromiley (1996) developed an OTI-short form (OTI–SF), a 12-item questionnaire condensed version of the 62-item OTI-long form. The authors believe and prove the OTI-SF provides a more usable questionnaire without sacrificing substantial measurement assets. The 12 question OTI–SF allows subjects to express their opinions of the other organization on a 7-point Likert-type scale ranging from "strongly agree" to "strongly disagree" (Cummings and Bromiley 1996).

2.6.3 Research on trust in construction

Although trust has been discussed in various disciplines for several decades, it was not before 1980 that it started to gain interest in management (Kadefors 2004; Romahn and Hartman 1999). The way relationships are established and sustained by trust has been widely studied in the fields of social sciences, anthropology, economics, psychology, and sociology. However, trust still appears as a stranger with adversarial relationships, taking the lead in construction projects (Kadefors 2004; Swan et al. 2002; Wong et al. 2008). Most research in construction has affiliated trust with partnering, since it is known to decrease the adversarial environment (Herzog 2001; Kadefors 2004; Wong et al. 2008; Yeung et al. 2009). However, with more emphasis placed on the importance of trust in construction projects, many studies have started to focus on the issue of trust, be it a partnering or a traditional project setup.

Many studies were conducted in an attempt to gain a deeper understanding of trust through exploring different types and levels, and the factors affecting the development of trust in construction projects. A study by Wong et al. (2008) aimed at conceptualizing trust in construction through defining trust types in terms of the behaviors that affect trust development. A structural equation modeling (SEM) technique was used to develop and test a trust framework in construction contracts. A questionnaire was developed, based on the trust framework. The questionnaire was sent out to project managers, architects, engineers, contract/legal advisers, quantity surveyors, and project coordinators inquiring about twenty-three trusting behaviors arranged according to trust types (Wong et al. 2008).

The study concluded that in the construction industry, clients acquire most information from the record of consultants and contractors, i.e., cognitive-based having the highest influence on trust-building. Most parties are interested in receiving information about each other for the benchmarking function. Accordingly, a company or an individual who has all the essential records and information is more likely to be trusted by others. The second highest trust type was the system-based trust. In construction, a contract document that includes all rights and obligations of the contracting parties is essential to facilitate system-based trust. Through accomplishment of the contract/system requirements and conformance to organizational policy, system-based trust is derived. Affect-based trust was the least influential of the three trust categories among the three forms of trust. This does not defy the fact that showing care, concern, and consideration to other parties help promote a good work relationship; yet, it proposes things should not be taken too personal in a work environment (Wong et al. 2008).

On these same lines, Lendra and Andi's (2006) work aimed to measure the levels of trust in a subcontracting relationship. This study explored the internal factors (individual's reputation, personality type, and experience) and external factors (company category and age), which affect the trust level. A questionnaire was distributed to contractors and their subcontractors in Surabaya. The questionnaire included questions on internal and external factors. This is in addition to a personality test that has four combinations of individual's personality types (sensing, thinking, feeling, and intuition) to measure the internal factor dealing with personality type. The results from the survey showed the level of trust in subcontracting relationships is high, with internal factors being more significant than the external factors (Lendra and Andi 2006).

Personnel with a feeling personality type show a higher trust level than personnel with a thinking personality type. People with a thinking personality type focus more on cause and effect, logic, and facts, and do not easily trust others. This is in contrary to the characteristics of a feeling personality type, which focuses on empathy. As for the personnel experience, it was seen the longer the respondents' experience, the higher the trust level. This was attributed to the fact that employees with longer experience in construction understand the

work and their partners more. In terms of the external factors, they had no significant influence on the trust level, except for type of building projects and the value of subcontracted works. This was because the more complex and bigger the project, the more difficult for the participants to trust others, due to the large number of people involved; whereas, in small projects, it is easier for personnel to develop good relationships and communication (Lendra and Andi 2006).

McAllister developed a theoretical model to enhance the understanding of interpersonal trust relationships, in which two types of interpersonal trust were distinguished—cognition-based trust and affect-based trust. Factors affecting the development of each trust type were identified, followed by exploring the implications each has on coordination, control, and defensive behaviors. A total of 194 managers and professionals from different industries with their peers at work with whom they have lateral interdependence, participated in a questionnaire designed to measure behavioral responses with trusting or distrusting peers. In general, results from the study showed the levels of cognition-based trust were higher than those of the affect-based trust. This was in line with the fact some cognition-based trust is required for the development of affect-based trust (McAllister 1995).

Romahn and Hartman (1999) stressed the importance of having project managers understand trust and its impact on project success. Based on work conducted in different disciplines, they proposed a two-part trust model to integrate previous work completed. This model seeks to address the reasons leading to trust-building between individuals, groups, and organizations in different situations. The first part of the model explains why people trust each other through identifying three types of trust: 1) competence trust (observable proof such as experience), 2) ethical trust (good expectations), and 3) emotional trust (feelings) (Romahn and Hartman 1999). The three types exist and develop independently of each other. However, the trust level one party may have combines the three types, and depends on the situation and the trustee. Thus, it is not necessary to have all types of trust exist in one situation. Indeed, it sometimes becomes better to have the right type of trust dominate, depending on the situation (Kadefors 2004; Romahn and Hartman 1999) .

Just as different trust types' development is independent, their breach is, too. The second part describes the trust relationship development and the trustor/trustee interaction. The trust relationship is mutual and depends on both parties having high trust levels. Trustor should have a trusting behavior and trustee should be trustworthy. Low levels of trusting and trustworthiness leads to a lack of trust. Trust can be breached either intentionally or unintentionally by not meeting expectations. Thus, communication between parties becomes a key to define expectations and avoid trust breach (Romahn and Hartman 1999).

The Engineering and Physical Sciences Research Council investigated the role of trust in construction projects (Swan et al. 2005, 2002). A trust inventory, a measurement tool for assessing the trust levels in construction project team relationships, was developed. Two pilot and four full case studies were conducted to investigate trust from different perspectives. Their study used semi-structured interviews and a Social Network Analysis tool to identify key project relationships (Swan et al. 2005). Interviews with clients, contractors, and subcontractors were conducted to understand the parties' different perceptions of trust and their effects on how people work on projects (Swan et al. 2002).

Results from the interviews showed trust is developed through various ways, including communication, reliance, and reputation. The way parties' communicate with each other, by being honest and sharing information openly, enforces trust. People's reliance on each other to meet the expectations and deliver the outcomes on time in accordance with standards is another way of trust building. Although most interviewees were inclined to trust people rather than companies, they reported they would question who to trust, depending on the organization's reputation. Trust is thus built through the project, and once broken becomes very hard to rebuild. From the interviews conducted, it was also seen how people had different opinions of trust building, based on their position in the organization. The more operational the individual, the quicker trust must be built with mere focus on task/project, in contrary to directors, who focused more on the strategic level (Khalfan et al. 2007; Swan et al. 2002).

In addition to the individual factors built during the course of a project, interviews conducted by Swan et al. (2002) looked at other factors that can impact the trust relationship, such as company factors, project factors, and contract type. A company's culture decides on what values are important and how individuals express them, such as acting in an adversarial relationship versus a collaborative one. The company's financial position also affects its employee's behavior. If the company is in a bad position, employees may act in an untrustworthy manner to gain more money. Thus, dealing with a financially-stable company may improve the trusting relationship. The project scope, size, and complexity are other factors that may also have an impact on the trust relationship. It tends to become easier to build and manage relationships on smaller projects, since this involves less numbers of people. However, smaller projects are usually shorter in duration and the trust time frame becomes limited, unlike larger projects where more time and resources are offered to develop team relationships. It is worth noting, however, with larger projects come larger risks, leading to a higher cost of trust (Khalfan et al. 2007; Swan et al. 2002).

With the greater level of project complexity in a project, comes a greater need for trust. This is mainly because a complex project usually contains more specialist contractors and suppliers, who best know the technicalities of the task. Also, more complexity involves more information and multiple interfaces between different trades requiring better communication and exchange of information between all parties. It was highlighted by the interviewees that contract types may influence the trust relationship between parties (Swan et al. 2002). Partnering, for example, is one form of contracting viewed as a useful tool for building trust (Kadefors 2004; Swan et al. 2002).

Also, it is important for the contract to be fair to build trust and to prevent parties from taking an adversarial approach to gain more profit (Kadefors 2004; Swan et al. 2002). The study also showed the contract should not be used as a tool taken against each other; yet, it should act as a guideline to achieve joint goals (Swan et al. 2002). The ways contracts are setup clearly disagree with the benevolence and openness required to maintain trust (Kadefors

2004; Swan et al. 2002). The last factor studied was macroeconomics effect on trust with some interviewees viewing the current market as a strong base for trust building and others viewing the economic conditions as having no effect. It was pointed out with bad market conditions, trust building becomes difficult, as contracts may be stressful for contractors working with very tight deadlines and budgets (Swan et al. 2002).

Along these same lines, Kadefors (2004) studied the factors that influence development of trust and cooperation—specifically in owner-contractor relationships in Sweden. The paper found the client-contractor relationship, based on the current contract and procurement system, produces an uncooperative relationship (Kadefors 2004). Although under the contract, some actions taken by both contractors and clients are detrimental to trust and mutual respect, such as contractors taking advantage of errors in contract documents to claim money later through change orders, an overly supervision of clients on contractors hinders reciprocity (Kadefors 2004; Swan et al. 2005) .

Trust was also studied in terms of its effect on developing high performance teams and efficiency. Chinowsky et al. (2008) focused on the importance of developing high performance teams through the development of a construction social network model that integrates project management concepts with social sciences. The model emphasizes knowledge sharing as a key factor in high performance teams. A driving factor of knowledge sharing is the level of trust between team members. The model developed was based on the fact that achievement of trust in a social network will make team members move from mere information exchange to exchange of knowledge, leading to innovative solutions and high performance output. In construction, however, teams are formed in a more dynamic way, often hindering a trust relationship to be achieved (Chinowsky et al. 2008).

The study accordingly proposed a model that includes four layers of relationships that the team progresses through to reach shared values. These layers include individuals' previous experience in working with each other, reliance, and dependencies of project team members on each other, trust between team members that goes beyond completing tasks to acting for the benefit of each other, and finally, values shared between the members. A survey was used

to acquire input on the social network of a project comprised of 35 team members. Results from the survey were analyzed, using Social Network Analysis. From the analysis, it was concluded that over centralized decision-making and lack of information, knowledge integration, and trust lead to poor performing team members in this project. Thus, by mapping and visualizing the project network and its characteristics, the attributes of successful and unsuccessful project networks were revealed (Chinowsky et al. 2008).

Placing these concerns for implementation in the background, the current effort and example application of the social network model illustrates how the integration of social science concepts, such as trust, can affect the outcome of construction networks. In projects where trust and value sharing are not evident, the impact on information and knowledge sharing can be significant. Reduction in this open sharing results in an equally significant impact on the final project outcome. It is anticipated this result is not limited to a particular type or size of project. Rather, construction networks are fundamentally based on social networks. Therefore, to achieve high performance, the network must be managed, based from a social collaboration perspective, to achieve the next level of performance improvement (Chinowsky et al. 2008).

Webber (2008) examined the effect of teaming with the client through blended service on achieving better client relationship, and thus better performance in construction projects. The study assessed the cognitive and affective trust shared between the parties. Surveys were administered to both project managers and their respective clients. A measure of trust between peers within an organization, developed by McAllister (1995), was used to assess the parties' conception of trust. The study concluded the client's trust lead to better team trust, team cohesion, and team performance (Webber 2008). These results were in conformance with the results of the study conducted by Karlsen et al. (2008) that aimed at highlighting the benefits of having a trust relationship built between the project management of a construction project and its stakeholders. This study was based on in-depth semi-structured interviews conducted in a Norwegian New Opera House project (Karlsen et al. 2008).

Other researchers studied the relationship between risk and trust in contracts. Risks are regulated between different project parties through the project contract language. Zaghloul (2003) conducted a study to determine the premium amount owners, consultants, and contractors across Canada and the United States place on the disclaimer contract clauses that attempt to transfer risk from one party to the other (Zaghloul 2003). When contractors are faced in the contracts with disclaimer clauses they cannot control, they either insure it or add a contingency to their bid price, in both cases translating into a higher bid price (Zaghloul and Hartman 2002). From administering 300 surveys to owners, contractors, and consultants from both the private and public sectors, it was discovered the premium percentage in construction ranged from 8 to 20% (Zaghloul 2003).

From Figure 2.3, it is shown how disclaimer clauses in all cases always lead to a loss of at least one party, whether risk evolves to become a problem or not. Consequently, there are opportunities of better risk allocation if a trust relationship is built between the parties. The premiums placed are usually based on the party's business relationship with the owner, project conditions, type of contract, and fairness. Trust should govern how people deal with project risks, since these risks will vary, depending on the relationship parties have with each other. Results of the study showed a strong trust relationship can reduce the final project's cost, as it improves risk allocation between the parties. Contractors perceive the risk of the disclaimer clauses risk to be lower—thus, lower their premiums. In addition and also related to trust, the parties' previous work experience with each other and a good industry reputation can affect how parities allocate risks in the contract. In general, the study showed the trust level in the construction industry is low (Zaghloul 2003).

Focusing on the contract effect on trust, other studies aimed at exploring the benefits of having less detailed contracts (Kadefors 2004; Lau 2001). Lau's study questioned whether the details in the contract documents can be decreased to include only the necessary clauses and not all the procedural issues to provide room for flexibility in contract execution. A questionnaire was sent to clients, consultants, and contractors in Hong Kong, asking them

how comfortable they were in working with a contract that has little details. Results of the study showed, although respondents agree that working with a contract with little details is a strong form of trust, they would not feel comfortable working with such a contract (Lau 2001).

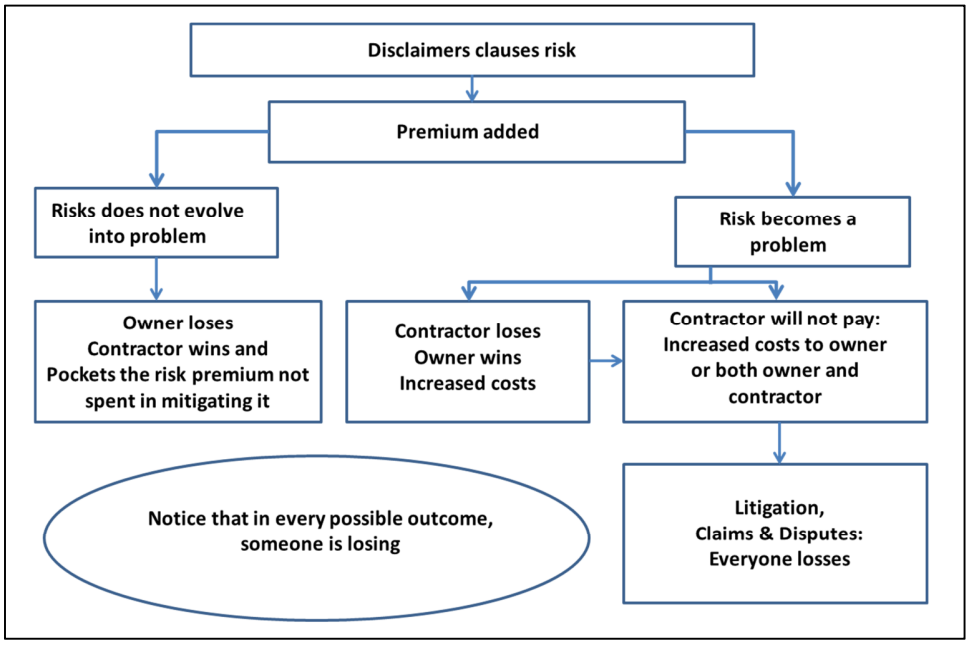


Figure 2.3: General outcomes of risk allocation through disclaimer clauses (adopted from Zaghloul 2003)

The study categorized trust into high trust, trust, and distrust. High trust is formed when the agreement does not have all rules and procedures spelled out, and where parties do not care so much about what is in the contract. The next level, trust, exists when the contract acts as an outline and covers only important issues, while the details are worked out as an ongoing process. Distrust is when the contract is not based on the mutual interest of the parties and is biased towards one party. Parties try to protect their own interests and focus on contract areas favorable to them, causing distrust. The importance of this study emerges from the fact that contracts are generally incomplete and that sometimes issues arise that are not included in the

contract. Trust built through personal relations and reciprocity during the project would account for such a case. Thus, incompleteness of contract leaves room for trust between the parties, making them reach agreements without referring to a legal document (Lau 2001).

Jing and Ling (2005) developed a framework for fostering trust and building relationships in construction projects in China. The objective was to identify the risks and the respective trust-fostering tools in each project developmental stage. This was achieved through studying two projects in China. Such a framework would aid in avoiding the adversarial relationships that exist in construction projects. The framework showed no risks exist between parties, if there are still no dealings. Therefore, trust at such a stage becomes unnecessary. As risks start to appear during the course of the project with parties beginning to interact and develop relationships, the trust-fostering tools proposed in the framework come into play to produce trust that would counterbalance these risks. Thus, with more risks, more trust is needed to foster the relationship. It is noted in contrary to other views, the framework proposes more risks appear at later stages of the project, requiring more commitment to trust. As explained by the authors, the amount of risks increase, although the seriousness of some risks that appear early in the project stage may decrease in later stages (Jing and Ling 2005).

2.7 Risk

2.7.1 Defining risk

Risk is the possibility that events, their impacts, and interactions may turn out differently than anticipated (Dikmen and Birgonul 2004). Thus, it is an important aspect of any decision-making process. International construction projects involve all the uncertainties available in any local construction projects, in addition to any risks associated with the international markets (Han and Diekmann 2001). Every construction activity in an international construction project attracts risk in some way. These risks vary from one region to another, even if dealing with the same project type and size (Zhi 1995).

Risks in construction projects cannot be completely eliminated; yet, they can be properly regulated through proper risk management and risk allocation (Zaghloul and Hartman 2002).

Risk management defines a set of methods and activities designed to decrease the disturbances occurring during the course of the project. The most common approach for risk management follows these steps—risk identification, risk assessment, and risk response. Identifying, mitigating, or avoiding these risk factors is important to minimize the number of claims and the potential catastrophic economic impact of claims on a project. Risk management becomes even more crucial in international construction projects, especially in the pre-contracting stage, where numerous uncertainties are involved, due to the lack of available information (Zhi 1995).

2.7.2 Types and measurement of risks in construction

Many studies have been conducted to determine and categorize the types of risks involved in a construction project. Kasprowicz (2002) divided risk into three categories, based on type of uncertainty: 1) uncertainty of works, such as accidents and unforeseen events; 2) uncertainty of resources, such as technical, organizational, and operational risks; and 3) situational uncertainty, such as unforeseen events related to the environment in which a construction project is operated. A common method to consider the most frequent and severe risk factors is to classify them according to their sources and to use a hierarchical structure. Risk in construction projects is derived from two main sources—project-specific or external risks.

2.7.2.1 Project-specific risks

Uncertainties existing in the project itself are usually referred to as project-specific risks. Project-specific risks cover the unexpected occurrences during the construction period that are inherent to the companies involved or determined by the project's own nature. They mainly lead to time and cost overruns, or shortfalls in performance parameters of the completed project (Bing et al. 1999; Zhi 1995). These risks include:

a) Client-related risks, such as cash flow problems, excessive demands, and variations during the course of the project.
b) Organizations' relationship risks, which stem from the lack of communication and poor relationships that could occur with other parties in a project, such as the consultant/designer, subcontractors, or suppliers.

c) Subcontractor or supplier's risks, such as technical qualifications, timeliness, reliability, and financial stability can result in time loss and increased cost during construction.
d) Contractual risk is usually caused by disagreements arising from inconsistent contract documents, inappropriate types of contract, improper tendering procedure, differences in legal relationships between partners, special local requirements, or improper contractual clauses (Bing et al. 1999; Zhi 1995).
e) Technical risks include design and construction risks that may impact the project's progress (Kalayjian 2000). It may also cover improper planning and budgeting, or limited past experience with similar projects.
f) Schedule delay risks, which may arise from many reasons, such as incomplete design, late construction site possession, bad weather, and unforeseen ground conditions.
g) Cost overrun risks, which may be due to ambiguous scope, unclear boundaries of work, inaccurate estimation, and price fluctuations (Kalayjian 2000).

2.7.2.2 External risks

Factors that relate to the national/regional market or the local construction industry that have significant impacts on the project may be called external risks. External risks represent those risks that originate from the competitive macroenvironment the project operates within. International projects have more uncertainties in terms of external risks, mainly because of the large size of projects and the international issues involved (Zhi 1995). These risks include:

a) Political risks refer to a nation's political stability. These risks include wars, civil disorder, and inconsistencies in government policies, changes in laws and regulations, restriction on fund repatriations, and import restrictions. Due to the wide variety of ruling political systems—democratic, authoritarian, socialist, communist, and dictatorships—this type of risk becomes of great concern (Bing et al. 1999). Governments in developing nations can face serious problems that could jeopardize their stability and continuity. Complex planning, approval, and permit procedures may be involved (Zhi 1995).
b) Legal risks stem from the legal conditions that impact the country's attitude toward foreign firms, its contract issues, and conditions. These conditions have a huge influence

on domestic construction investment and activity (Han and Diekmann 2001; Kalayjian 2000). The strength of the legal system in the host country is important, as it regulates the management of claims, disagreements, conflicts, disputes, and all contract-related problems. The legal system may be incompatible to the dispute resolution procedures set forth in the contract and to whether decision enforcement through the courts exists. There might also be constraints on employment and materials availabilities (Zhi 1995).

c) Economic and financial risks refer to economic fluctuations, inflation, tax rate, monetary restrictions, and foreign exchange rates that could have substantial impact on the profit or loss of participants in a project (Bing et al. 1999). Changes in exchange rates under a floating (freely traded) currency condition and an owner's ability to obtain funds and maintain an adequate credit flow have drastic impacts on the financial success of the projects (Han and Diekmann 2001; Kalayjian 2000).

d) Environmental risks, such as climatic risks that include forces majeure, which may cause the destruction of facilities, equipment, material, and death.

e) Social risks include security problems, language barriers, different cultural traditions, religion backgrounds, and bribery and corruption (Bing et al. 1999; Zhi 1995). International projects specifically involve parties from different cultural backgrounds (Chan and Tse 2003). Cultural differences affect the communication schemes all construction projects require to coordinate technical, administrative, and legal issues. Miscommunication becomes too easy with differences in social customs and religious beliefs (Kalayjian 2000). Local workers, for example, may not be accustomed to the reporting policies and procedures normally employed in large construction companies (Han and Diekmann 2001).

2.7.3 Research on risk in construction

The issue of international risks in construction projects has been extensively researched. Researchers focused on many areas within this topic. Some worked on identifying the different types of risks involved in international construction projects (Choi and Mahadevan 2008; Ofori 2003), and on developing models to assist decision-makers in evaluating the risks anticipated (Hastak and Shaked 2000). Others focused on identifying the risks

anticipated in operating in third world and developing countries (Kalayjian 2000; Qing 2002; S. Wang et al. 2004), or in specific countries, such as Russia, Turkey and China (Aleshin 2001; Dikmen and Birgonul 2004; Han and Diekmann 2001; Kapila and Hendrickson 2001; Zhi 1995). Other studies focused on specific types of risks involved in international construction projects, such as financial and economic risks (Han et al. 2004; Kapila and Hendrickson 2001) or social and cultural risks (Chan and Tse 2003).

The different forms of risks involved in partnering with local companies/governments to perform work in their countries, such as joint ventures (Bing et al. 1999; Ozorhon et al. 2007), public private partnerships, or build/operate/transfer projects (Wang et al. 2000) were also widely explored in the literature. This is in addition to focusing on risks involved in projects' contract clauses, such as the disclaimer clauses (Zaghloul 2002) and dispute resolution provisions (Watkins 2005). Going one step further, other studies of risk management in international markets aim at assisting decision-makers to determine whether their companies should operate in the foreign markets (Dikmen and Birgonul 2004). Entry decisions studies include those based on evaluating country risks, political risks, or economic risks, project appraisal techniques based on lenders' perspectives, portfolio management techniques by combining investments where the risks are not closely correlated, bid/no bid or go/no go decision models (Han and Diekmann 2001).

2.8 Point of Departure

Construction disputes are an integral part of the construction process. Many studies explored the various forms of DRMs and their characteristics in an aim to make construction parties more knowledgeable of the advantages and disadvantages of one DRM over the other. Although DRMs have been investigated in many contexts, few studies were conducted to investigate the choice of DRMs, especially in the construction industry. Deciding on the appropriate DRM for international projects requires vigorous investigation, due to the cross-cultural situations involved (Chan et al. 2003) together with the country's risks.

It is also seen from the literature review that there is an increasing trend in construction management research on the less tangible management aspects, including culture and trust in construction (Atkinson et al. 2006). However, little attention is paid to establishing procedures for mitigating the impact of culture on different construction activities (Hall and Jaggar 1997). This includes contract formation and dispute resolution process it entails. Many studies recommended exploring cultural diversity and dimensions, such as collectivism versus individualism, and their effects on choice of DRMs (Chan and Tse 2003; Hall and Jaggar 1997). The contextual factors that influence international construction projects, such as the project's general nature, socioeconomic characteristics, legal culture, and the institutional setups for dispute resolution, together with the sociocultural differences in perceiving and resolving disputes all need further exploration.

The issues of culture, trust, and risk all interweave. Trust is critical in many aspects, such as in negotiations among international parties which are affected by the parties' culture. Thus, understanding other cultures' styles and the risks entailed will minimize tension and disagreements (Sennara 2002). Nevertheless, there is still no research in the construction field done to integrate these three aspects and to relate them to the choice of DRMs.

2.9 Research Questions

The purpose of this study is to explore the available DRM used in international projects and their most significant characteristics. Based on the culture of the country that the construction company is operating in, the level of trust borne between the contracting parties, and the level of risk in the country, one DRM or a multi-tiered DRM will be recommended for incorporation into the prime contract document between the owner and the contractor. It is the aim of this study to help owners and/or international contractors in the selection of the appropriate DRM during contract formation, given identified culture characteristics, trust levels, and risk factors.

The following research questions were used for this study:

- What factors currently/should affect the companies' decision on selecting a specific DRM?
- How does culture affect the choice of DRMs?
- How does trust affect the choice of DRMs?
- How does risk affect the choice of DRMs?
- How do culture, risk, and trust interact in choosing a DRM?

An identification of factors affecting the DRMs choice versus what factors the experts recommend will provide a comparison of current industry practices versus the best practices recommended by experts. As for culture, risk, and trust, it is hypothesized through this study these three factors have an effect on the choice of DRMs and some DRMs may be favorable in different project conditions. In addition, with increasing research being achieved on the effect of the social sciences aspects on the construction project performance, a deeper look at the culture of the contracting parties and the trust levels between parties can help international contractors better determine what DRMs to use and enhance the idea that such social sciences aspects should not be overlooked in the construction industry.

CHAPTER 3: **METHODOLOGY**

3.1 Introduction

This chapter provides an overview of the different types of research methodology. It then describes the research methodology adapted to conduct this study, together with a justification on why it was employed. This chapter serves to explain each stage of the research design and outlines data collection and analysis mechanisms applied in addition to the validation techniques utilized.

3.2 Research methods

Surveys, experiments, ethnographic observations, and unobtrusive techniques are all different research tools that yield somehow different perspectives of a research question. Each has its specific problems of validity and reliability, and limits to generalizability. Thus, a thorough investigation of the options available and what best achieves the researchers' goals are necessary (Abowitz and Toole 2010). The aim of this section is to introduce the three different research approaches—quantitative, qualitative, and mixed method approach—and provide examples of the different methods used in each approach.

3.2.1 Quantitative research

Quantitative research focuses on testing a hypothesis or a theory proposed deductively at the beginning of the research. The study is composed of variables, measured with numbers, and analyzed using statistical procedures. Thus, data generated from quantitative research are countable, tangible, and objective in nature. Using this type of research method is preferred when researching a fact about a concept or a question by collecting factual evidence and studying the relationships between these facts (Naoum 2007).

Examples of quantitative research methods include:

- Experimental designs: Their aim is to determine if specific inputs impact the output. This is achieved by providing specific inputs in one group and withholding them from the other to determine the effect of this input on the output results.

- Surveys: They are used to provide a numeric description of the trends or opinions of a population by studying a sample of that population. Survey research includes questionnaires or structured interviews for collecting the data (Creswell 2009).

3.2.2 Qualitative research

Qualitative research focuses on attitudes, behaviors, meanings, and experiences through obtaining an in-depth opinion from the respondents. Since it involves a deeper look at people's opinions, it involves a less number of people compared to the quantitative method and is subjective in nature (Dawson 2002). Since construction engineering research involves studying aspects that involve people, social science research methodologies are usually inherited (Abowitz and Toole 2010). This becomes especially true when studying topics involving human behaviors, such as trust and culture.

Qualitative research can be categorized to exploratory and attitudinal. Exploratory is used when there is a limited amount of knowledge on the topic. Thus, it is used to diagnose the problem, screen alternatives, and discover new ideas. Attitudinal research subjectively evaluates the opinion or perception of a person towards a particular question/problem (Naoum 2007). Examples of qualitative research methods include:

- Narrative Research: The researcher studies the lives of individuals through the participants' narration of their life stories.
- Phenomenology: The researcher identifies the essence of human experience towards a phenomenon as described by the participants.
- Ethnographies: The researcher studies a cultural group in the actual setting through a long period of time.
- Grounded theory studies: The researcher proposes a theory based on the views of the participants.
- Case study: The researcher explores in great detail a project, process, or event (Creswell 2009).

3.2.3 Mixed research methods

Mixed methods originally evolved to examine different approaches to collecting data (Creswell 2009). In a mixed method, two or more data collection approaches, whose validity and reliability problems counterbalance each other, are used to enable triangulation on the true result. Triangulation seeks the convergence of both qualitative and quantitative methods. It also aims at connecting or integrating the qualitative and quantitative data. Mixed methods balance the advantages and disadvantages of the qualitative and quantitative techniques (Abowitz and Toole 2010). For example, the results obtained from one method can aid in identifying or asking other questions in another method, or all the data obtained from both methods can be integrated to reinforce each other (Creswell 2009).

There are primarily three general strategies to employ mixed methods:

1. Sequential mixed methods: By using this approach, the researcher aims at expanding the findings of one method with another method. The study can either begin with a quantitative method to test a certain theory then follow up with a qualitative method to explore specific cases, or vice versa by exploring a certain problem and then generalizing the results.
2. Concurrent mixed methods: By combining qualitative and quantitative methods, this approach aims at providing a comprehensive analysis of the problem in question. The researcher collects the data from both methods concurrently and then compiles all the results.
3. Transformative mixed methods: This method mainly addresses change at levels ranging from the personal to the political. With this method, any quantitative, qualitative, or mixed methods study can be utilized with a transformative or advocacy purpose (Creswell 2009).

3.2.4 Statistical analysis

Statistical methods are tools that distinguish between results compatible with chance and those no longer explained by chance. It is a method of analyzing data in a more objective manner. Statistical analysis could be achieved descriptively and inferentially. Descriptive

statistics summarize the information in a collection of data to make it easier to assimilate, yet not distort the information (Agresti and Finlay 1997). Examples are mean, median, and mode to measure central tendency of a variable or variance, standard deviation, and range to measure dispersion.

Inferential methods are used to make predictions about characteristics of a population, based on information in a sample from that population, compare, and relate between the variables in question (Groves et al. 2004). The statistical test used is usually dependent on the types of variables and the distribution of the data set. There are three types of variables—nominal, ordinal, and scale. Nominal variables represent categories with no intrinsic ranking, ordinal variables represent categories with some intrinsic ranking, and scale variables are continuous variables with infinite continuum of possible real number values (Agresti and Finlay 1997). Thus, if a variable has a nominal scale, for instance, methods used to analyze interval data cannot be used.

For data distribution, if the data are assumed to follow a normal distribution, parametric methods are appropriate. Nonparametric or distribution-free methods can be utilized in cases where this assumption does not apply, as they do not rely on any mathematical distribution. Nonparametric methods require fewer stringent assumptions compared to parametric methods. However, parametric methods are more powerful, as they are more likely to lead correctly to the rejection of a false null hypothesis (Washington et al. 2003). Nonparametric tests usually result in loss of efficiency—the ability to detect a false hypothesis. In this study, a normality test was conducted on the data to test the data set for normality distribution and accordingly determine which statistical tests to use. The Statistical Package for the Social Science (SPSS) was utilized to analyze the data in this study.

3.2.5 Validity and reliability

In all research designs, researchers should account for interventions/threats that may affect the results' quality of the study. Potential threats may affect the validity of the process and the outcome, and should be taken into account early (Creswell 2009). Validity determines

whether the means of measurement are accurate and the research is measuring what it was planned to measure (Golafshani 2003). It ensures the research methodology phases chosen by the researcher, including planning, executing and evaluating, complies with high quality standards (Lucko and Rojas 2010).

In quantitative research, validation is mainly divided into two major areas: internal and external validity. Internal validity deals with the causality concept and the derivability of relations within data (Lucko and Rojas 2010). It is mainly involved with the procedures used (Creswell 2009). On the other hand, external validity is concerned with the generalizability of results for prediction purposes (Lucko and Rojas 2010). It arises from drawing wrong inferences from the sample data to a population or other settings, mainly due to wrong representation of the population, timing of experiment, or uniqueness of the settings.

There are also other types of validity threats. Statistical conclusion validity threats occur when inaccurate inferences are made from the data, due to inadequate statistical use (Creswell 2009). Construct validity threats occur when inaccurate definitions and measurements are used. Construct validity confirms the research is measuring what it is supposed to measure (Creswell 2009; Lucko and Rojas 2010). This can be achieved through pilot studies or instrument testing. Face validity seeks the validity of the results from non-researchers. This can be achieved through a number of methods, including involvement of industry people in the study through interviews, focus groups, Delphi analysis, and case studies. Content validity assures the study content represents reality. Criterion validity ensures the results of an assessment instrument correlate with one another (Lucko and Rojas 2010).

In qualitative research, validity does not take the same shape as in quantitative research. In qualitative research, validity, sometimes called trustworthiness or credibility, is achieved through checking the accuracy of the findings by following certain procedures. Examples of such procedures for case studies include documenting procedures, setting up a protocol, and a database. Other methods include triangulation of data from different converging data

sources and using member checking with participants who review the final report and assess its accuracy (Creswell 2009).

The other quality measurement is reliability to measure the consistency and repeatability of the results over time. Thus, if results of the study can be replicated using the same methodology, the instrument of research is considered reliable (Golafshani 2003). There are different kinds of reliability, such as inter-rater reliability (consistency between subjects), internal reliability (consistency within measurement instrument), test-retest reliability (consistency of results when same tool is reused), and parallel forms reliability (consistency of different related measurement tools when applied to the same sample). In qualitative research, however, reliability mainly indicates the approach used is consistent across different projects and researchers. This can be done completed by cross-checking codes (Creswell 2009).

3.3 Research design overview

According to Creswell (2009), a qualitative, quantitative, or mixed method approach is preferred, depending on the research problem and questions. This research aims to achieve two main objectives: 1) identification of factors affecting the choice of Dispute Resolution Methods (DRMs) and 2) investigating the effect of culture, risk, and trust on the choice of DRMs. The first objective involves the identification of factors that influence an outcome. Therefore, a quantitative approach is recommended. While, very little research has been completed on the effect of culture, trust, and risk on the choice of DRMs, making an exploratory qualitative approach best serves the second objective (Creswell 2009). Accordingly, it becomes apparent that choosing either a qualitative or a quantitative method is inadequate to answer the research questions.

A concurrent mixed method design is employed. Data were collected from two main sources—industry professionals and DRMs experts. Data from the industry professionals about the current DRMs used in international construction projects in the Middle East and/or Asia were collected using surveys. A Delphi technique was used in parallel to explore in

details the views of DRMs experts on the effects of culture, risk, and trust on the choice of DRMs. Throughout these two methods, validation techniques were used to account for any validity or reliability issues that may be encountered.

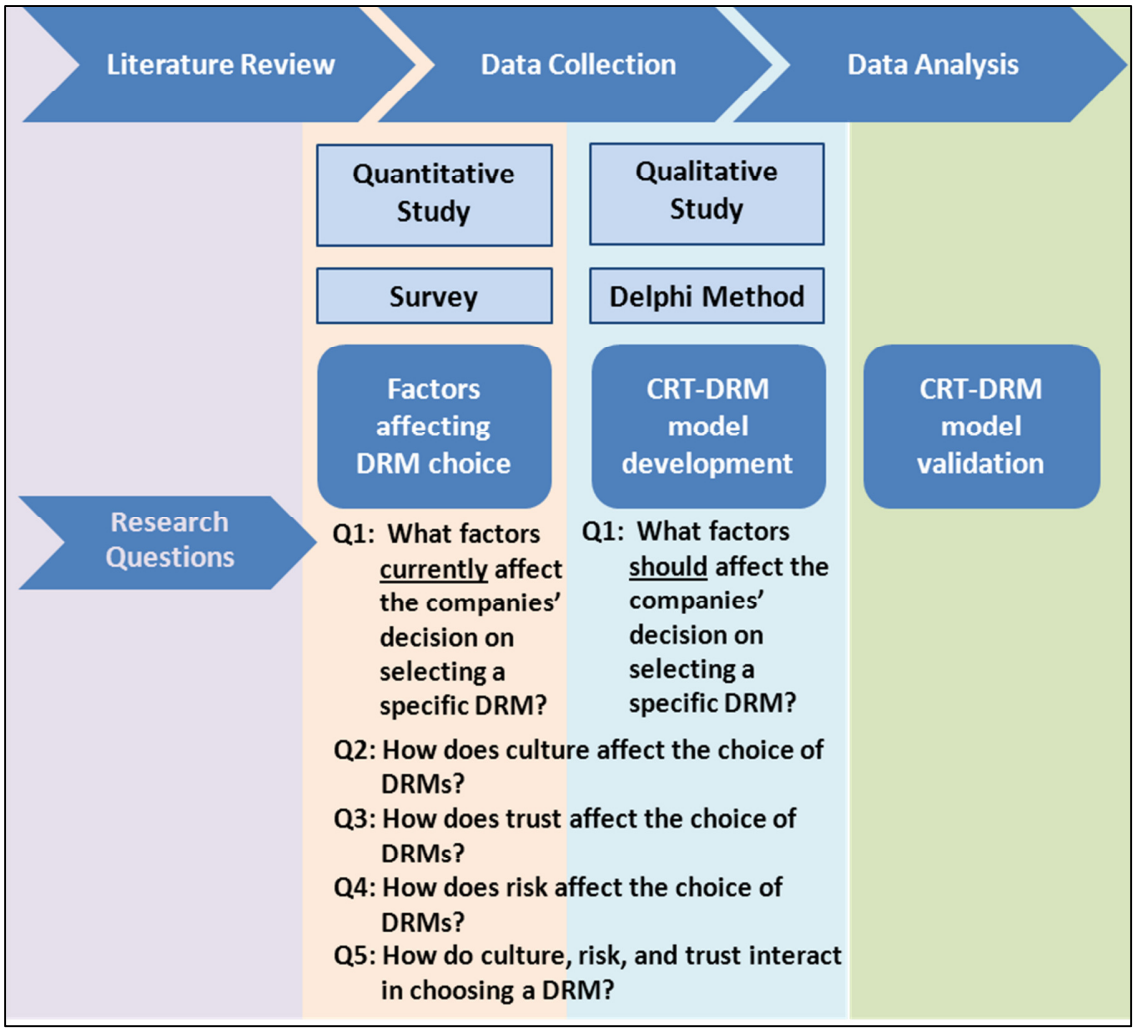


Figure 3.1: Overall research design

3.3.1 Surveys

Surveys provide a numeric description of the trends or opinions of a population by systematically studying a sample of that population and then generalizing the results on the whole population. Survey research includes questionnaires or structured interviews for collecting the data (Creswell 2009). Questionnaires were chosen to collect information on the

factors affecting the choice of DRMs and the current practices in choosing DRMs, as they relate to culture, risk, and trust. Surveys can reach a wide range of respondents from all over the world, with no personal contact required. A cross-sectional survey design was utilized. General steps followed in conducting the survey are shown in Figure 3.2.

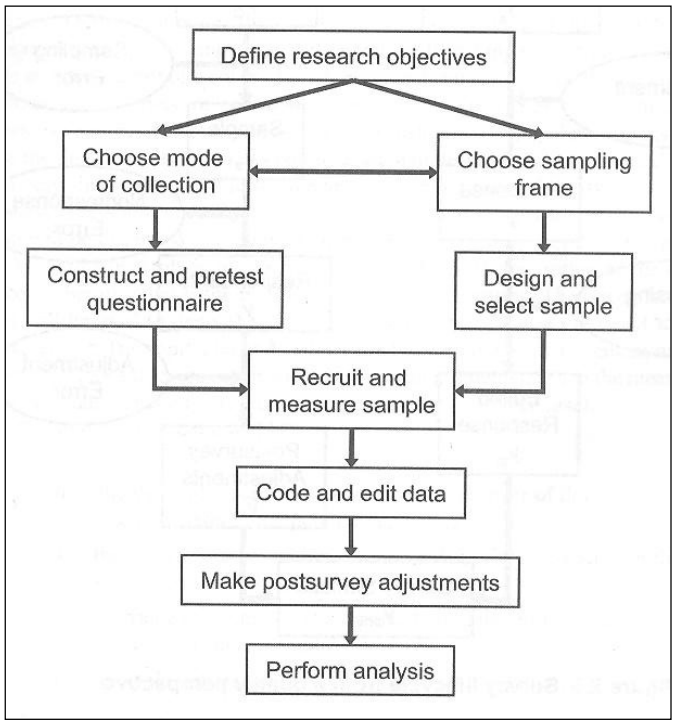


Figure 3.2: Survey process (Creswell 2009)

3.3.1.1 Survey target population and sample

The population for this study is the employees responsible for drafting or involved in negotiation of international contract documents signed between a local owner and an international contractor (referred to as “procurement/contracts departments’ employees" in the rest of the study). These employees can work in international construction projects located in the Anglo cluster, the Arab cluster, and the Asian cluster for contractors based in English-speaking countries. (Refer to Chapter 2, section 2.5.2 for details on culture clusters.)

The population of interest is spread across different areas, making simple random sampling not feasible. Accordingly, a convenience sampling procedure was employed. In construction

research, the random sample generates low response rates. Thus, convenience sampling is mostly used by approaching individuals or firms that will most likely agree to participate. Problems with such type of sampling include the compromised accuracy of estimates, limitation to generalizability, and inability of calculating the sampling error (Abowitz and Toole 2010).

To develop the sampling frame, databases that list the names and contacts of international contractors involved in international projects were utilized. Examples of such lists include the Engineering News-Record (ENR), which lists the top international contractors and owners involved with international contractors. This database was filtered to create a list of international contractors that fit the criteria for this study (international contractors based in English-speaking countries that operate in the Middle East or Asia). The sample for the study consists of procurement/contracts departments' employees working at these companies during the year 2011. The survey was administered online to around 100 international contractors, based in English-speaking countries.

3.3.1.2 Survey mode

When selecting the survey modes, a web-based questionnaire was developed, using an online survey tool (Zoomerang). This web-based option was chosen, due to the following reasons:

- This study involves participants from different regions around the world. Therefore, web-based questionnaires offer respondents the option to respond anytime and from anywhere in the world.
- Since all respondents work in well-established facilities, they have web access.
- Web-based administered surveys are inexpensive compared to other means, such as mail surveys or self-administered surveys (Creswell 2009).

A total of 100 survey requests were sent via email during the months of May, June, and July 2011. Contractors were first contacted through telephone to obtain contact information for the person in the company most capable of answering the survey. Details of the survey mode are listed below:

- First wave: The employee was sent an email incorporating the cover letter and a link to a web-survey.
- Second wave: After sending the first email, one week later, a follow-up email was sent to non-respondents, emphasizing the importance of their participation and requesting their response.
- Third Wave: Non-respondents were re-contacted by phone this time, requesting their participation.
- Fourth Wave: The fourth wave began, if no response was received from the company contact. In this case, another employee in the same company, who qualified to take the survey, was contacted and the first wave began again.

3.3.1.3 Survey instrument

The survey consisted of two major sections. The first section (Section A) included eight questions regarding general information on the company and participant. The second section (Section B) involved questions regarding two projects. Each project was divided into four parts; part I included eight general project information-related questions, part II included ten DRMs' related questions, part III included eleven risk-related questions, and part IV included twelve trust-related questions. A short introduction of the survey's purpose requesting procurement/contracts departments' employees' participation was included in the email first sent and in the beginning of the survey. The survey and cover letter are included in Appendix A.

A. Measuring culture in projects

Measuring culture and assessing the culture of the contractor versus the owner is based on the home country of the project. Projects in the Middle East and Asia with owners from the same cultures and international contractors from English-speaking countries were included in this study. The classification of the countries is based on the GLOBE study (for more details refer to Chapter 2, section 2.5.2).

B. Measuring risk levels in projects

To measure the risk level in the project, the risk section (Section B, part II) in the survey was divided into 11 questions. These questions represented the different types of risks anticipated in a construction project (for more details and definitions on these risks, refer to Chapter 2, section 2.7.2). The types of risk included in the survey were

1. Owner-related risks
2. Organizations' relationship risks
3. Technical risks
4. Contractual risk
5. Schedule delay risks
6. Cost overrun risks
7. Political risks
8. Legal risks
9. Economic and financial risks
10. Environmental or climatic risks
11. Social risks

Respondents were asked to rate each risk factor of these 11 in terms of likelihood of occurrence and impact of project on a 5-point Likert-type scale ranging from "least likely" to "most likely." The risk associated with a single event *n* is the product of probability of occurrence and impact of occurrence (Project Management Institute 2008), represented by:

$$Risk_n = Likelihood_n * Impact_n . \qquad (3\text{-}1)$$

The overall risk for the project was measured as the sum of *n* risks. Thus, the rates provided by the respondents for both likelihood and impact of each risk were multiplied for each project,. Then, the product of all risks for that project was added, providing a number that measures the project risk. For example, if a respondent rated social risks as two in terms of likelihood and four in terms of impact, the product for this individual risk will be eight, which will be added to the remaining risks giving a total risk value for the project. A higher risk number indicates higher levels of risks.

C. Measuring trust levels in projects

Cummings and Bromiley (1996) developed an instrument that can be used to measure organizational trust (for more details, refer to Chapter 2, section 2.6.2). The Organizational Trust Inventory – Short Form (OTI–SF) is used as part of this study's survey (Section B, part III) to measure the level of trust between the international contractor and the owner. The OTI–SF is a twelve-item questionnaire that allows subjects to express their opinion on a 7-point Likert-type scale ranging from "strongly agree" to "strongly disagree." For details about the 12 questions asked, refer to Appendix A. The ratings from the OTI-SF for each project are used to create a summative measure of trust between the parties for each project. The higher the trust sum, the higher the trust level. To compute the sum from the OTI-SF 12 questions, questions 1, 2, 3, 7, 8, 9, and 10 are added, while questions 4, 5, 6, 10, and 12 are subtracted.

3.3.1.4 Survey analysis

The data collected from the survey are analyzed using both descriptive and inferential statistics. Descriptive statistics are used to describe the size and distributions of various attributes of the population, while inferential statistics are used to compare and relate between the variables in question. Details on specific statistical analysis employed are presented below.

A. Fisher's exact test

Since the results of the survey for the DRMs employed were frequencies measured across different categories, the chi-squared test would be a good option to use to test if a relationship exists between two categories. A chi-squared test is used when a relationship between two categorical variables is explored; in this case, it would be the relationship between project location (Middle East and Asia) and use (Yes/No) of each DRMs. The chi-squared test assumes the expected value for each cell is five or higher. However, looking at our data, the expected frequency in some of the cells is less than five. Thus, this assumption is not met in the dataset and accordingly, it is recommended to use Fisher's exact test.

Fisher's exact test is more accurate than the chi-squared test when one or more of the cells have an expected frequency of five or less. It is a statistical significance test used in the analysis of contingency tables and usually employed when sample sizes are small. The principle behind the test is to obtain a P-value, which is a combination of the frequencies actually obtained (i.e., the probability of every possible combination which indicates more evidence of association), the higher the P-value, the stronger the evidence the two proportions are truly different (Agresti and Finlay 1997). It is illustrated by Eq. (3-2) as follows:

$$P = \frac{(a+b)!(c+d)!(a+c)!(b+d)!}{a!b!c!d!N!}, \qquad (3\text{-}2)$$

Where a, b, c, d =individual frequencies of each cell in the contingency table

N = total frequency

Fisher exact test assumptions are:

- A directional hypothesis based on a one-tailed test predicting either a positive or a negative association.
- Values of the first unit of items sampled do not become affected by the value of the other unit of item sampled.
- Observations are assumed mutually exclusive (a given case falls in only one cell in the table).
- Dichotomous measurement level of the variables.

The hypothesis tested is:

H_o: There is no statistically significant relationship between the use (frequency mentioned) of each DRM and each project condition.

H_a: There is no statistically significant relationship between the use (frequency mentioned) of each DRM and each project condition.

B. Multinomial logistic regression (MNL)

The objective of a multinomial logit (MNL) model is to estimate a function that can determine outcome probabilities (Washington et al. 2003). MNL is used to model choices.

The purpose of developing a MNL model in this study is to estimate the DRM choice (the likelihood of a project to use one of the six DRMs). There are six unordered alternatives available—adjudication, arbitration, DRB/DAB, litigation, mediation and negotiation. Thus, MNL is a good choice, since are there are more than two discrete outcomes.

MNL relies on the assumption of independence of irrelevant alternatives. This assumption states that the odds do not depend on other not relevant alternatives (e.g. the relative probabilities of choosing negotiation or arbitration do not change, if litigation is added as an additional possibility). This becomes important in cases where one of the DRMs disappears; yet, this does not apply to our study. Therefore, it is acceptable to use the MNL. MNL does not make any assumptions of normality, linearity, and homogeneity of variance for the independent variables. The minimum number of cases per independent variable is 10 (Hosmer and Lemeshow 1989). The MNL formulation is represented by Eq. (3-3):

$$P_n(\mathrm{i}) = \frac{\mathrm{EXP}[\beta_i \mathrm{X}_{in}]}{\sum_{\forall I} \mathrm{EXP}[\beta_i \mathrm{X}_{In}]}, \qquad (3\text{-}3)$$

Where $P_n(\mathrm{i})$ is the probability of observation n having discrete outcome i (i ϵ I).

B is the estimable parameter for discrete outcome i.

In MNL, there are two outputs related to the statistical significance of individual predictor variables—the likelihood ratio tests and parameter estimates. The likelihood ratio test evaluates the overall relationship between an independent variable and the dependent variable. The overall test of relationships among the independent variables and groups defined by the dependent are based on the reduction in the likelihood values for a model, which does not contain any independent variables, and the model that contains the independent variables. This difference in likelihood follows a chi-squared distribution and is referred to as the model chi-squared. The significance test for the final model chi-squared (after the independent variables have been added) is our statistical evidence of the presence of a relationship between the dependent variable and the combination of the independent variables. The parameter estimates focus on the role of each independent variable in differentiating between the groups specified by the dependent variable.

3.3.1.5 Survey validation

In surveys, "errors" is used to indicate the deviations from the true value applicable to the population. Figure 3.3 shows the errors likely encountered while moving from one step to the other in a survey lifecycle. They are mainly errors of observations and errors of non-observations. These errors should be accounted for by making design and estimation choices that do not compromise the quality (Groves et al. 2004). The following are the potential errors forecasted and measures taken to minimize them:

- Construct validity defines how the measure used is related to the construct. Measurement errors are errors resulting from the deviation of the answers given for a survey question, i.e., a deviation from the true value. The critical task for measurement is to design questions that provide answers, which perfectly reflect the constructs measured (Groves et al. 2004). The following was completed to account for the measurement errors:
  - Expert reviews to rate the survey were achieved by sending it to eight construction engineering professors, instructors, and graduate students, who provided input on the survey questions and suggested recommendations.
  - The survey was also pre-tested on several graduate students to establish content validity of the survey and to improve the questions, format, and scales. Evaluation of the survey included checking unit non-responses, assessing the scale used in the survey, and checking the coding used.

- Processing errors are introduced after data collection and before estimation, due to missing data or illogical answers (Groves et al. 2004).
  - After data collection, responses were screened and edited to determine any outliers or illogical answers before moving to the analysis process.

- Coverage errors result from the sampling frame not matching the total population (Groves et al. 2004).
  - Since the study employs convenience sampling, undercoverage of the population may occur. However, it is assumed that the ENR serves as an adequate representation of the population.

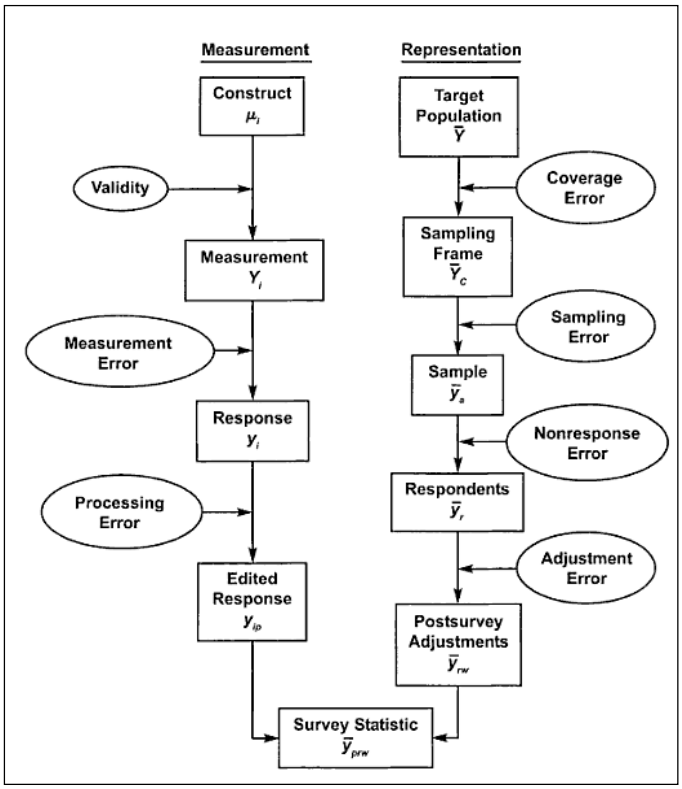


Figure 3.3: Survey lifecycle from a quality perspective (Groves et al. 2004)

- Sampling errors are due to the sampling procedure used. They occur when members of the sampling frame are not given a chance for selection (sampling bias) or when many different sets of the frame elements are chosen from the same sample design (sampling variance) (Groves et al. 2004).
  - ENR serves as an adequate tool for sampling design, as it constitutes the top international contractors working worldwide.

- Nonresponse errors occur due to nonresponse of the participants to the whole survey or some questions leading to computed values not representative of the sample (Groves et al. 2004). To decrease the nonresponse errors, the following are suggested:
  - Since a web-based survey was used, pop-up messages were used to decrease item non-response (missing of questions).

- Academic urls for emails are known to increase the response rate, since the participants will not view the survey as commercial. Therefore, they will be more prone to respond.
- Because multiple contacts are a key to good response rates, two reminder emails were sent to non-respondents and a follow-up phone call reminder was made to the non-respondents to remind them to complete the survey and, thus, increase response rate.
- Multiple contacts from a single company were sent the email to increase response rate.

3.3.2 Delphi technique

The aim of the second research method employed is to gain a deeper understanding from experts in the dispute resolution field on factors that may affect the choice of DRMs in specific cultures, risks, and trust. By gaining a deeper insight, a DRM-CRT model is developed from the results of the Delphi technique. The Delphi technique was chosen because it facilitates obtaining opinions and their justifications from experts in a couple of rounds until a consensus between the experts is reached. The forthcoming paragraphs will introduce the Delphi technique, its steps, and statistical analysis conducted on the data.

3.3.2.1 Delphi technique design

The Rand Corporation developed the Delphi technique in the early 1950s. It aimed at achieving convergence of opinions among a panel of experts about real-world topics often intangible. Experts are selected to participate in a series of structured surveys using multiple rounds. In each round, the researcher provides the experts with an anonymous summary of the results of the previous round, seeking their input and re-evaluation of their responses to achieve group consensus (Figure 3.4). Thus, the objective is to minimize the variability of the experts' responses (Hallowell and Gambatese 2010; Hsu and Sandford 2007)

Although this method has received criticisms by some authors, many others have justified it when objective data are not available or when organizing experts in one geographical location is not feasible. The Delphi technique has several advantages. It allows researchers to

have control over any bias in a well-structured process by using the qualified experts' opinions and allows for experts' interactions. It is also useful when it is difficult to reach objective data, no empirical evidence is available, and experimental research is not an option. However, if the technique is not properly designed and implemented, the quality of findings may be compromised. Examples include poor design of survey instruments, poor choice of experts, minimum effort to reduce bias, and limited feedback provided to experts in each round (Hallowell and Gambatese 2010).

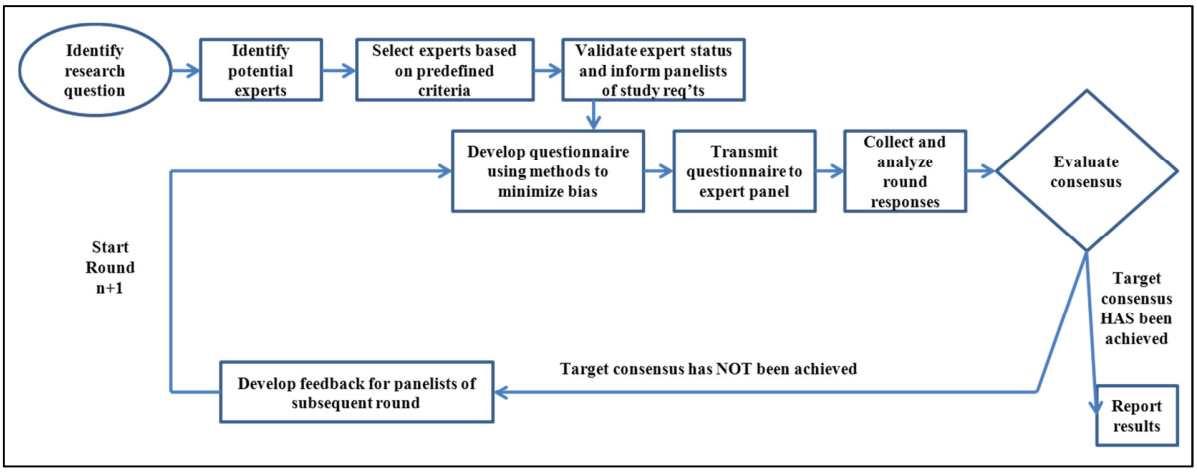


Figure 3.4: Delphi technique procedure (adopted from Hallowell and Gambatese 2010)

In an effort to standardize the use of the Delphi technique, Hallowell and Gambatese (2010) developed guidelines for implementation of the Delphi technique shown in Table 3-1. These guidelines were followed in this study, as they identify the technique's best practices, including how experts are chosen, the number of experts on the panel, and adequate number of rounds.

Table 3-1: Guidelines for Delphi research method (adopted from Hallowell and Gambatese 2010)

Characteristic	Minimum requirement
Identifying potential experts	• Membership in nationally recognized committee in the focus area of research • Primary writer of publications in ASCE journals • Known participant in similar expert-based studies
Qualifying panelists as experts	Experts must satisfy at least four of the following criteria in the topics related to the research • Primary or secondary writer if at least three peer-reviewed journal articles • Invited to present at a conference • Member or chair of a nationally recognized committee • At least 5 years of professional experience in the construction industry • Faculty member of an accredited institution of higher learning • Writer or editor of a book or book chapter on the topic of research • Advance degree in the field of civil engineering, CEM, or other related fields (minimum of B.S.) • Professional registration such as PE
Number of panelists	8-12
Number of rounds	3
Feedback for each round Round 1 Round 2 Round 3	 Data from preliminary research or achieved data (if available) Median response form Round 1 Median response from Round 2 and responses from outlying respondents
Measuring consensus	Absolute deviation (with consensus indicated by a value <1/10 of the range of possible values for quantitative studies)

3.3.2.2 Sample: Experts' choice

Hallowell and Gambatese (2010) suggest the experts meet at least four of the requirements listed in Table 3-1 (qualifying panelists as experts' bullet). They further develop an alternative point system (Table 3-2), based on experiences and time commitment of the experts, allowing the researcher to choose the expert qualities, depending on the study's goals. Experts should obtain at least one point in four different criteria and a total of 11 points to qualify as participants.

For this study, experts involved in resolving international dispute resolution, such as arbitrators/mediators, are the target population. A list of arbitrators and mediators involved in international contracts from international arbitration centers was generated. The list was screened to identify those with previous experience in dispute resolution processes involving contracting parties from English-speaking countries, the Middle East, and Asia. A list of 37 experts was generated, based on the following criteria:

- At least 10 years' experience in resolving international construction disputes;

- Experience working with parties from English-speaking, Middle Eastern, or Asian countries;
- Published books or articles and provided presentation/lectures on DRMs;
- Experience with various DRMs; and
- Engineering background (desired, but not required).

These 37 experts were contacted and asked to participate in the study, 12 agreed to participate. The members of the panel included professionals from the United States, the United Kingdom, Egypt, Lebanon, Qatar, and Australia, which provided a balanced cultural view for the Delphi study.

Table 3-2: Point system for expert panelist (adopted from Hallowell and Gambatese 2010)

Achievement or experience	Point (each)
Professional registration	3
Year of professional experience	1
Conference presentation	0.5
Member of a committee	1
Chair of a committee	3
Peer-reviewed journal article	2
Faculty member at an accredited university	3
Writer/editor of a book	4
Writer of a book chapter	2
Advanced degree:	
B.S.	4
M.S.	2
Ph.D.	4

3.3.2.3 Delphi questionnaire development

The study included four rounds of questions included in Appendix B and summarized below.

Delphi round one

The first round of the Delphi, accompanied by an invitation letter, was emailed to these 12 experts. The questionnaire constituted two main sections. The first section was composed of four questions. The first question asked the experts to list all factors they could think that might affect the choice of DRMs in international construction contracts. The second through the fourth questions in this section asked the experts whether from their experience, they

thought the culture of the contracting parties, risk level in the construction project, and trust level between contracting parties, respectively, had an effect on the choice of DRMs in an international construction contract. The experts were also asked to provide justification for their answers. The second section sought information on the expert's experience to confirm they met the criteria for participation in the study.

Delphi round two

In the second round, the factors generated from the first round were compiled. Results from the first round included the frequency of mentioning each factor and the percentage of experts who identified each factor. The experts were provided these factors and asked to rate them in terms of their importance, using a Likert-type scale from 1 to 5, with 1, not important to 5, very important. To rate these factors, the experts were asked to assume a specific scenario—they are consulting a U.S.-based international contractor on factors to consider, when selecting DRMs in the international contract with the owner. This contractor is assumed to be in the contract formation stage and planning to operate in the Middle East or Asia.

Delphi round three

The third round included three questions. The first question gave the experts the opportunity to revise their responses from the first round regarding culture, risk, and trust effect on the choice of DRMs in international contracts in an attempt to reach a consensus among all the experts. Experts were provided the justifications given by all the panel members to their responses. The second question asked the experts to rate the 27 factors generated from the first round in terms of their importance in the choice of respective DRMs in an international contract. On rating these factors, the experts were asked to assume a specific scenario— they are consulting a U.S.-based international contractor operating in the Middle East and/or Asia, from -3 to 3 with -3 being 'major negative effect' to 3 'major positive effect', i.e., which would they most likely recommend, based on the factors listed. The third question asked the experts to rate the suitability of each DRM, given different project conditions (country of

operation, risk level, and trust level) using a score from 10 (least favorable) to 110 (most favorable).

Delphi round four

The fourth round was sent in an attempt to reach a consensus among the experts on questions two and three of round three. The experts were provided their scores and the group median score for each cell in each question. They were accordingly asked to re-evaluate their responses based on the group's median score. They were given the option to accept the group median by inserting 'ok' or maintain the original response by placing 'x' or revise their score with a totally new rating. If they provided a new response or maintained their original response, they were asked to provide a justification on why they did not agree with the group median. Finally, the experts were asked if they would be interested in participating in a follow-up interview to discuss their individual responses and the results of the Delphi technique, in general.

3.3.2.4 Delphi technique analysis

After each round of questions, results were compiled, shared with the participants in the next round, and used to fine tune the successive round questions. When all rounds were completed, qualitative coding and statistical aggregation of group responses was conducted to allow for quantitative analysis and interpretation of data. The following statistical tests were conducted with the data. Note, the project condition refers to culture, risk, or trust; project condition levels refer to the levels of culture (Middle East and Asia), levels of risk (low and high), or levels of trust (low, medium, and high).

A. Shapiro-Wilk test of normality

The Shapiro-Wilk test analyzes the null hypothesis that a sample came from a normally-distributed population. The Shapiro-Wilk was used to test the normality of the DRMs scores. The null hypothesis is the population normally distributed (StatSoft nd). If the p-value is less than the chosen alpha level, then the null hypothesis is rejected and the data do not come from a normally-distributed population.

B. Kendall's coefficient of concordance W

Kendall's coefficient of concordance *W* is a statistical method used to measure the degree of agreement existing among raters assessing a number of objects. Each case is a judge and each variable is the DRM. For each variable, the sum of ranks is computed. Kendall's coefficient of concordance *W* ranges from 0, indicating no agreement, to 1 indicating complete agreement (Mehta and Patel 2010). Equation (3-4) illustrates as follows:

$$W=\frac{12*s}{k^2*n*(n^2-1)} \quad , \qquad (3\text{-}4)$$

Where s = sum of squares of deviations of factors,

k = number of experts,

n = number of DRMs.

The hypothesis tested is:

H_o: The judges are not in agreement on ranks of the DRMs in each project condition.

H_a: The judges are in agreement on the ranks of the DRMs in each project condition.

C. Mann-Whitney rank-sum test

If after conducting the normality tests, the data does not follow normal distribution, the Mann-Whitney rank-sum test, a non-parametric analog of the two-sample t-test, is conducted. The Mann-Whitney test is used to compare two independent samples and assumes homogeneity of variance. It tests the null hypothesis that the probability distributions of two ordinal scale variables are the same for two independent populations. This is achieved through testing the differences in location (mean or median) between the two populations, i.e., the rankings (Agresti and Finlay 1997; Washington et al. 2003). Equation (3-5) is illustrated as follows:

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \, , \qquad (3\text{-}5)$$

Where U = measure of difference between the ranks of two samples,

n_1 = sample size of population 1,

n_2 = sample size of population 2,

R_1 = sum of ranks from sample 1.

The Mann-Whitney rank-sum test was used in this study for two purposes:

1. To compare between the individual DRM scores within the project condition. For example, the general hypothesis tested is:

   H_o: There is no statistically significant difference between the mean ranks of DRM1 score in each project condition 1 versus project condition 2.

   H_a: There is a statistically significant difference between the mean ranks of DRM1 score in each project condition 1 versus project condition 2.

2. To determine if there is a statistically significant difference between each DRM and the next in score in each project condition. This will help to determine which DRMs to recommend in the DRM-CRT model developed. For example, the general hypothesis tested in Asia is:

   Ho: There is no statistically significant difference between the mean ranks of DRM1 and DRM2 in each project condition.

   Ha: There is a statistically significant difference between the mean ranks of DRM1 and DRM2 in each project condition.

A 95% confidence interval is used as the confidence level for all results of tests conducted. H_o is rejected if $p < \alpha$ level, where $\alpha = 0.05$. The *p*-value is the smallest level of significance for α that leads to rejection of the null hypothesis.

D. Kruskal-Wallis test

In cases where there are more than two samples (k independent samples), the Kruskal-Wallis test is used in lieu of the Mann Whitney test. Thus, when k=2, Kruskal-Wallis test specializes the Mann-Whitney test (Washington et al. 2003). Because there are three trust levels to compare (high, low, and neutral), the Kruskal-Wallis test is used to compare the DRMs' scores at various levels of trust. Equation (3-6) is illustrated as follows:

$$W = \frac{12}{n(n+1)} \sum_{i=1}^{k} \frac{R_i}{n_i} - 3(n+1), \qquad (3\text{-}6)$$

Where W = Kruskal-Wallis test statistics,

n = sample size,

k = number of groups,

i = group number,

R_i = sum of ranks from group *I,*

n_i = number of observations in group *i.*

For large samples ($n_i > 5$), the distribution of Kruskal-Wallis test statistic *W* under the null hypothesis is approximated by the chi-squared distribution with (k-1) degrees of freedom. Accordingly, the null hypothesis is rejected for a given level of significance, α, if W > $\chi^2_{k-1;\alpha}$

The hypothesis tested for each DRM in each trust level is:

H_o: There is no statistically significant difference between the mean ranks of DRM1 score in projects with high, low, and neutral levels of trust

H_a: There is a statistically significant difference between the mean ranks of DRM1 score in projects with high, low, and neutral levels of trust

E. Multivariate analysis of variance (MANOVA)

Multivariate analysis of variance (MANOVA) is a parametric test that assesses the statistical significance of the main and the interactions effect of one or more independent variables on a set of two or more dependent variables. In this study, MANOVA's dependent variables are the ten DRMs and the three independent variables are culture (two levels), risk (two levels), and trust (three levels). By conducting a MANOVA, a multivariate F-value is obtained, based on a comparison of the error variance/covariance matrix and the effect variance/covariance matrix. Although, Wilk's λ is the most widely used multivariate test statistic, Pillai's test is utilized if homogeneity of covariance is violated, since it is more conservative and robust to these violations.

MANOVA detects when groups differ on a system of variables. Individually, groups may not differ on dependent variables, but systems of variables may have a significant combined effect. Univariate tests ignore correlations that might exist among the responses. Thus, MANOVA provides a more complete description of the phenomenon under investigation

The major benefit of MANOVA compared to multiple ANOVAs (studies each dependent variable individually) is controlling the Type I error rate, which may reject a true null hypothesis. Assumptions of MANOVA are:

- Dependent variables must be continuous (DRMs scores are continuous numbers).
- Independent variables are categorical (levels of culture, risk, and trust are categorical).
- Normal distribution: All IV's must be normally distributed, any linear combination of the dependent variables must be normally distributed, and all subsets of the variables must have a multivariate normal distribution. (In addition to having a large data set, which can assume normality, a nonparametric test was conducted as confirmatory evidence of results of MANOVA (discussed above).)
- Homogeneity of covariance matrices: Variance for all dependent variables must be equal across the experimental groups defined by the independent variables and covariances (variance shared between 2 variables) for all unique pairs of dependent variables. This is tested using the Box's M test.
- Independence of observations: Scores on the dependent variables are not influenced by other S's in his/her experimental group.
- Multicollinearity and singularity: When there is a high correlation between dependent variables, one dependent variable becomes a near-linear combination of the other dependent variables. Under such circumstances, it would become statistically redundant and suspect to include both combinations.

The second step in MANOVA is if the overall F-test shows the means vector of the dependent variables is not the same for all the groups formed by the categories of the independent variables, post-hoc univariate F-tests of group differences are used to determine which group means differ significantly from the others. This helps identify the exact nature of the overall effect determined by the F-test. Pairwise multiple comparison tests, such as Bonferroni test, compare all pairs of means simultaneously with a fixed overall confidence coefficient (Agresti and Finlay 1997).

3.3.2.5 Delphi technique validation

Given the inherent nature of the Delphi technique in which experts re-evaluate their subjective scores, based on other experts' opinions and finally achieve a presumably objective consensus with other experts, a self-validating mechanism is by default applied to the entire Delphi process. However, a couple of measures were taken to ensure validity of the technique utilized:

- To ensure the topic in question is adequately addressed, a couple of pretest questionnaires were given to faculty members and industry experts to validate, through their responses, the questions are properly answered.
- To reduce group error and increase decision quality, the sample size was planned large—starting with twelve experts and ending with eight experts—which is acceptable. It was also important not to increase the sample size too much to ensure managing the Delphi process and analyzing the data do not become too complicated.
- After the four rounds were concluded, member checking (Creswell 2009) or follow-up interviews with three of the panel experts were conducted. The interviews' main objectives were to receive feedback and comments from the experts on their responses compared to the group response and to validate the DRM-CRT model developed from the results of the Delphi rounds of questions.

3.4 Conclusions

The research methodology for this study followed a concurrent mixed method design, utilizing surveys and the Delphi technique. Surveys were administered to procurement/ contracts departments' employees of international contraction based in English-speaking countries. The Delphi technique was utilized to explore into more details the views of DRMs experts on the effect of culture, risk, and trust on the choice of DRMs and accordingly develop a DRM-CRT model.

Table 3-3: Summary of statistical methods used to answer research questions (Delphi Technique)

Research Question	Statistical Analysis			
	Descriptive analysis	**Kendall's coefficient of concordance**	**Mann-Whitney rank-sum/ Kruskal-Wallis test**	**MANOVA**
1. What factors should affect the companies' decision on selecting a specific DRM?	Listing of factors based on frequency, mean score for importance			
2. How does culture affect the choice of DRMs?	Mean scores of DRMs in Middle East and Asia	Measurement of agreement on rankings of DRMs between experts in each project condition	1. Comparisons of the mean ranks of each DRM score between cultures, risk levels, and trust levels. 2. Comparisons of the mean ranks of each 2 consecutive DRMs scores in each project condition level separately.	
3. How does risk affect the choice of DRMs?	Mean scores of DRMs in high and low risk projects			
4. How does trust affect the choice of DRM?	Mean scores of DRMs in high, neutral, and low trust levels in projects			
5. How do culture, risk, and trust interact in choosing a DRM?				Determine the effect of the culture, risk, and trust and their interactions on the DRMs scores obtained from the experts

CHAPTER 4: **RESULTS AND ANALYSIS**

4.1 Introduction

This chapter presents the results and the analysis of the data collected from the survey and the Delphi technique. It is divided into three main sections; section 4.2 presents the survey results and analysis, section 4.3 covers the Delphi technique results and analysis, and section 4.4 presents the 'Dispute Resolution Method-Culture Risk Trust (DRM-CRT)' model. Sections 4.2 and 4.3 are structured around the research questions.

4.2 Survey

Surveys were emailed to approximately 100 employees from 36 companies—42 responded. Of these 42, five were excluded, since the companies were either not based in English-speaking countries or the projects were not located in the Middle East or Asia. Of the 37 remaining responses, 17 did not complete the survey. However, the 17 respondents answered questions on the factors affecting the choice of DRMs. Thus, it was decided to include these 17 respondents' responses in answering the first research question. Of the 20 companies with complete responses, seven companies provided information on two projects resulting in a total of 27 projects with complete responses.

This section is divided into seven parts. Section 4.2.1 provides descriptive overview information on the companies, respondents, projects, and the DRMs used. Sections 4.2.2 through 4.2.5 answer the four research questions of the study, respectively. Section 4.2.6 attempts to develop a DRM choice statistical model. Finally, section 4.2.7 presents the conclusions of the survey results.

4.2.1 Descriptive statistics (Survey)

This section provides descriptive data on the survey's respondents and their companies. The tables are divided into two columns; 'complete responses' column includes responses from participants who completed the whole survey and 'all' column includes all responses,

including the ones who opted out of the survey before answering specific questions on the projects (i.e., opted out at the beginning of Section B).

4.2.1.1 Company demographics

Table 4-1 provides information on the home country of the respondents' company. As can be seen from the table, all 20 companies are based in English-speaking countries. Table 4-2 shows where the company operations are worldwide.

Table 4-1: Home country of company

Home country of the company	Frequency (complete responses)	Frequency (all)
USA	16	29
Canada	2	3
Australia	1	3
Europe	1	1
Missing	0	1
Total	**20**	**37**

Table 4-2: Where does the company operate?

Where does your company operate?	Frequency (complete responses)	Frequency (all)
Middle East	18	33
Asia	18	31
Africa	10	22
Latin America/ Caribbean	17	28
Europe	12	25
US	17	31
Canada	14	28

4.2.1.2 Respondents Demographics

Looking at the respondents' experience in the 'complete responses' column of Table 4-3, 90% of the respondents have more than 15 years of experience in the construction industry. All respondents with complete responses have experience in international construction projects with 50% having more than 15 years of experience (Table 4-4). All respondents have experience in negotiation and formation of international contracts, with 60% having

experience of more than 15 years. These percentages indicate, in general, the respondents have strong international experience.

Table 4-3: Respondents' years of experience in construction industry

No. of years of experience in construction industry	Complete responses		All (including missing)	
	Frequency	Percent	Frequency	Percent
None	0	0	1	2.7
1-5 years	1	5.0	3	8.1
5-10 years	1	5.0	2	5.4
10-15 years	0	0	0	0
15-20 years	3	15.0	7	18.9
> 20 years	15	75.0	24	64.9
Missing	0	0	0	0
Total	**20**	**100**	**37**	**100**

Table 4-4: Respondents' years of experience in international construction projects

No. of years of experience in construction international projects	Complete responses		All (including missing)	
	Frequency	Percent	Frequency	Percent
None	0	0	1	2.9
1-5 years	3	15.8	7	20.6
5-10 years	3	15.8	4	11.8
10-15 years	1	5.3	3	8.8
15-20 years	3	15.8	6	17.6
> 20 years	9	47.4	13	38.2
Missing	0	0	0	0
Total	**22**	**100**	**37**	**100**

Table 4-5: Respondents' years of negotiation and formation of international contracts

No. of years of experience in negotiation and formation of international contracts	Complete responses		All (including missing)	
	Frequency	Percent	Frequency	Percent
None	0	0	0	0
1-5 years	2	10.0	6	16.7
5-10 years	5	25.0	9	25.0
10-15 years	1	5.0	3	8.3
15-20 years	2	10.0	4	11.1
> 20 years	10	50.0	14	38.9
Missing	0	0	0	0
Total	**22**	**100**	**37**	**100**

4.2.1.3 Projects' Demographics

Of the 27 projects included in this study, 18 were located in the Middle East and nine in Asia (Table 4-6). Projects' types included building, heavy, highway, industrial, and infrastructure. (Figure 4-1). Construction duration varied from less than one year to more than eight years (Figure 4-2). As for construction cost, this varied from less than ten million U.S. dollars to more than 500 U.S. million dollars (Figure 4-3).

Table 4-6: Project locations

Project Location	Frequency	
	Complete responses	All (including missing)
Middle East	18	23
Asia	9	9
Missing	0	12
Total	**27**	**44**

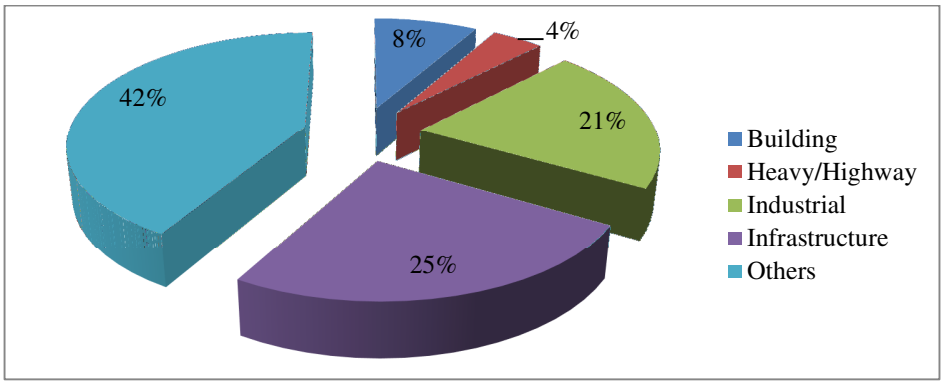


Figure 4-1: Project Type (based on 27 complete responses)

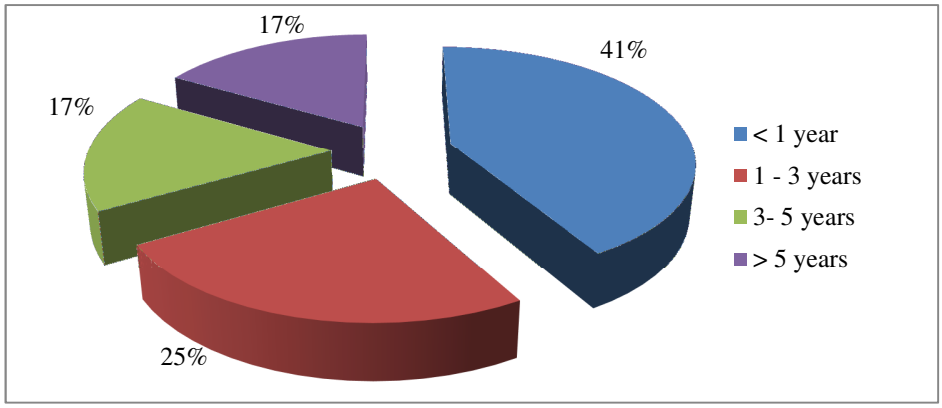


Figure 4-2: Total project construction duration (based on 27 complete responses)

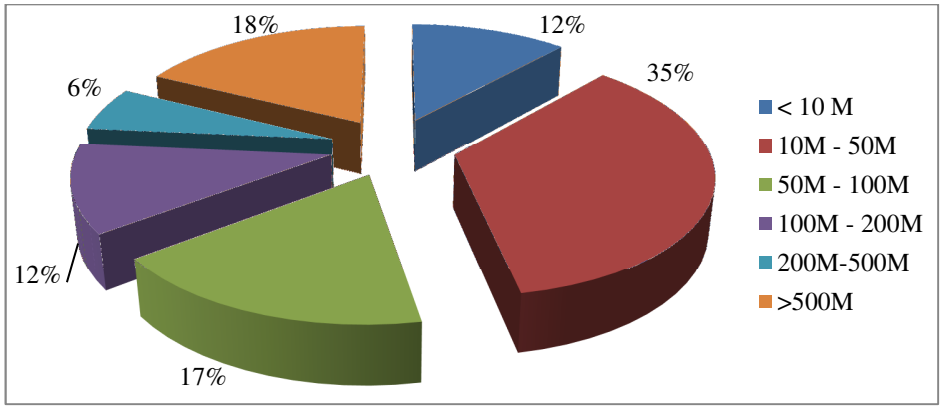


Figure 4-3: Total project construction cost in U.S. dollars (based on 27 complete responses)

4.2.1.4 Dispute resolution methods employed in projects

Looking at the DRMs employed in the contract, eighteen projects out of the 27 employed more than one DRM in the contract document. In general, the most DRM employed was arbitration followed by negotiation then mediation. The least was litigation, and mini-trial was not employed in any of the projects (Table 4-7).

Table 4-7: DRMs stated in the project contract document

DRM stated in contract document	Frequency	
	Complete responses	All (including missing)
Arbitration	26	29
Negotiations	18	18
Mediation	12	13
Dispute Review Board/ Dispute Adjudication Board (DRB/DAB)	7	7
Adjudication	5	5
Litigation	5	5
Mini-trial	0	0

When asking respondents on the basis on which DRMs were chosen, seven out of the 27 projects had country regulations and/or laws that necessitated the selection of the DRM(s) stated in the project contract, such as procedures, rules, and regulations of the Qatar International Center for Commercial Arbitration (QICCA). Fifty-five percent of the remaining respondents reported it was normal practice used by the other contracting party,

30% reported it was normal practice used by our company, and the remaining respondents chose other reasons, i.e., 85% of the respondents reported it was normal practice used by the companies (Figure 4-4). Other options included mandated by a standard contract document, such as the International Federation of Consulting Engineers (FIDIC). When asked whether the DRM was actually employed with the project, only 37% reported the DRM was used in the project (Figure 4-5).

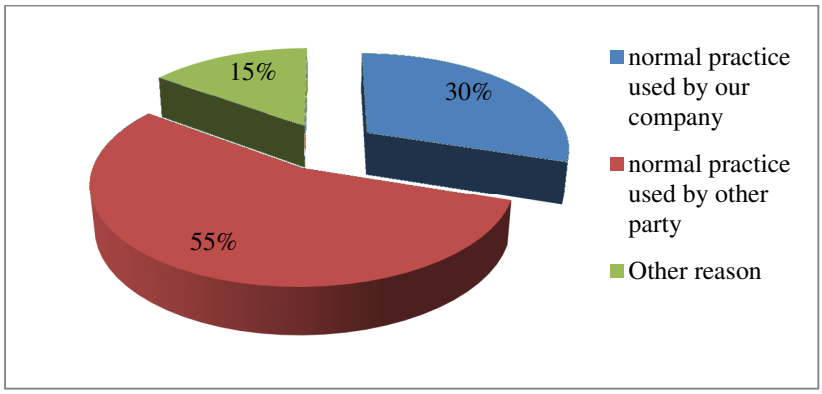


Figure 4-4: Basis on which DRM chosen in contract (based on 27 complete responses)

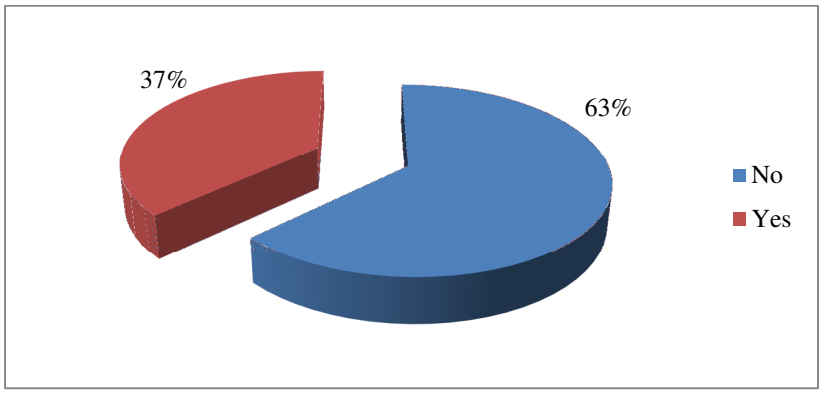


Figure 4-5: Where DRM employed in the projects (based on 27 complete responses)

4.2.2 What factors currently affect the choice of DRMs? (Survey)

Respondents were asked to choose the factors that affect their company's decision on the choice of DRMs. The first eight factors listed in Table 4-8 were the choices provided to the respondents. The shaded rows were added by the respondents in the 'others' choice. The table includes the responses of all 37 companies that responded (including ones that didn't

complete the survey). It is seen from the table the 'location of project' followed by 'laws' were the highest mentioned factors. The third most mentioned factor was 'risk', while 'level of trust borne with other party' was eighth in terms of frequency mentioned. The least factors mentioned by the respondents were 'value of the contract', 'need to bring in third parties to process', and 'binding outcome'.

Table 4-8: Factors affecting the choice of DRMs

No.	Factors affecting choice of DRM	Frequency	% mentioned
1	Location of the project	33	89%
2	Laws	27	73%
3	Risks in project	26	70%
4	Local customs	19	51%
5	Type of contract	19	51%
6	Past business relationship	18	49%
7	Limitation of Liability on the contract	18	49%
8	Level of trust borne with other party	15	41%
9	Contract requirements (mandated)	3	8%
10	Cost of resolving the dispute	2	5%
11	Enforceability of decision	2	5%
12	Court system	2	5%
13	Division of neutral's compensation among parties	1	3%
14	Binding outcome	1	3%
15	Need to bring in third parties to process such as PM or architect	1	3%
16	Value of the contract	1	3%

Note: Shaded rows were added by respondents (not originally included in survey)

4.2.3 Does culture affect the choice of DRMs? (Survey)

The effect of culture on the choice of DRMs was first addressed by looking at how culture levels were measured in the survey, then the descriptive statistics of the results, and finally determining whether the results were statistically significant by conducting a Fisher's exact test.

4.2.3.1 Define culture levels

The Global Leadership and Organizational Behavior Effectiveness (GLOBE) Research Program's culture dimensions and globe clusters were used in this study (for more details refer to Chapter 2, section.1.5.2). This study's scope included four clusters of countries—Anglo-cluster (principally English-speaking countries), Middle Eastern, both Confucian (or East), and Southern Asian (Asian countries). Countries included in each one of these clusters are shown in Table 4-9.

Table 4-9: GLOBE study country clusters

Cluster	Countries included
Anglo	Canada, U.S.A., Australia, Ireland, England, New Zealand, and South Africa (white sample)
Middle Eastern	Turkey, Kuwait, Egypt, Morocco, and Qatar
Confucian Asian	Philippines, Indonesia, Malaysia, India, Thailand, and Iran
Southern Asian	China, Hong Kong, Japan, Singapore, South Korea, and Taiwan

4.2.3.2 Comparison of DRMs (Descriptive)

Looking at the DRMs employed in the contract in both project locations, both Middle East and Asia, had the same frequency order for the DRMs employed. The DRM with the highest frequency was arbitration, followed by negotiation, then mediation. The least frequency was litigation, and mini-trial was not employed in the projects (Table 4-10 and Figure 4-6). Mini-trial was not mentioned in either the Middle East or Asia. Litigation and adjudication were mentioned in the Middle East only.

Table 4-10: DRMs stated in contract document divided by project location

DRM stated in contract document	**Complete responses**		**All (including missing)**	
	Project Location		**Project Location**	
	Middle East	**Asia**	**Middle East**	**Asia**
Arbitration	15	9	17	9
Negotiations	12	3	12	3
Mediation	7	3	7	3
DRB/DAB	5	1	5	1
Adjudication	4	0	4	0
Litigation	4	0	4	0
Mini-trial	0	0	0	0

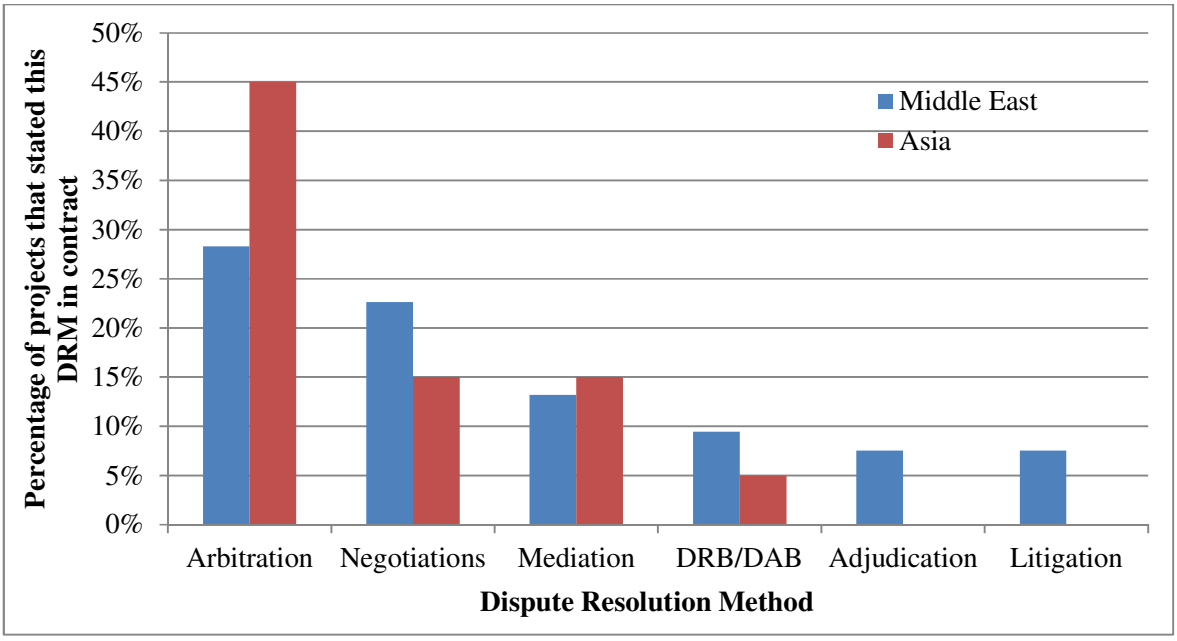


Figure 4-6: Percentage of projects in which DRMs was stated in contract document in the Middle East versus Asia

4.2.3.3 Comparison of DRMs in different project conditions (Fisher's exact test):

The results of the survey for the DRMs used in each project were frequencies. The Chi-squared test is a good statistical option to test if a relationship exists between two categories. It assumes the expected value for each cell is five or higher. However, looking at the results contingency table for negotiation and project location, for instance (Table 4-11), the expected frequency in some of the cells is less than five. Thus, the Fisher's exact test is used to conduct a chi-squared test when one or more of the cells have an expected frequency of five or less.

Table 4-11: Negotiation * project location contingency table

			Negotiations		
			No	**Yes**	**Totals**
Project Location	**Middle East**	Count	6	12	18
		Expected Count	8	10	18
	Asia	Count	6	3	9
		Expected Count	4	5	9
Totals		Count	12	15	27
		Expected Count	12	15	27

The hypothesis tested for negotiation (for example) was as follows:

H_o: There is no statistically significant relationship between negotiation use and location of the project.

H_a: There is a statistically significant relationship between negotiation use and location of the project.

Negotiations were used in 23% of the projects in the Middle East compared to 15% of the projects in Asia (Figure 4-6). When performing the Fisher's exact test using the SPSS software package, it was determined the null hypothesis cannot be rejected, i.e., there is no statistically significant relationship between negotiation use and the location of the project ($p = 0.127$, two-tailed Fisher's exact test). The Fisher's exact test (two-tailed) was performed on all remaining DRMs results. All DRMs did not have a statistically significant relationship with the project location ($p>0.05$, two-tailed Fisher's exact test). Output from the SPSS of the Fisher's exact test for all other DRMs is provided in Appendix C.

4.2.4 Does risk affect the choice of DRMs? (Survey)

The effect of culture on the choice of DRMs was first addressed by looking at how risk levels were measured in the survey, followed by looking at the descriptive statistics of the results, then finally by determining whether the results were statistically significant by conducting a Fisher's exact test.

4.2.4.1 Define risk levels

Risk was categorized into two main categories—low and high risk levels. A score of 100 was the breaking point between the two levels. Scores lower than 100 was low risk project and greater than 100 was high-risk project. These scores were mainly chosen to provide adequate project representation for both risk levels. Figure 4-9 shows the number of projects in each risk category, based on the score levels defined.

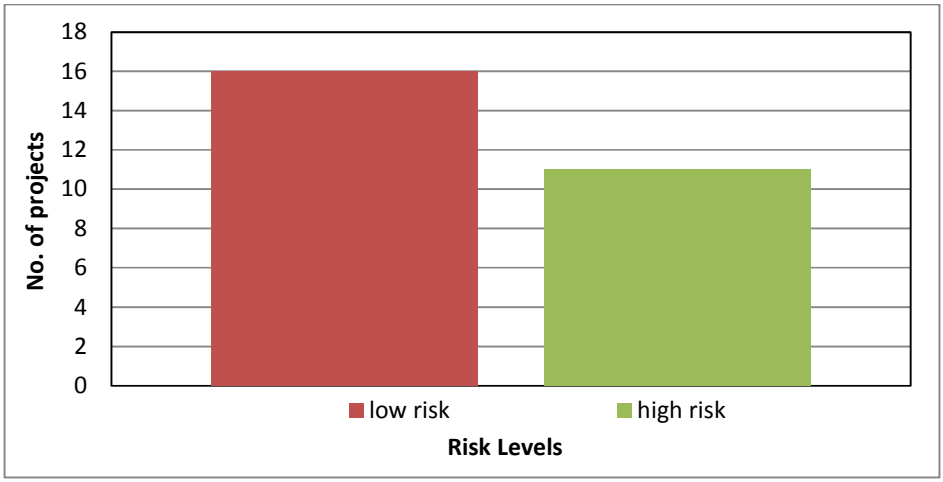


Figure 4-7: Number of projects with different risk levels

4.2.4.2 Comparison of DRMs (Descriptive)

Looking at the DRMs employed in the contract at different project risk levels, low risk and high risk levels, the top three DRMs employed in both risk levels were the same. The DRM with the highest frequency was arbitration, followed by negotiation, then mediation. The least used DRM was adjudication in low risk projects, while litigation was not employed at all in high-risk projects (Figure 4-8).

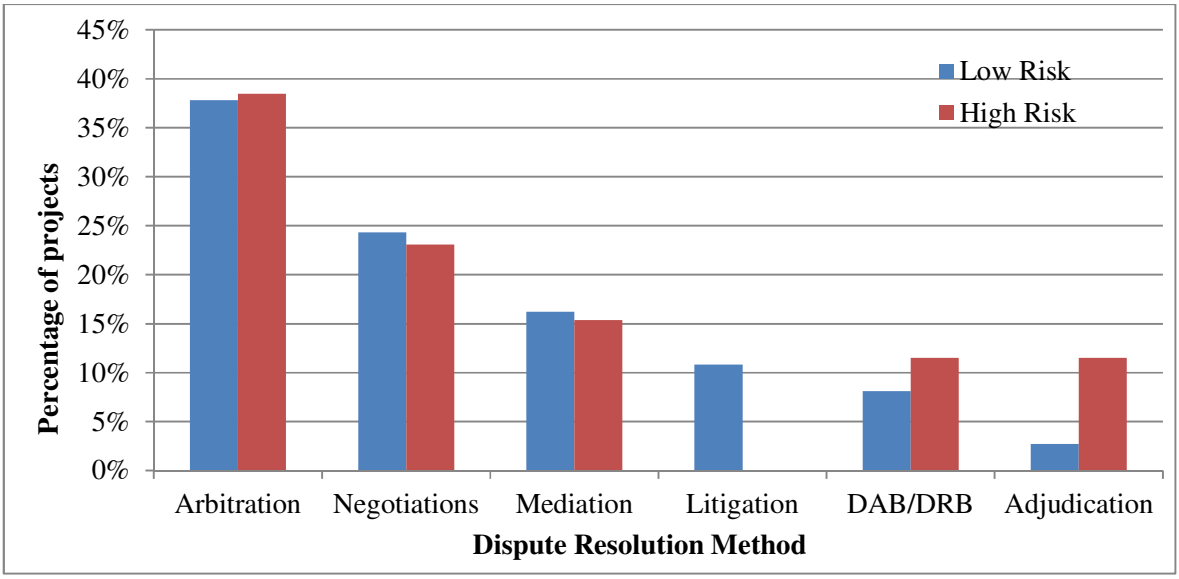


Figure 4-8: Percentage of projects in which DRM was stated in contract document in low versus high-risk projects

4.2.4.3 Comparison of DRMs (Fisher's exact test):

The Fisher's exact test was used again to test the following hypothesis for adjudication, for example:

H_o: There is no statistically significant relationship between adjudication use and the risk level in the project.

H_a: There is a statistically significant relationship between the adjudication use and the risk level in the project.

Adjudication was used in 3% of low risk projects compared to 12% of the high-risk projects (Figure 4-8). When performing the Fisher's exact test using the SPSS software package, it was determined the null hypothesis cannot be rejected, i.e., there is no statistically significant relationship between adjudication use and the risk level of the project ($p = 0.273$, two-tailed Fisher's exact test). The Fisher's exact test (two-tailed) was performed on all the remaining DRMs results. All DRMs did not have a statistically significant relationship with the project risk level ($p > 0.05$, two-tailed Fisher's exact test). Output from the SPSS for the Fisher's exact test is provided in Appendix C.

4.2.5 Does trust affect the choice of DRMs? (Survey)

The effect of culture on the choice of DRMs was first addressed by looking at how trust levels were measured in the survey, followed by looking at the descriptive statistics of the results, and finally by determining whether the results were statistically significant by conducting a Fisher's exact test.

4.2.5.1 Define trust levels

Trust scores obtained from the survey were categorized into three main categories—low, neutral, and high trust levels (Table 4-12). A score of less than eight is 'low trust', from eight to 18 is 'neutral trust', and higher than 18 is 'high trust'. These scores were mainly chosen to provide adequate project representation for all trust levels. Figure 4-9 shows the number of projects in each trust category, based on the score levels defined above.

Table 4-12: Trust scores categorization

Level of trust	Score range
Low trust	<8
Neutral trust	8-18
High trust	> 18

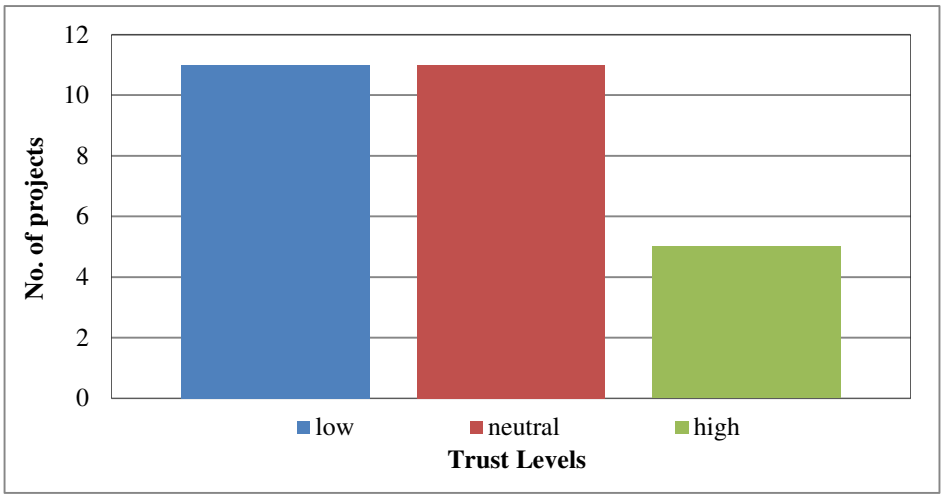


Figure 4-9: Number of projects with different trust levels

4.2.5.2 Comparison of DRMs (Descriptive)

Figure 4-10 shows the percentage of projects in which different DRMs were stated in the contract categorized, based on different project trust levels—low, neutral, and high trust level. For low trust projects, arbitration had the highest frequency, followed by negotiations, mediation, and litigation and adjudication, while DAB/DRB was not employed at all. In neutral trust projects, arbitration had the highest frequency, followed by negotiations, DRB/DAB, mediation, litigation, and adjudication. As for high trust projects, arbitration had the highest frequency, followed by adjudication, DRB/DAB and mediation, and negotiation. Litigation was not used in high trust projects.

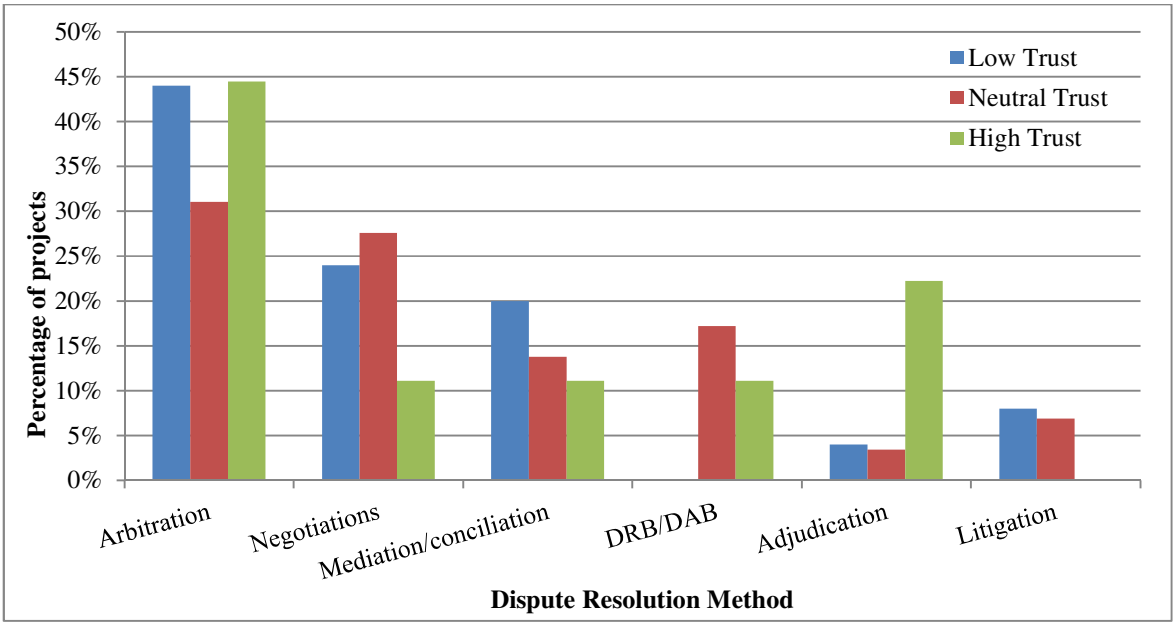


Figure 4-10: Percentage of projects in which DRMs was stated in contract in projects with different trust levels between parties

4.2.5.3 Comparison of DRMs (Fisher's exact test):

The Fisher's exact test was utilized again to test all DRMs. The following hypothesis for DRB/DAB was made, for example:

H_o: There is no statistically significant relationship between DRB/DAB use and the three trust levels between the contracting parties in the project.

H_a: There is a statistically significant relationship between the DRB/DAB use and the three trust levels between the contracting parties in the project.

DRB/DAB was used in 17% of the neutral trust projects compared to 11% in high trust projects (Figure 4-10). An online 2x3 Fisher's exact test calculator was used instead of the SPSS package, as it does not include the Fisher's exact test for than more than 2x2 comparisons (Joosse 2011). After performing Fisher's exact test, it was determined the null hypothesis is rejected, i.e., there is a statistically significant relationship between DRB/DAB use and the trust level of the project ($p = 0.034$, two-tailed Fisher's exact test). The remaining DRMs did not have a statistically significant relationship with the project trust level ($p>0.05$, two-tailed Fisher's exact test).

For example, the hypothesis for adjudication was as follows:

H_o: There is no statistically significant relationship between adjudication use and the three trust levels between the contracting parties in the project.

H_a: There is a statistically significant relationship between adjudication use and the three trust levels between the contracting parties in the project.

Adjudication was used in 4% of low trust projects compared to 3% in high trust projects and 22% in high trust projects (Figure 4-10), which was found insignificant, i.e., the null hypothesis cannot be rejected, i.e., there is no statistically significant relationship between adjudication use and trust level of the project ($p = 0.207$, two-tailed Fisher's exact test). Results of Fisher's exact test for the remaining DRMs are provided in Appendix C.

4.2.6 Developing a DRM choice model (Multinomial Logistic Regression)

A multinomial logistic model was developed to estimate a DRM choice, based on the three variables of interest—culture, risk, and trust. Multinomial logistic regression requires the minimum ratio of valid cases to independent variables be at least 10 to 1. The ratio of valid cases (63) to number of independent variables (6) was 10.5 to 1, equal to or greater than the minimum ratio. The requirement for a minimum ratio of cases to independent variables was satisfied.

The initial log likelihood LL(0) value (120.958) is a measure of a model with no independent variables, i.e., only a constant or intercept. The final log likelihood value LL(β) (104.661) is the measure computed after all of independent variables have been entered into the logistic regression. The difference between these two measures is the model chi-squared value $\chi 2$ (16.297) is tested for statistical significance. The overall model fit R^2 was 0.238. The model Chi-Square value of 16.297 has a significance of 0.363 ($p > 0.05$), thus the whole model is insignificant and there is no difference between the model without independent variables and the model with independent variables. There is no significant relationship between the dependent variable and the set of independent variables. In the model developed, all

variables, culture, risk, and trust are insignificant contributors to explain the choice of the DRMs.

In attempt to improve the model, the dependent variables adjudication and DRB/DAB were grouped to increase the number of observations per dependent variable. However, the overall model fit R^2 was 0.210. The model Chi-Square value of 13.943 has a significance of 0.304 ($p > 0.05$), thus the whole model is insignificant and there is no difference between the model without independent variables and the model with independent variables (Refer to Appendix H for results details).

4.2.7 Survey conclusions

The survey revealed the most important factors that companies consider when choosing a DRM are the 'location of project' followed by 'laws'. Both factors are related to the country of operation, i.e., culture. The third most mentioned factor was 'risk', while 'level of trust borne with other party' was eighth in terms of frequency mentioned.

A descriptive and statistical analysis (using Fisher's exact test) was performed to compare between the uses of different DRMs given different project conditions. Table 4-13 provides a summary of the results of the DRMs used in each project condition (culture, risk, and trust). It is seen that arbitration followed by negotiation and mediation are the most frequently used DRMs in most project conditions, except in high trust projects, where adjudication and DRB/DAB were most frequently utilized. Mini-trial was not mentioned in any project. Litigation was the least used in both cultures. In high-risk projects, litigation was the least used compared to adjudication in low-risk projects. DRB/DAB and adjudication were the least used in low and neutral trust projects, respectively. It was a remarkable observation that negotiation was the least used in high trust projects.

The Fisher's exact test was performed on all DRMs to compare their use in different project conditions. The only case showing a statistical significance was DRB/DAB in low trust versus high trust projects. All remaining DRMs did not have a statistically significant

relationship with the project location, project risk level, and trust level between parties ($p > 0.05$, two-tailed Fisher's exact test).

Table 4-13: Highest and least used DRMs in different project conditions

Factor	Highest frequency			Lowest frequency		
Culture	**Middle East**	**Asia**		**Middle East**	**Asia**	
	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation		Mini-trial Litigation Adjudication	Mini-trial Litigation Adjudication	
Risk	**Low**	**High**		**Low**	**High**	
	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation		Mini-trial Adjudication DRB/DAB	Mini-trial Litigation Adjudication	
Trust	**Low**	**Neutral**	**High**	**Low**	**Neutral**	**High**
	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation	Arbitration Adjudication DRB/DAB	Mini-trial DRB/DAB Adjudication	Mini-trial Adjudication Litigation	Mini-trial Litigation Negotiation

4.3 Delphi technique

This section is divided into eight parts. Section 4.3.1 provides descriptive overview information on the experts' backgrounds and experiences. Section 4.3.2 through 4.2.5 answer the five research questions of the study, respectively. Section 4.3.7 provides information on the follow-up interviews conducted with three of the experts, who participated in the Delphi technique. Finally, section 4.3.8 summarizes the Delphi results and analysis.

The Delphi technique in this research included four rounds of questions. Table 4-14 shows the response rate for each of the rounds sent to experts. The highest drop off was observed in Round 3, which can be attributed mainly to the length of the survey.

Table 4-14: Delphi technique response rate

Delphi Round	No. of experts who were sent the survey	No. of respondents	Response Rate
1	12	11	91.6 %
2	11	11	100 %
3	11	8	72.7 %
4	8	8	100 %

4.3.1 Descriptive statistics (Delphi Technique)

This section provides descriptive data on the experts, who participated in the Delphi technique round of questions. This information was collected from the second section of round one, which involved asking the experts about their educational background and experiences in international dispute resolution to confirm they possess the qualifications required for this study. Results indicated that all experts (11) were involved in arbitration, while 10 experts were involved in both litigation and mediation. Mini-trial was the least method the experts were involved with only four experts out of the 11 (Figure 4-11). Nine out of the 11 experts were involved in more than 10 international cases; five were involved in more than 50 cases (Figure 4-12).

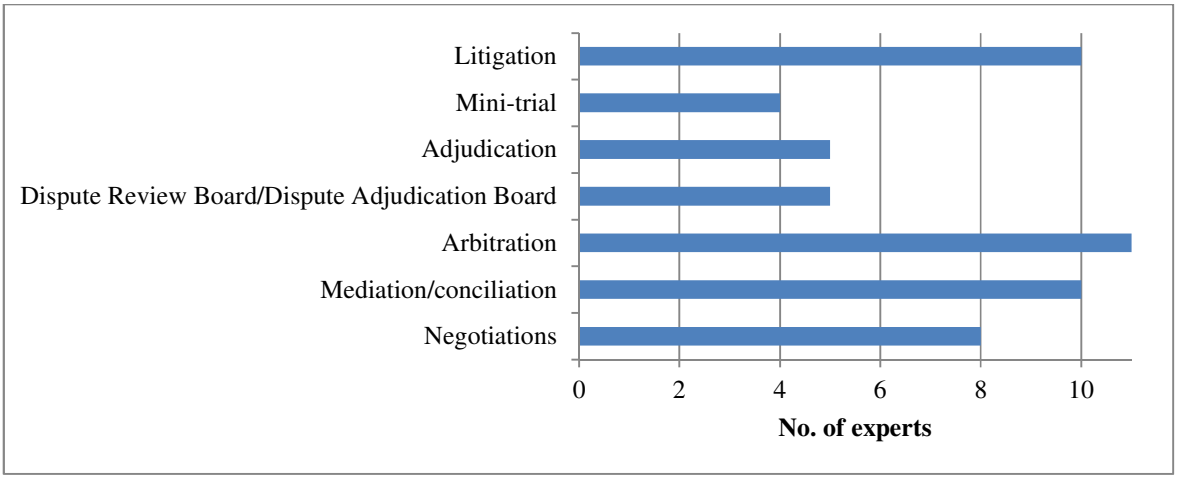


Figure 4-11: Types of DRM experts involved in

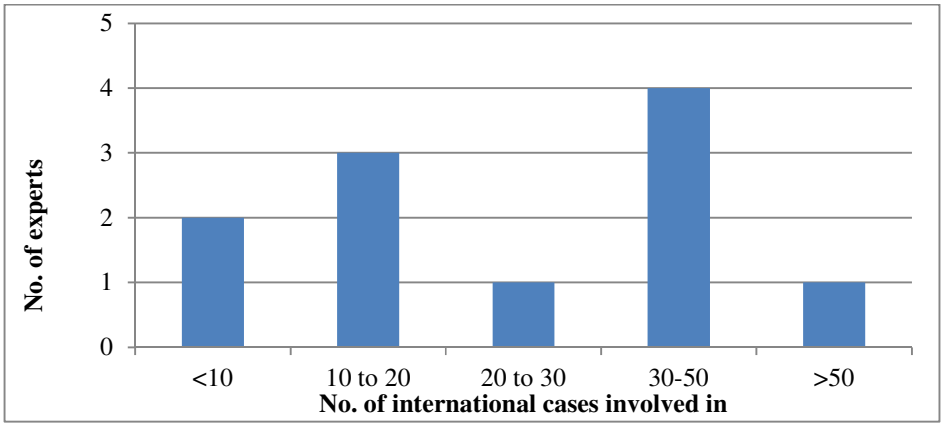


Figure 4-12: Number of international construction cases experts involved in

Ten out of the 11 experts had more than 10 years of experience in international dispute resolution in construction projects (Figure 4-13). Ten out of the 11 experts worked with parties from both the Middle East and Asia. (Figure 4-14).

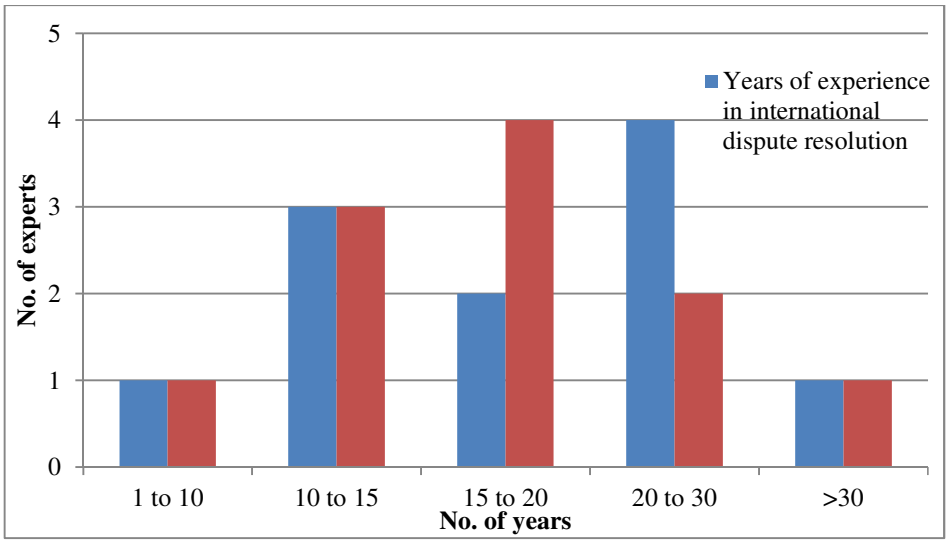


Figure 4-13: Experts experience in DRMs

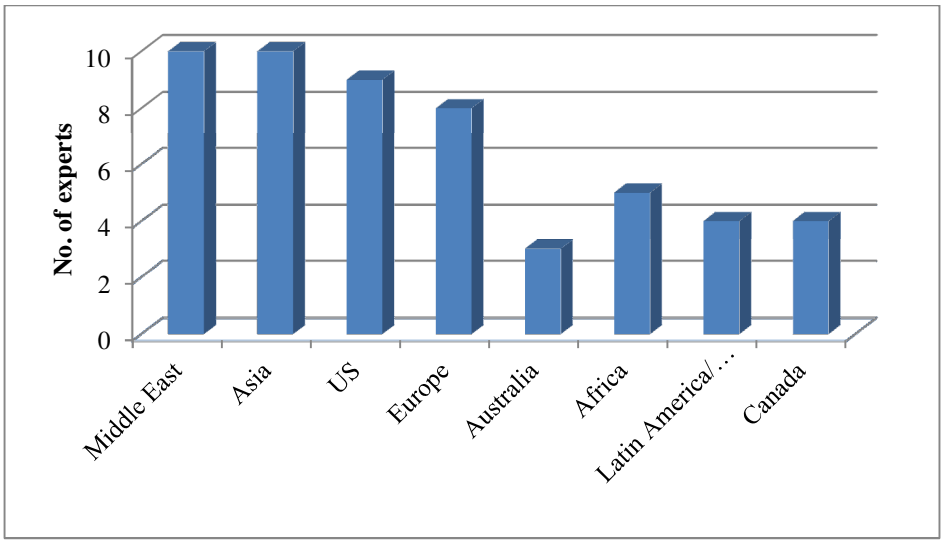


Figure 4-14: Regions of world from which the disputing parties the experts dealt

4.3.2 What factors affects the choice of DRMs? (Delphi Technique)

The question regarding the factors affecting the choice of DRMs was included in rounds 1 and 2 of the Delphi technique. From round 1, the experts generated 84 factors that affect the choice of DRMs in an international construction contract. Factors with similar meaning were grouped, yielding a total of 27 different factors (Table 4-15). For example, 'value of privacy' and 'confidentiality of the process' were grouped into 'confidentiality and privacy'. 'Cost of resolving the dispute' followed by 'time taken to resolve the dispute' were the highest mentioned factors in the first round.

Table 4-15: Factors affecting DRMs choice generated from (Delphi round 1)

No.	Factor	Frequency	% of experts
1	Cost of resolving the dispute	9	81.8%
2	Time taken to resolve the dispute	7	63.6%
3	National Law and jurisdiction	5	45.5%
4	Neutral party's technical knowledge	5	45.5%
5	Complexity of the contract/work	4	36.4%
6	Confidentiality and privacy	4	36.4%
7	Nationality of the parties	4	36.4%
8	Past experience with the DRM	4	36.4%
9	Binding process	3	27.3%
10	Contract/funder/insurance requirements	3	27.3%
11	Court system	3	27.3%
12	Enforceability of decision	3	27.3%
13	Flexibility of the process	3	27.3%
14	Location of the project	3	27.3%
15	Flexibility in selection of the neutral	3	27.3%
16	Location of the hearings	2	18.2%
17	Maintaining good long-term relationship between parties	2	18.2%
18	Nature and size of the dispute	2	18.2%
19	Value of the contract	2	18.2%
20	Cross-border dimension (e.g.: electronic ADR)	1	9.1%
21	Duration/Term of the contract	1	9.1%
22	Language used in the DRM process	1	9.1%
23	Neutral party's level of involvement	1	9.1%
24	Political Considerations (Public Boards)	1	9.1%
25	Need for legal precedent	1	9.1%
26	Need to bring in third parties to process (PM or architect)	1	9.1%
27	Division of neutral's compensation among parties	1	9.1%

In round 2, experts were provided the 27 factors and asked to rate them in terms of importance from 1 to 5 (1 being least important and 5 being most important). Almost 50% of the experts agreed that 13 factors out of the 27 are rated greater than 3 in terms of their importance. The top two factors, which had an average score greater than five in terms of average importance, were 'enforceability of the decision' (M= 4.64, SD= 0.674) followed by 'national law and jurisdiction' (M = 4.45, SD = 0.820).

Table 4-16: Factors ranked in terms of importance (Round 2)

No.	Factor	Importance Average Score	Std. Deviation
1	Enforceability of decision	4.64	0.674
2	National Law and jurisdiction	4.45	0.820
3	Binding outcome	4.27	0.786
4	Time taken to resolve the dispute	4.18	0.751
5	Court system	4.09	1.221
6	Cost of resolving the dispute	3.73	0.786
7	Neutral party technical knowledge	3.73	1.191
8	Past experience with the DRM	3.45	1.368
9	Flexibility of the process	3.45	0.934
10	Language used in the DRM process	3.45	1.036
11	Complexity of the contract/work	3.36	1.120
12	Confidentiality and privacy	3.36	0.924
13	Flexibility in selection of the neutral	3.36	1.027
14	Contract/funder/insurance requirements	3.27	1.421
15	Location of the project	3.27	1.191
16	Nature and size of the dispute	3.27	1.272
17	Nationality of the parties	3.18	1.168
18	Maintaining good long term relationship between parties	3.00	1.095
19	Value of the contract	3.00	1.252
20	Location of the hearings	2.82	1.250
21	Neutral party level of involvement	2.82	1.328
22	Political considerations (Public Boards)	2.73	1.348
23	Need to bring in third parties to process (PM or architect)	2.73	1.009
24	Duration/term of the contract	2.64	1.286
25	Need for legal precedent	2.45	1.214
26	Cross-border dimension (e.g.: electronic ADR)	2.27	1.104
27	Division of neutral's compensation among parties	2.18	1.168

4.3.3 Does culture affect the choice of DRMs? (Delphi technique)

The question of whether culture affects the choice of DRMs was first addressed by looking at the descriptive statistics of the results, the agreement among the experts on the ranking of DRMs was statistically tested using Kendall's coefficient of concordance, and then by comparing the DRMs within and across the different projects conditions using the Mann-Whitney test.

4.3.3.1 Descriptive statistics

When experts were asked in round 1 whether culture affects the choice of DRMs, 10 out of the 11 experts agreed (Figure 4-15), providing reasons such as:

- Unfamiliarity with judicial system and with interpretation of contracts governed by local laws.
- Uncertainty about local courts' reliability.
- Preference of an international process for neutrality reasons (preference of not to be governed by the culture of the other party of the contract).
- Unfamiliarity with the DRM most popular in the country of operation.
- Different preferences of how disputes should be resolved; for instance, Asian cultures prefer a less formal process as a preliminary way to resolve disputes.
- Involvement of multinational parties from different political, legal, economic, and cultural backgrounds.
- Communication problems are involved, such as language barriers.

In round 3, experts were provided the opportunity to revise their responses, based on the justifications given by other experts on the panel. One expert revised his/her response to agreement, reaching a consensus among all panel members that culture has an effect on choice of DRMs (Figure 4-15).

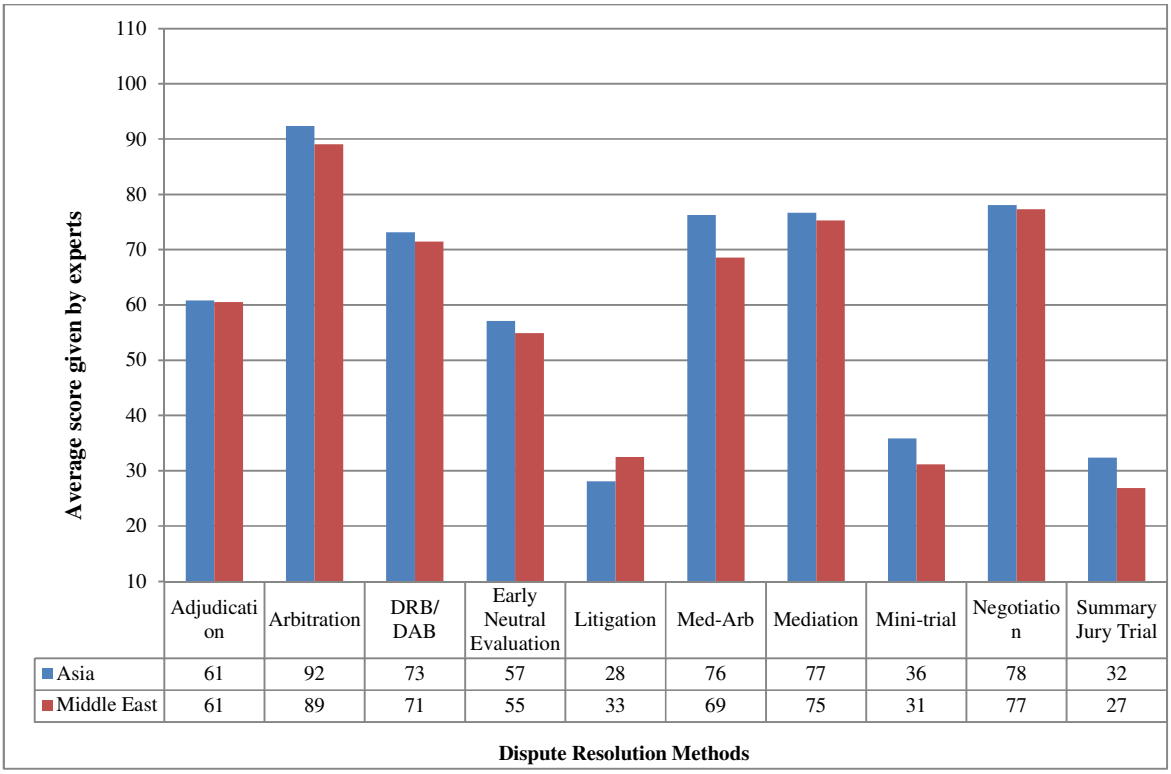
Table 4-17: Does culture affect choice of DRMs? (Rounds 1 and 3)

Does culture affect choice of DRMs?	No. of experts	
	Round 1	Round 3
Yes	10	9
No	1	0

As for the scores provided by the experts for the most suitable DRMs to use in the Middle East and Asia, Table 4-18 shows the mean scores for both cultures in rounds 3 and the revised scores in round 4. Although all experts agreed that culture has an effect on the choice of DRM, it can be seen that arbitration is the most likely method to be used in both the Middle East and Asia, followed by negotiations and then mediation. The least preferable method in both cultures is litigation. However, the least recommended DRM changed in round 4 in the Middle East is summary jury trial. Figure 4-15 shows a comparison of the Middle East and Asia mean scores in the last round (round 4).

Table 4-18: Mean scores given by experts for each DRM in Middle East and Asia (Rounds 3 and 4)

DRM	Mean score			
	Asia		Middle East	
	Round 3	Round 4	Round 3	Round 4
Arbitration	94	92	89	89
Negotiation	72	78	71	77
Mediation	67	77	69	75
DRB/DAB	66	73	67	71
Adjudication	63	61	59	61
Med-arb	57	76	54	69
Early Neutral Evaluation	50	57	50	55
Summary Jury Trial	40	32	37	27
Mini-trial	39	36	37	31
Litigation	34	28	35	33



	Adjudication	Arbitration	DRB/ DAB	Early Neutral Evaluation	Litigation	Med-Arb	Mediation	Mini-trial	Negotiation	Summary Jury Trial
Asia	61	92	73	57	28	76	77	36	78	32
Middle East	61	89	71	55	33	69	75	31	77	27

Figure 4-15: Comparison of scores given by experts for different DRMs in the Middle East and Asia-Round 4

4.3.3.2 Experts agreement on DRMs' ranks (Kendall's coefficient of concordance)

In the previous section, the average scores given by all experts were used to assess which DRMs are recommended in each culture. However, it becomes important to test the level of agreement among experts on the scores provided for the DRMs. Kendall's coefficient of concordance *W* is used to measure the degree of agreement existing among raters assessing a number of objects.

In the case of the Middle East, the hypothesis tested is:

H_o: The experts are not in agreement on the ranks of the DRMs in the Middle East.

H_a: The experts are in agreement on the ranks of the DRMs in the Middle East.

Kendall's *W* for the Middle East was 0.471 in Round 3, and then increased to 0.588 in Round 4, indicating increasing similarities among the experts' rankings. All values were statistically significant; in Round 3, $W = 0.471$, $p = 0.001$, while in Round 4, $W = 0.588$, $p = 0.000$.

Because $p<0.05$ for both rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in the Middle East with a 95% confidence level.

In the case of Asia, the hypothesis tested is:

H_o: The judges are not in agreement on the ranks of the DRMs in Asia.

H_a: The judges are in agreement on the ranks of the DRMs in Asia.

Kendall's *W* for Asia was 0.455 in Round 3, and then increased to 0.549 in Round 4, indicating increasing similarities among the experts' rankings. All values were statistically significant; in Round 3, $W = 0.455$, p= 0.004, while in Round 4, $W= 0.549$, $p = 0.001$. Because $p < 0.05$ for both rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in Asia with a 95% confidence level (Refer to Appendix D for SPSS output).

4.3.3.3 Comparison of DRMs (Mann-Whitney rank-sum test)

Shapiro-Wilk test analyzes the null hypothesis that a dataset is normally distributed. The p-value for the DRMs scores was less than $\alpha = 0.05$; thus, the null hypothesis is rejected and the data are not normally distributed. The Mann-Whitney rank-sum test (nonparametric test) was used for two purposes as detailed in Chapter 3:

1. To compare between the individual DRM scores in the two cultures (Appendix E).
2. To determine if there is a statistically significant difference between each DRM and the next in score for each project condition (Appendix F). This will help determine which DRMs to recommend in the DRM-CRT model to be developed in section 4.4

Purpose 1

The hypothesis tested for adjudication (for example) is:

H_o: There is no statistically significant difference between the mean ranks of the Middle East and Asia in adjudication.

H_a: There is a statistically significant difference between the mean ranks of the Middle East and Asia in adjudication.

The hypothesis stated above was tested for all DRMs individually to compare the Middle East and Asia. A statistically significant difference was between the Middle East and Asia group's median scores for the following DRMs, since $p < 0.05$:

- Med-Arb (z = -2.242, p = 0.025). Therefore, it can be concluded Asia elicited a statistically significant higher score of 49.17 compared to the Middle East score of 37.50.
- Summary Jury Trial (z = -2.160, p = 0.031). Therefore, it can be concluded Asia elicited a statistically significant higher score of 45.33 compared to the Middle East score of 34.50.

Purpose 2

Looking at Table 4-18, each two consecutive DRMs (in order) in Asia and the Middle East are separately compared. Table 4-19 shows which DRMs are compared in Asia and the results of the test. The first hypothesis tested in Asia, for example, is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and negotiation in Asia.

H_a: There is a statistically significant difference between the mean ranks of arbitration and negotiation in Asia.

Table 4-19: Mann-Whitney results for DRMs in Asia

Hypothesis	DRM compared		z value	Significance
1	Arbitration	Negotiation	-2.880	0.004*
2	Negotiation	Mediation	-0.603	0.546
3	Mediation	Med-arb	-0.017	0.986
4	Med-arb	DRB/DAB	-0.111	0.912
5	DRB/DAB	Adjudication	-1.694	0.090
6	Adjudication	Early Neutral Evaluation	-0.495	0.621
7	Early Neutral Evaluation	Mini-trial	-5.266	0.000*
8	Mini-trial	Summary Jury Trial	-1.090	0.276
9	Summary Jury Trial	Litigation	-1.988	0.047*

**Significant difference at α= 0.05*

Table 4-20 shows the hypothesis tested in the Middle East. The first hypothesis tested is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and negotiation in the Middle East.

H_a: There is a statistically significant difference between the mean ranks of arbitration and negotiation in the Middle East.

Table 4-20: Mann Whitney results for DRMs in Middle East

Hypothesis	DRM compared		z value	Significance
1	Arbitration	Negotiation	-3.214	0.001*
2	Negotiation	Mediation	-0.720	0.472
3	Mediation	DRB/DAB	-0.305	0.760
4	DRB/DAB	Med-arb	-1.362	0.173
5	Med-arb	Adjudication	-1.267	0.202
6	Adjudication	Early Neutral Evaluation	-1.914	0.056
7	Early Neutral Evaluation	Litigation	-4.502	0.000*
8	Litigation	Mini-trial	-0.610	0.542
9	Mini-trial	Summary Jury Trial	-1.543	0.123

**Significant difference at α= 0.05*

The second hypothesis in both cultures compares the difference between negotiation and mediation, and so on. For Asia, a statistically significant difference was determined between median scores of the following DRMs since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and negotiation ($z = -2.880, p = 0.004$). Thus, arbitration elicited a statistically significant higher score of 43.51 compared to negotiation score of 29.49.
- There is a statistically significant difference between median scores of the early neutral evaluation and mini-trial ($z = -5.226, p = 0.000$). Thus, early neutral evaluation elicited a statistically significant higher score of 49.33 compared to mini-trial score of 29.67.
- There is a statistically significant difference between median scores of the summary jury trial and litigation ($z = -1.988, p = 0.047$). Thus, summary jury trial elicited a statistically significant higher score of 41.32 compared to litigation score of 31.68.

For the Middle East, it was determined there is a statistically significant difference between median scores of the following DRMs since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and negotiation ($z = -3.214, p = 0.001$). Thus, arbitration elicited a statistically significant higher score of 57.49 compared to negotiation score of 39.51.

- There is a statistically significant difference between median scores of the early neutral evaluation and litigation (z = -4.502, p = 0.000). Thus, early neutral evaluation elicited a statistically significant higher score of 61.22 compared to litigation score of 35.78.

4.3.4 Does risk affect the choice of DRMs? (Delphi technique)

The question of whether risk affects the choice of DRMs was first addressed by looking at the descriptive statistics of the results, the agreement among the experts on the ranking of DRMs was statistically-tested using Kendall's coefficient of concordance, and then by comparing the DRMs within and across the different projects conditions using the Mann Whitney test.

4.3.4.1 Descriptive statistics

Eight out of the 11 experts agreed that risk affects the choice of DRMs in international construction contracts in round 1 (Table 4-21), providing different reasons such as:

- The higher the risk, the more likely it is that disputes will arise. If the parties anticipate more disputes, then they most likely want to employ a system that resolves issues more quickly than the traditional judicial system, the procedures will be formalized, and the more likely in my view is the choice of an international body to administer the resolution process (e.g. international arbitration in a neutral country).
- Where the indemnity and liability provisions are elaborate and extensive, and the nature of the job involves a higher level of exposure to either party, particularly the contractor, the DRM tends to be more complex, occasionally a combination of both arbitration and litigation. While disputes are generally referred to arbitration, the parties are also able to seek limited injunctive relief from local courts.
- Depending on risk in project (size of contract, nature of project, location, etc., …), you may have one arbitrator or three arbitrators, an expedited hearing, neutral venue in Paris in a contract between two parties from Libya and America. One needs to find the measurement of risk in the DRMs. For example, arbitration is final; adjudication has some insurance added to the process as mechanism is added. There exists risk in the procedure itself.

Experts who thought risk does not have an effect on the choice of DRMs gave reasons, such as disputes being dependent on the behavior of the parties, which is not predictable. In round 3, experts were given the opportunity to revise their responses, based on the justifications given by other experts on the panel; none of the experts revised their responses.

Table 4-21: Does risk affect choice of DRMs? (Rounds 1 and 3)

Does risk affect choice of DRMs?	No. of Experts	
	Round 1	Round 3
Yes	8	7
No	3	2

As for the scores given by the experts for the most suitable DRMs to use in low versus high risk projects, Table 4-22 shows the mean scores for both risk levels in Rounds 3 and the revised scores in Round 4. It can be seen that arbitration is the most likely method to use in both high and low risk projects, followed by negotiations. The least preferable method in low-risk projects is litigation, while in high-risk projects, it is a summary jury trial. Figure 4-16 shows a comparison of high risk and low risk mean scores in the last round (round 4).

Table 4-22: Mean scores given by experts for each DRM in low versus high-risk projects (Rounds 3 and 4)

DRM	Risk			
	Low Risk		High Risk	
	R3	R4	R3	R4
Arbitration	91	90	91	90
Negotiation	74	81	69	75
DRB/DAB	67	71	66	73
Mediation	71	79	65	73
Adjudication	60	60	62	61
Med-Arb	56	73	55	71
Early Neutral Evaluation	47	53	53	59
Summary Jury Trial	37	31	40	28
Litigation	32	27	38	35
Mini-trial	39	35	36	32

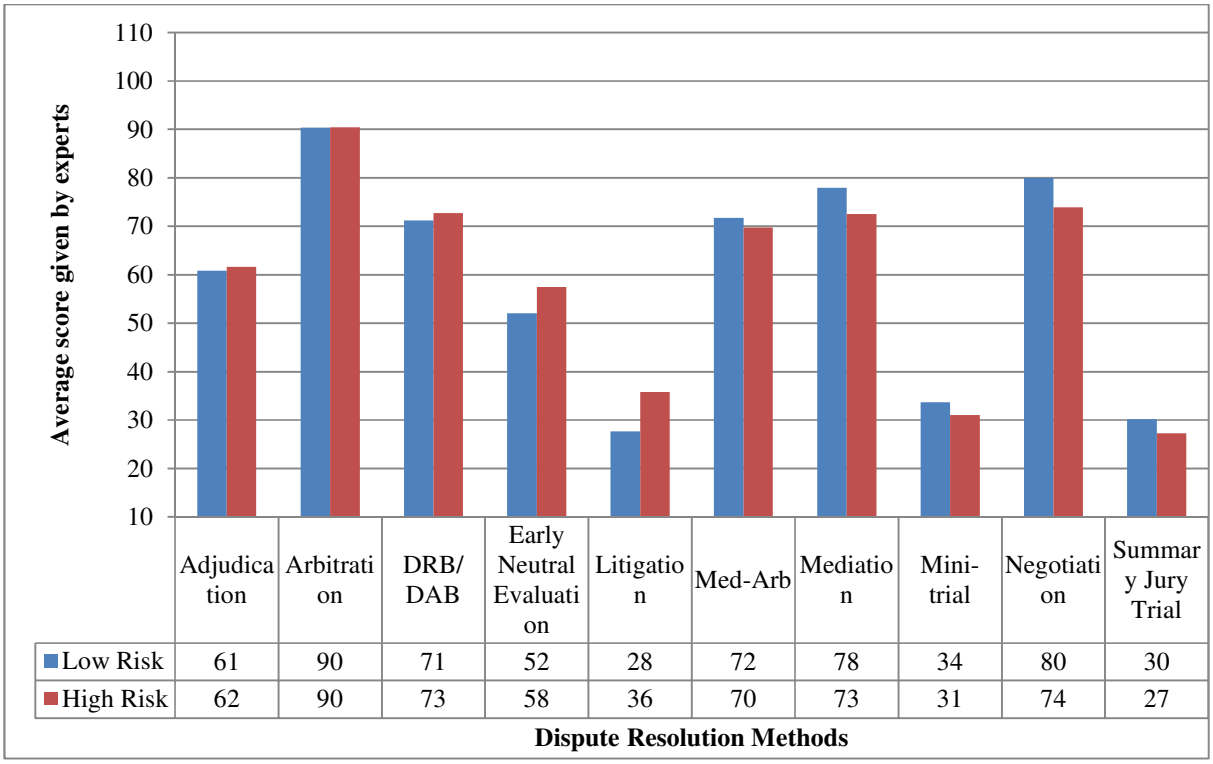


Figure 4-16: Comparison of scores given by experts for different DRMs in the different risk levels

4.3.4.2 Experts agreement on DRMs' ranks (Kendall's coefficient of concordance)

Kendall's coefficient of concordance *W* was again used to measure the degree of agreement existing among experts on the DRMs at different risks levels in projects. In the case of high-risk projects, the hypothesis tested is:

H_o: The judges are not in agreement on the ranks of the DRMs in high-risk projects.

H_a: The judges are in agreement on the ranks of the DRMs in high-risk projects.

Kendall's *W* for high-risk projects was 0.412 in Round 3, and then increased to 0.548 in Round 4, indicating increasing similarities among the experts' rankings. All values were statistically significant; in Round 3, $W = 0.412$, $p= 0.002$ while in Round 4, $W= 0.548$, $p=0.000$. Because $p<0.05$ for both Rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in high-risk projects with a 95% confidence level.

In the case of low risk projects, the hypothesis tested is:

H_o: The experts are not in agreement on the ranks of the DRMs in low-risk projects.

H_a: The experts are in agreement on the ranks of the DRMs in low-risk projects.

Kendall's *W* for low-risk projects was 0.502 in Round 3, and then increased to 0.616 in Round 4, indicating increasing similarities among the experts' rankings. All values were statistically significant; in Round 3, $W = 0.502$, $p = 0.000$, while in Round 4, $W = 0.616$, $p = 0.000$. Because $p<0.05$ in both Rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in low-risk projects with a 95% confidence level. (Refer to Appendix D for SPSS output.)

4.3.4.3 Comparison of DRMs (Mann-Whitney rank-sum test)

The Mann-Whitney rank-sum test was used for two purposes as detailed below:

Purpose 1

Mann-Whitney test was used again to test the differences between the scores of DRMs in high-risk projects versus low-risk projects. The hypothesis tested for adjudication (for example) is:

H_o: There is no statistically significant difference between the mean ranks of high- and low-risk projects in adjudication.

H_a: There is a statistically significant difference between the mean ranks of high- and low-risk projects in adjudication.

The hypothesis stated above was tested for all DRMs individually to compare high- and low-risk projects. No statistically significant difference was determined between high- and low-risk projects' group's median for all DRMs, since $p > 0.05$. Thus, H_o cannot be rejected; there is no statistically significant difference between the mean ranks of high- and low-risk projects in all DRMs.

Purpose 2

Each two consecutive DRMs (in order) in low- and high-risk projects are separately compared. Table 4-23 shows which DRMs are compared in low-risk projects and the results of the test. The first hypothesis tested in low-risk projects, for example, is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and negotiation in low-risk projects.

H_a: There is a statistically significant difference between the mean ranks of arbitration and negotiation in low-risk projects.

Table 4-23: Mann-Whitney results for DRMs in low-risk projects

Hypothesis	DRM compared		z value	Significance
1	Arbitration	Negotiation	-2.579	0.006*
2	Negotiation	Mediation	-0.619	0.536
3	Mediation	Med-arb	-1.486	0.137
4	Med-arb	DRB/DAB	-0.168	0.866
5	DRB/DAB	Adjudication	-1.981	0.048*
6	Adjudication	Early Neutral Evaluation	-1.603	0.109
7	Early Neutral Evaluation	Mini-trial	-5.313	0.000*
8	Mini-trial	Summary Jury Trial	-1.519	0.129
9	Summary Jury Trial	Litigation	-2.408	0.016*

**Significant difference at α= 0.05*

Table 4-24 shows the hypothesis tested in high-risk projects and the test results. The first hypothesis tested is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and negotiation in high-risk projects.

H_a: There is a statistically significant difference between the mean ranks of arbitration and negotiation in high-risk projects.

For low-risk projects, a statistically significant difference was determined between median scores of the following DRMs, since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and negotiation (z = -2.579, p = 0.006). Thus, arbitration elicited a statistically significant higher score of 49.75 compared to the negotiation score of 35.25.
- There is a statistically significant difference between median scores of the DRB/DAB and adjudication (z = -1.981, p = 0.048). Thus, DRB/DAB elicited a statistically significant higher score of 47.70 compared to an adjudication score of 37.30.
- There is a statistically significant difference between median scores of the early neutral evaluation and mini-trial (z = -5.313, p = 0.000). Thus, early neutral evaluation elicited a statistically significant higher score of 54.27 compared to a mini-trial score of 26.71.
- There is a statistically significant difference between median scores of the summary jury trial and litigation (z = -2.408, p = 0.016). Thus, summary jury trial elicited a statistically significant higher score of 47.38 compared to a litigation score of 35.07.

Table 4-24: Mann-Whitney results for DRMs in high-risk projects

Hypothesis	DRM compared		z value	Significance
1	Arbitration	Negotiation	-3.303	0.001*
2	Negotiation	DRB/DAB	-0.660	0.510
3	DRB/DAB	Mediation	-0.723	0.470
4	Mediation	Med-arb	-0.572	0.567
5	Med-arb	Adjudication	-1.155	0.248
6	Adjudication	Early Neutral Evaluation	-0.812	0.417
7	Early Neutral Evaluation	Litigation	-3.914	0.000*
8	Litigation	Mini-trial	-0.532	0.594
9	Mini-trial	Summary Jury Trial	-1.475	0.140

- **Significant difference at α= 0.05*

For high-risk projects, a statistically significant difference was determined between median scores of the following DRMs, since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and negotiation (z = -3.303, p = 0.001). Thus, arbitration elicited a statistically significant higher score of 51.12 compared to a negotiation score of 33.88.
- There is a statistically significant difference between median scores of the early neutral evaluation and litigation (z = -3.914, p = 0.000). Thus, early neutral

evaluation elicited a statistically significant higher score of 52.86 compared to a litigation score of 32.14.

4.3.5 Does trust affect the choice of DRMs? (Delphi technique)

The question of whether trust affects the choice of DRMs was first addressed by looking at the descriptive statistics of the results (Section 4.3.5.1), the agreement among the experts on the ranking of DRMs was statistically-tested using Kendall's coefficient of concordance (Section 4.3.5.2), and then by comparing the DRMs within and across the different projects conditions using the Mann-Whitney test (Section 4.3.5.3).

4.3.5.1 Descriptive Statistics

As to whether trust affects the choice of DRMs, six out of the 11 experts agreed trust affects the choice of DRMs in international construction contracts (Table 4-25), providing different reasons such as:

- Trust is always an issue if taking a dispute to DRM. If one party does not trust the other, then that party is more likely to insist upon a more formal structure for resolving the disputes with legal safeguards, etc.
- If a party does not trust the other party, it will be unwilling to agree to any unusual procedure in the dispute resolution clause.
- As a general matter, U.S.-based construction and engineering companies do not want to be subject to the jurisdiction or rulings of foreign courts, especially those with a systematic problem with corruption and bribery, or a strong bias against out-of-country parties.
- The less the trust, the more likely a binding formal enforceable process is needed.
- Dispute resolution techniques will only work if the parties are willing to accept them voluntarily. Therefore, it is imperative for parties to trust the process.

One expert stated, "in sophisticated construction transactions, the element of trust or the level of the parties' relationship does not play a significant role in the choice of DRM. However, in many contracts of relatively small contract value between various local organizations, the

choice of DRM does often depend also on the relationships. For example, where there is a longstanding business relationship, the DRM provisions may not be sufficiently detailed."

While experts who thought trust doesn't affect the choice of DRMs gave the following reasons:

- When it comes to a dispute, there is no trust; so that is not a factor when thinking about a DRM.
- Nothing to do with the choice of DRMs; trust is reflected in a neutral tribunal and venue. Procedures and the place where it will happen. For example, ICC law allows little domestic interference with procedures.

In Round 3, experts were provided an opportunity to revise their answers, based on the justifications given by other experts on the panel. One out of the nine respondents revised his/her response to agreement that risk does have an effect (Table 4-25).

Table 4-25: Does trust affect choice of DRMs? (Rounds 1 and 3)

Does trust affect choice of DRMs?	**No. of Experts**	
	Round 1	**Round 3**
Yes	6	6
No	4	2
Depends	1	1

As for the scores given by the experts for the most suitable DRMs to use in projects with different levels of trust, Table 4-26 shows the mean scores for all trust levels in Round 3 and the revised scores in Round 4. It can be seen that for projects with low trust, it is recommended to use arbitration, followed by DRB/DAB, and then med-arb, while the least recommended is summary jury trial and mini-trial. As for projects with neutral trust levels, the most recommended is arbitration, followed by negotiation, then mediation. In high trust projects, negotiation is the most recommended followed by mediation then arbitration. The least recommended methods in both high and neutral trust are litigation and summary jury trial. Figure 4-17 shows a comparison of high risk and low risk mean scores in the last round (Round 4).

Table 4-26: Mean scores given by experts for each DRM in projects with different trust level between parties (Rounds 3 and 4)

DRM	Trust level					
	Low Trust		Neutral		High Trust	
	R3	R4	R3	R4	R3	R4
Arbitration	102	104	87	86	83	81
DRB/DAB	61	70	66	71	72	76
Med-Arb	55	70	53	70	57	76
Mediation	59	67	68	77	76	84
Negotiation	61	61	72	80	82	93
Adjudication	60	59	59	58	64	65
Early Neutral Evaluation	44	51	53	58	53	59
Litigation	43	43	33	26	29	23
Mini-trial	37	32	36	34	40	34
Summary Jury Trial	37	31	38	28	40	29

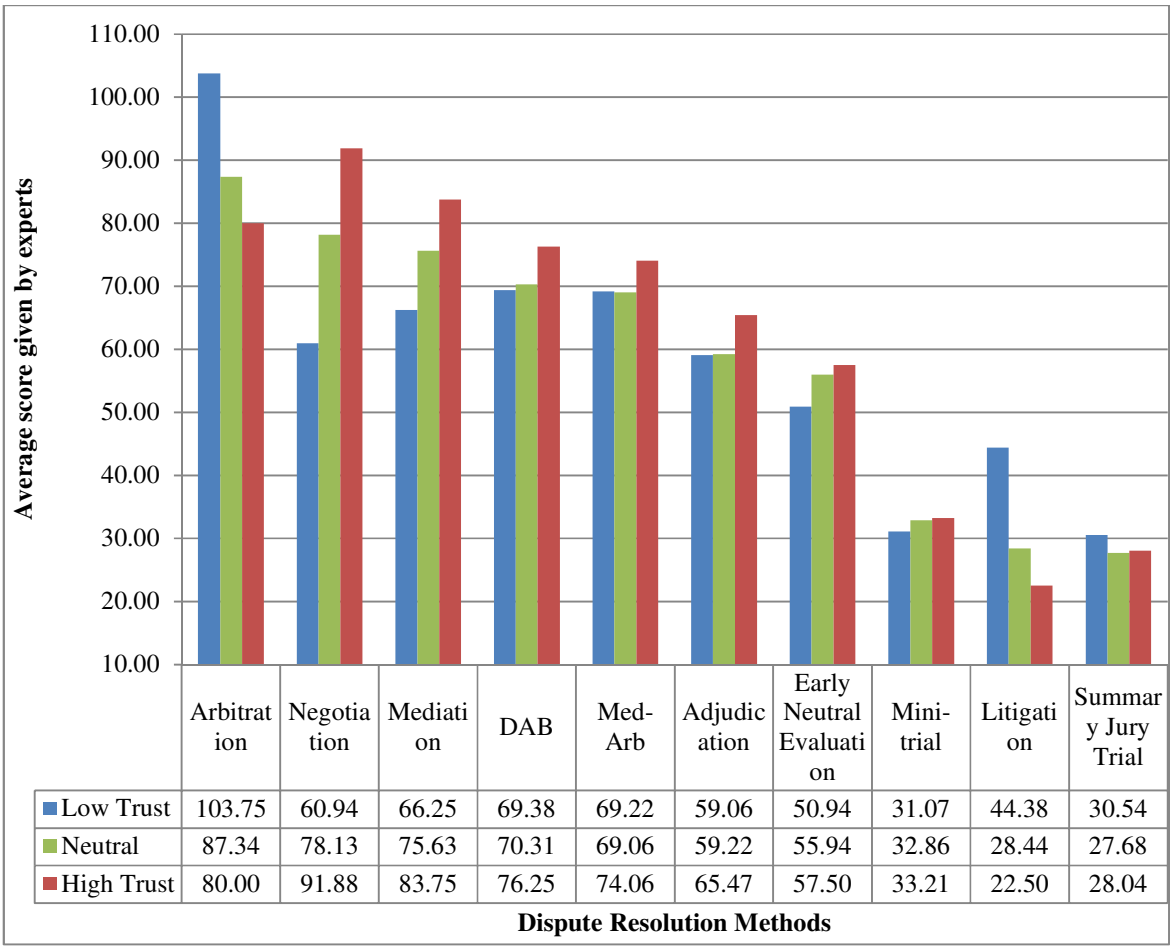


Figure 4-17: Comparison of scores given by experts for different DRMs in the different trust levels

4.3.5.2 Experts agreement on DRMs ranks (Kendall's coefficient of concordance)

Kendall's coefficient of concordance *W* was again used to measure the degree of agreement existing among experts on the DRMs for projects with different trust levels. In the case of high trust projects, the hypothesis tested is:

H_o: The experts are not in agreement on the ranks of the DRM in projects with high trust levels.

H_a: The experts are in agreement on the ranks of the DRMs in projects with high trust levels.

Kendall's *W* for high trust projects was 0.493 in Round 3, and then increased to 0.672 in Round 4, indicating increasing similarities among the experts rankings. All values were statistically significant; in Round 3, $W = 0.493$, $p= 0.000$, while in Round 4, $W= 0.672$, $p=0.000$. Because $p<0.05$ in both Rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in projects with high trust levels with a 95% confidence level.

In the case of low trust projects, the hypothesis tested is:

H_o: The judges are not in agreement on the ranks of the DRM in projects with low trust levels.

H_a: The judges are in agreement on the ranks of the DRMs in projects with low trust levels.

Kendall's *W* for low trust projects was 0.462 in Round 3, and then increased to 0.676 in Round 4, indicating increasing similarities among the experts rankings. All values were statistically significant; in Round 3, $W = 0.462$, $p= 0.001$, while in Round 4, $W= 0.676$, $p=0.000$. Because $p<0.05$ in both Rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in projects with low trust levels.

Finally, in the case of low trust projects, the hypothesis tested is:

H_o: The judges are not in agreement on the ranks of the DRM in projects with neutral trust levels.

H_a: The judges are in agreement on the ranks of the DRMs in projects with neutral trust levels.

Kendall's *W* for neutral trust projects was 0.456 in Round 3, and then increased to 0.598 in Round 4, indicating increasing similarities among the experts rankings. All values were statistically significant; in Round 3, $W = 0.456$, $p= 0.001$, while in Round 4, $W= 0.598$, $p=0.000$. Because $p<0.05$ in both Rounds 3 and 4, H_o was rejected; there is an agreement between judges on the ranks of the DRMs in projects with neutral trust levels. (Refer to Appendix D for SPSS output.)

4.3.5.3 Comparison of DRMs (Kruskal-Wallis and Mann Whitney tests)

The two comparisons conducted in culture and risk scores will be conducted on the trust scores. However, both Kruskal-Wallis and Mann-Whitney tests will be utilized in this case. The Kruskal-Wallis test will be utilized to compare between the DRMs scores in projects with different levels of trust, while Mann-Whitney will be used to compare consecutive DRM in each trust level.

Purpose 1

Since there are more than two levels of trust (high, neutral, and low), Kruskal-Wallis test is used in lieu of the Mann-Whitney test to compare the DRMs scores in projects with different levels of trust. The hypothesis tested for adjudication (for example) is:

H_o: There is no statistically significant difference between the mean ranks score of adjudication in projects with high, low, and neutral levels of trust.

H_a: There is a statistically significant difference between the mean ranks score of adjudication in projects with high, low, and neutral levels of trust.

The hypothesis stated above was tested for all DRMs individually to compare the different levels of trust. A statistically significant difference was determined between trust levels median for the following DRMs, since $p < 0.05$:

- Arbitration ($\chi^2(2, N=84) = 33.286$, $p = 0.000$). It can be concluded that low trust has a higher mean rank score of 63.04 compared to 37.04 for neutral trust, and 27.43 for high trust. Therefore, arbitration is more likely recommended in low trust, followed by neutral trust, then high trust projects.
- Litigation ($\chi^2(2, N=84) = 11.828$, $p = 0.003$). It can be concluded that low trust has a significantly higher mean rank score of 55.02 compared to 37.52 for neutral trust, and 34.96 for high trust. Therefore, litigation is more likely recommended in low trust, followed by neutral trust, then high trust projects.
- Mediation ($\chi^2(2, N=84) = 22.995$, $p = 0.000$). It can be concluded that high trust has a significantly higher mean rank score of 57.41 compared to 43.13 for neutral trust, and 29.96 for low trust. Therefore, mediation is more likely recommended in high trust, followed by neutral trust, then low trust projects.
- Negotiations ($\chi^2(2, N=84) = 38.026$, $p = 0.000$). It can be concluded that high trust has a significantly higher mean rank score of 62.32 compared to 42.48 for neutral trust, and 22.70 for low trust. Therefore, negotiation is more likely recommended in high trust, followed by neutral trust, then low trust projects.

Purpose 2

Looking at Table 4-26, each two consecutive DRMs (in order) in low, neutral, and high trust projects are separately compared. Table 4-27 shows which DRMs are compared in low trust projects and the results of the test. The first hypothesis tested in low trust projects for example is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and negotiation in low risk projects.

H_a: There is a statistically significant difference between the mean ranks of arbitration and negotiation in low risk projects.

Table 4-29 shows the hypothesis tested in high-risk projects and the test results. The first hypothesis tested is:

H_o: There is no statistically significant difference between the mean ranks of arbitration and DRB/DAB in low trust projects.

H_a: There is a statistically significant difference between the mean ranks of arbitration and DRB/DAB in low trust projects.

Table 4-27: Mann-Whitney results for DRMs in low trust projects

Hypothesis	DRM compared		z value	Significance
1	Arbitration	DRB/DAB	-6.105	0.000*
2	DRB/DAB	Med-arb	-0.689	0.491
3	Med-arb	Mediation	-0.507	0.612
4	Mediation	Negotiation	-1.029	0.304
5	Negotiation	Adjudication	-0.025	0.980
6	Adjudication	Early Neutral Evaluation	-1.244	0.213
7	Early Neutral Evaluation	Litigation	-1.371	0.171
8	Litigation	Mini-trial	-1.678	0.093
9	Mini-trial	Summary Jury Trial	-0.019	0.985

**Significant difference at α= 0.05*

For low trust projects, a statistically significant difference was determined between median scores of the following DRM, since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and DRB/DAB ($z = -6.105, p = 0.000$). Thus, arbitration elicited a statistically significant higher score of 41.50 compared to a negotiation score of 15.50.

For neutral trust projects, a statistically significant difference was determined between median scores of the following DRMs, since $p < 0.05$:

- There is a statistically significant difference between median scores of the arbitration and negotiation ($z = -6.280, p = 0.000$). Thus, arbitration elicited a statistically significant higher score of 33.16 compared to a negotiation score of 23.84.
- There is a statistically significant difference between median scores of the early neutral evaluation and mini-trial ($z = -4.576, p = 0.000$). Thus, early neutral

evaluation elicited a statistically significant higher score of 36.86 compared to a mini-trial score of 17.42.

For high trust projects, a statistically significant difference was determined between median scores of the following DRMs, since $p < 0.05$:

- There is a statistically significant difference between median scores of the negotiation and mediation ($z = -2.706, p = 0.007$). Thus, negotiation elicited a statistically significant higher score of 34.02 compared to a mediation score of 22.98.
- There is a statistically significant difference between median scores of the early neutral evaluation and mini-trial ($z = -4.498, p = 0.000$). Thus, early neutral evaluation elicited a statistically significant higher score of 36.71 compared to a mini-trial score of 17.58.
- There is a statistically significant difference between median scores of the summary jury trial and litigation ($z = -2.048, p = 0.041$). Thus, summary jury trial elicited a statistically significant higher score of 31.88 compared to a litigation score of 23.43.

Table 4-28: Mann-Whitney results for DRMs in neutral trust projects

Hypothesis	DRM compared		z value	Significance
1	Arbitration	Negotiation	-6.280	0.000*
2	Negotiation	Mediation	-0.800	0.424
3	Mediation	DRB/DAB	-0.556	0.578
4	DRB/DAB	Med-arb	-0.527	0.598
5	Med-arb	Adjudication	-1.827	0.068
6	Adjudication	Early Neutral Evaluation	-0.578	0.563
7	Early Neutral Evaluation	Mini-trial	-4.576	0.000*
8	Mini-trial	Summary Jury Trial	-1.748	0.080
9	Summary Jury Trial	Litigation	-1.264	0.206

**Significant difference at α= 0.05*

Table 4-29: Mann-Whitney results for DRMs in high trust projects

Hypothesis	DRM compared		z value	Significance
1	Negotiation	Mediation	-2.706	0.007*
2	Mediation	Arbitration	-0.177	0.859
3	Arbitration	DRB/DAB	-0.671	0.502
4	DRB/DAB	Med-arb	-0.468	0.640
5	Med-arb	Adjudication	-1.038	0.299
6	Adjudication	Early Neutral Evaluation	-1.277	0.202
7	Early Neutral Evaluation	Mini-trial	-4.498	0.000*
8	Mini-trial	Summary Jury Trial	-1.702	0.089
9	Summary Jury Trial	Litigation	-2.048	0.041*

**Significant difference at α= 0.05*

4.3.6 How do culture, risk, and trust interact in choosing a DRM? (Delphi technique)

This research question was first addressed by looking at the descriptive statistics of the results, and then by assessing the statistical significance of the main and the interactions effect of the independent variables (culture, risk, and trust) on the dependent variables (DRMs).

4.3.6.1 Descriptive Statistics

Table 4-30 is similar to the table provided to the experts in the questionnaire. This table reports the mean scores and the standard deviation of the different DRMs for different project conditions. For instance, negotiation was most likely recommended in low-risk projects in Asia, where there is high trust between parties (M= 97, *SD*= 12.1). The mean scores in Table 4-30 are converted to ranks in Table 4-31. For example, arbitration has the top rank in low trust and neutral trust conditions, and the lowest rank in high trust conditions, which was the opposite of negotiation. It had the top ranks in high trust and neutral conditions, and lowest ranks in low trust conditions.

Table 4-30: Mean scores of DRMs in different project conditions

Project conditions			Mean score (M) *Standard deviation (SD)*									
Country	**Project Risk Level**	**Trust Level**	**Negotiations**	**Mediation/ Conciliation**	**Dispute Review Board/ Dispute Adjudication Board**	**Adjudication**	**Med-Arb**	**Arbitration**	**Early-Neutral Evaluations**	**Summary Jury Trial**	**Mini-trial**	**Litigation**
Middle East	**high risk**	**neutral**	83 *18.1*	75 *15.1*	73 *19.6*	62 *29.5*	68 *13.6*	89 *18.9*	56 *27.6*	26 *25.1*	29 *27.9*	29 *25.9*
	high risk	**high trust**	89 *13.6*	81 *12.5*	73 *21.9*	63 *30.9*	69 *21.7*	78 *13.9*	64 *24.3*	27 *24.3*	29 *27.9*	23 *19.8*
	high risk	**low trust**	53 *13.9*	63 *13.9*	70 *19.3*	58 *28.2*	66 *18.5*	103 *7.1*	54 *21.8*	27 *24.3*	29 *27.9*	58 *26.6*
	low risk	**neutral**	74 *16.0*	76 *15.1*	67 *19.6*	56 *27.2*	68 *13.6*	84 *17.4*	54 *23.4*	27 *24.3*	36 *24.4*	29 *26.4*
	low risk	**high trust**	95 *12.0*	85 *14.1*	78 *23.1*	65 *31.2*	70 *17.5*	79 *16.4*	51 *21.5*	27 *24.3*	37 *24.3*	24 *23.3*
	low risk	**low trust**	71 *14.6*	72 *14.9*	69 *19.6*	60 *28.2*	71 *20.1*	103 *7.1*	50 *22.0*	27 *24.3*	29 *27.9*	34 *23.1*
Asia	**high risk**	**neutral**	87 *18.3*	78 *16.0*	75 *23.5*	62 *35.4*	73 *8.2*	85 *20.7*	63 *30.1*	27 *27.3*	36 *26.7*	23 *23.6*
	high risk	**high trust**	90 *15.5*	83 *13.7*	78 *26.4*	67 *38.3*	85 *12.2*	83 *18.6*	63 *30.1*	27 *27.3*	36 *26.7*	22 *23.8*
	high risk	**low trust**	47 *18.6*	58 *19.4*	70 *22.8*	58 *33.0*	69 *18.3*	107 *4.1*	52 *27.7*	34 *22.7*	36 *26.7*	52 *18.3*
	low risk	**neutral**	77 *17.5*	78 *16.0*	68 *23.0*	53 *30.8*	73 *8.2*	88 *20.9*	58 *26.6*	34 *22.7*	36 *26.7*	23 *27.9*
	low risk	**high trust**	97 *12.1*	87 *15.1*	78 *26.4*	67 *38.3*	83 *8.2*	85 *20.7*	57 *24.2*	34 *22.7*	36 *26.7*	23 *27.9*
	low risk	**low trust**	72 *16.0*	75 *16.1*	70 *22.8*	58 *33.0*	75 *19.7*	107 *4.1*	50 *26.6*	38 *22.9*	36 *26.7*	25 *23.5*

Table 4-31: Ranks of DRMs in different project conditions (across rows)

Project Conditions			DRMs									
Country	Project Risk Level	Trust Level	Negotiations	Mediation/ Conciliation	Dispute Review Board/ Dispute Adjudication Board	Adjudication	Med-Arb	Arbitration	Early-Neutral Evaluations	Summary Jury Trial	Mini-trial	Litigation
Middle East	high risk	neutral	2	3	4	6	5	1	7	10	8	8
	high risk	high trust	1	2	4	7	5	3	6	9	8	10
	high risk	low trust	8	4	2	5	3	1	7	10	9	5
	low risk	neutral	3	2	5	6	4	1	7	10	8	9
	low risk	high trust	1	2	4	6	5	3	7	9	8	10
	low risk	low trust	3	2	5	6	3	1	7	10	9	8
Asia	high risk	neutral	1	3	4	7	5	2	6	9	8	10
	high risk	high trust	1	3	5	6	2	3	7	9	8	10
	high risk	low trust	8	4	2	4	3	1	6	10	9	6
	low risk	neutral	3	2	5	7	4	1	6	9	8	10
	low risk	high trust	1	2	5	6	4	3	7	9	8	10
	low risk	low trust	4	2	5	6	2	1	7	8	9	10

4.3.6.2 Interaction of culture, risk, and trust (MANOVA)

When testing the data for normality, it was determined not to be normally distributed. The data set is considerably large (96 data points). Therefore, it was decided to conduct parametric tests, as they are more powerful. For confirmatory evidence, it was acceptable to use parametric tests, although the data are not normally distributed. The Mann-Whitney rank-sum test results were compared to the parametric t-test. Similar results were obtained from the parametric tests as those from the nonparametric t-test. Therefore, it was decided to use multivariate analysis of variance (MANOVA), a parametric test to obtain better interpretation of the data, especially to see the effect of interactions between the different factors.

MANOVA was performed at 95% confidence level to assess the statistical significance of the main and the interactions effect of one or more independent variables on a set of two or more

dependent variables. The independent variables are culture, risk, and trust, and the dependent variables are the 10 types of DRMs. Refer to Appendix G for detailed SPSS output.

Box's M Test of equality of covariance matrices was conducted to test the homogeneity variance-covariance matrices. However, it could not be calculated using all the DRMs, since there were fewer than two nonsingular cell covariance matrices. Thus, the assumption of homogeneity of variance-covariance matrices could not be proven or disproven. In such a case, Pillai's criterion better evaluates the multivariate significance and is recommended (Tabachnick and Fidell 2001).

MANOVA was used to test the following hypothesis:

> Ho: There is no statistically significant difference between the mean scores of DRMs across the different project conditions.
>
> Ha: There is a statistically significant difference between the mean scores of DRMs across the different project conditions.

The results of MANOVA were based on the statistics of Pillai's trace. Significant main effects were found for both Risk, F (10, 57) = 2.303, p = 0.024 and Trust, F (10,116) = 5.825, p = 0.000, as well as a significant interaction effect for Risk*Trust, F(20, 116) = 1.885, p =0.020. However, culture reported F (10, 57) = 1.924 at p = 0.060, which is insignificant at a 95% confidence level; yet, this is a borderline case. For example, arbitration has the top rank in low trust and neutral trust conditions, and the lowest rank in high trust conditions, which was the opposite of negotiation. It had the top ranks in high trust and neutral conditions, and lowest ranks in low trust conditions.

The null hypothesis was rejected, based on a combined dependent variable for culture, risk, and trust, and risk interaction. To determine how the dependent variables each separately differ for the independent variables, ANOVA was conducted; yet, the homogeneity of variances must be checked first. Levene's test of equality of error variances was conducted

and all independent variables (DRM scores) had a value of p>0.05 (Appendix G). Follow-up multivariate ANOVA comparisons showed the following significant results:

- Arbitration score was significantly different for different levels of trust (F(2,66) = 15.668; p = 0.000). Estimated marginal means, Table 4-32, shows the means for each DRM averaged across all levels of trust would serve as a good interpretation of such differences in arbitration scores. It can be seen the low trust levels have the highest mean score for arbitration of 104.76, while the high trust levels provide the lowest mean score of 81.
- Litigation score was significantly different for different levels of trust (F(2,66) = 4.010; p = 0.023). The low trust levels have the highest mean score for litigation of 39.17, while the high trust level provided the lower mean score of 23.04.
- Mediation score was significantly different for different levels of trust (F(2,66) = 7.360; p = 0.001). The high trust levels have the highest mean score for mediation of 83.93, while the low trust level gave the lower mean score of 67.26.
- Negotiation score was significantly different for different levels of trust (F(2,66) = 25.947; p = 0.000). The high trust levels have the highest mean score for mediation of 32.38, while the low trust level gave the lower mean score of 60.30.

Table 4-32: Estimated marginal means for significant DRMs

Dependent Variable	Trust level	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Arbitration	Low Trust	104.76	3.148	98.476	111.048
	High Trust	81.01	3.148	74.726	87.298
	Neutral	86.34	3.148	80.053	92.625
Litigation	Low Trust	39.17	4.592	29.999	48.334
	High Trust	23.04	4.592	13.868	32.203
	Neutral	23.45	4.592	14.285	32.620
Mediation	Low Trust	67.26	3.087	61.099	73.425
	High Trust	83.93	3.087	77.766	90.091
	Neutral	77.02	3.087	70.861	83.187
Negotiation	Low Trust	60.30	3.178	53.952	66.643
	High Trust	92.38	3.178	86.035	98.726
	Neutral	80.12	3.178	73.774	86.465

- Negotiation score was significantly different in the interaction between risk and trust ($F(2,66) = 5.703$; $p = 0.005$). Estimated marginal means, Table 4-33, shows the means for risk averaged across all levels of trust would serve as a good interpretation of such differences in negotiation scores. It can be seen the interactions between low risk and high trust levels gave the highest mean score for negotiation of 95.47, while the interaction between the high risk and the low trust levels gave the lowest mean score of 49.76.

Table 4-33: Estimated marginal means for negotiation for Risk*Trust interaction

Dependent Variable	Risk level	Trust level	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Negotiation	Low Risk	Low Trust	70.83	4.495	61.86	79.81
		High Trust	95.47	4.495	86.50	104.45
		Neutral	75.47	4.495	66.50	84.45
	High Risk	Low Trust	49.76	4.495	40.79	58.74
		High Trust	89.28	4.495	80.31	98.26
		Neutral	84.76	4.495	75.79	93.74

The post-hoc Bonferroni test compares all pairs of means simultaneously. It showed the following significant results:

- The mean scores for arbitration were statistically significantly different between low trust and high trust ($p = 0.000$), and neutral trust and low trust ($p = 0.000$), but not between high trust and neutral trust ($p = 0.640$).
- The mean scores for litigation were statistically significantly different between low trust and high trust ($p = 0.045$), but not between neutral and high trust ($p = 0.053$), and neutral and low trust ($p = 1.000$).
- The mean scores for mediation were statistically significantly different between low trust and high trust ($p = 0.001$), but not between neutral and high trust ($p = 0.349$), and neutral and low trust ($p = 0.092$).
- The mean scores for negotiation were statistically significantly different between low trust and high trust ($p = 0.000$), neutral and high trust ($p = 0.023$), and neutral and low trust ($p = 0.000$).

4.3.7 Follow-up interviews with experts from the Delphi technique

As a follow-up to the Delphi technique results, semi-structured telephone interviews were conducted with three of the experts, who responded to all the Delphi rounds of questions. There were two main purposes for conducting these interviews. One was to obtain feedback from the experts on their responses compared to the group response, especially where variability exists. The other reason was to validate the results. The three experts are called Expert A, Expert B, and Expert C for confidentiality purposes.

Expert A has been involved in approximately 50 international cases with almost all types of DRMs in many places around the world, including the Middle East, Asia, Europe, U.S., and Canada. Expert A has many certifications, such as being an American Association for Cost Engineers (AACE) fellow, Royal Institution of Chartered Surveyors (RICS) fellow, Certified Forensic Claims Consultant (CFCC), Certified Construction Manager (CCM), and Project Management Professional (PMP). Additionally, Expert A has more than 50 publications in peer-reviewed journals, two books, more than 100 conference presentations, and more than 20 trade publications. Expert A has experience working in construction projects, such as working as a contract administrator, project controller, project manager, and claims consultant. Expert A has 40 years of industry experience, 20 of these years are in international dispute resolution in the construction industry.

Expert B has been involved with almost all types of DRMs in around 10 international cases in many parts around the world, including the Middle East, Asia, Europe, U.S., Canada, and Latin America. Expert B is a civil engineer with an M.S. in Construction Management and Ph.D. in Law. Expert B worked as lecturer of construction law for four years and is a licensed Professional Engineer (PE). Expert B has more than 15 publications in peer-reviewed journals, eight books, more than 50 conference presentations, and more than 25 trade publications. Expert B worked for five years as a construction field engineer and has around 30 years of experience working as construction lawyer in international dispute resolution in the construction industry.

Expert C has been involved with mediation, arbitration, and adjudication in around five international cases with parties from the Middle East, Asia, Europe, and U.S. Expert C is a civil engineer with a diploma in International Commercial Arbitration from a Law School and a M.S. in Construction Management. Expert C has been working as a lecturer of construction law for fifteen years, and is a registered arbitrator and an expert at the Cairo Regional Center for International Commercial Arbitration. Expert C published two articles in peer-reviewed journals, one book, gave several conference presentations, and conducts professional trainings. Expert C has almost 30 years of experience in the construction industry and is currently leading the project management department in one of the top international firms in design and consultations in the Middle East. Expert C has approximately 15 years of experience in international dispute resolution in the construction industry.

The interview started by asking the experts general comments about the survey and their responses. Expert A stated some DRMs are defined differently in different countries and in different contracts. For example, adjudication procedures in Europe are different compared to the U.S., which makes experts respond, based on their previous experiences with the method. Adjudication in the UK is a narrowly defined process by the Institution of Civil Engineers (ICE) contract documents. It is defined differently in the U.S. though. Expert B added that adjudication is usually used out of the parties' respect for the court system, where a retired judge with a broad background is trusted to make a fair decision. Expert B also agreed that adjudication's definition varies a lot from person-to-person, and also whether it is binding or not varies, too. It is very rarely used in the U.S. On adjudication, Expert C commented that its procedures are usually defined in the contract; sometimes it refers to an expert knowledgeable in the project's technicalities, who gets involved in the project from the beginning and resolves disputes as they arise. The three experts' comments about how adjudication is handled varied.

Expert C noted that some of the DRMs included in the survey are not widely used in the Middle East, such as summary jury trial, mini-trial, and early neutral evaluation. This was a

comment noted by another expert, too, in the survey. From Expert C's experience, the most widely used DRMs in the Middle East are arbitration, negotiation, and mediation. This comment was also brought up in the comments section of the survey by another expert, who pointed out that med-arb is most commonly used in Asia compared to the Middle East. Expert C believes it is usually difficult to impose new techniques. However, it is not unlikely to have new DRMs imposed on the Middle Eastern construction industry, especially with the increasing number of international projects. Expert C noted sometimes DRMs terminologies become confusing, as they do not provide an accurate definition of the process and become specific to each project by the terms defined in the contract document. This was in line with Expert B's comment about looking into the process details, not only by the name of the DRM used.

During the interview, Expert A revised two the previous responses giving a lower score to summary jury trial compared to mini-trial and a lower score to negotiation in low trust compared to high and neutral trust. These revisions were due to a better understanding of the questions and looking at the DRMs comparatively. Expert A views mediation/conciliation as a continuation of negotiations, but with the element of a third party involved, which made him/her give them both the same rank.

When asking about culture, Expert A thought culture is a very important aspect in many ways. For example, parties from cultures, where litigation is an anathema or where long-term relationships are more important than short-term financial gain, are more likely to negotiate a settlement than go to court. This is in line with what the DRM-CRT model concludes, where the least recommended DRM in Asia, litigation, is different than the Middle East, summary jury trial. Also, preparing a client to negotiate in the Middle East versus Asia is different; the person making the deal in Asia may not necessarily be the decision-maker; he/she may be just a spokesperson—saving face is critically important. The negotiator would usually be blamed, not the executive, if the deal didn't work. However, if a deal is reached, the executive takes credit. In the Middle East, Egypt, for example, everything is negotiable and

negotiations can drag on a long time. Thus, it becomes very difficult for American contractors to negotiate in such a different style.

Expert B noted the court system is another very important aspect directly related to the country of operation and the culture of the country where the project will be located. Parties from common law countries (such as U.K., U.S., Canada, Australia, and New Zealand), where the cultures are more similar, trust each other courts and decisions far more than courts that are very different. Expert C agreed that choosing DRMs that are enforceable worldwide makes the project more attractive for foreign investors, as the risks for dealing with local courts they are unfamiliar with is removed. Expert C also noted that as cultures become more civilized, disputes are less commonly taken personally, and the DRM process becomes more procedural and easier to handle. One of the experts on the panel noted a similar comment, "I would never advise a U.S. client to contract for local litigation in the Middle East."

In all cases and cultures, Expert A thinks negotiations should be tried first; yet, the information to disclose is the question. Most successful negotiation processes have the parties agree they don't want to go to a next step DRM and want to resolve dispute before this stage. Expert A advises parties to always opt for negotiation under all circumstances just not to spend money initially, as legal fees are very high. This was in agreement with Expert B, who recommends negotiation in all cases followed by mediation then DRB/DAB; if there is a cheap way, why not try it first? However, this recommendation is not totally in agreement with the DRM-CRT model. It still explains why negotiation appears in most of the project conditions as a highly recommended method (except in cases of low trust).

Expert A thinks arbitration is a risky process in terms of the decision reached, as it is extremely difficult to appeal an arbitration decision in some countries and the decision is enforceable by law. In some countries, law favors arbitration (do not overrule arbitration). In others, for example, France, it does not. Expert A, in some cases, would recommend litigation over arbitration, since the opportunity to appeal is very low in arbitration. Therefore, Expert A recommends not choosing any legal DRM process until the parties

totally comprehend the laws in the country governing these processes. One of the experts noted in the survey, "Depending on the case and chances for success and the fast issuance of decisions, some clients prefer/choose litigation before Qatari courts to claim for their dues, rather than from choosing other ADR methods." Therefore, as Expert A notes, "it becomes important to know what the country's norms are."

Both Experts B and C see arbitration as a very favorable DRM, especially in international projects with different nationalities, where neither party wants a home court advantage. Other experts mentioned this advantage in the comments section of the survey. This is in line with the DRM-CRT model, where arbitration is highly recommended in almost all project conditions, except cases of high trust. However, Expert C notes arbitration and litigation are not very comparable to all other alternative dispute resolution methods, as both are enforceable and binding, and are governed by law.

On risk and trust effects, Expert A stated it is important to note that one of the risks of recommending one method over the other is the risk of free discovery (laying out all the cards). Risk and trust are somehow part of the same equation. If one party trusts the other, he/she usually knows there is an intention to reach a settlement, making it less risky to disclose all information necessary to reach a conclusion. If there is no trust between parties, disclosing too much information may give the other party an edge when seeking more formalized DRMs. Parties can use the information disclosed in negotiation and mediation against the other party later in arbitration or litigation, for example. Negotiation with high trust among parties ensures a good chance for success, while in a low trust environment, there is a very low chance of succeeding to reach a resolution. This justifies why in the DRM-CRT model, negotiation is the most recommended in high trust projects. On trust, Expert A also noted trust is different in a public versus a private project. In public projects, there is not a real trust relationship considered; it is a low bid environment. However, in the private sector, relationships come second to safety. In general, a DRM that provides the quickest decision would be the best to select.

Expert C agreed risk affects the choice of DRMs, citing an example of a project of high complexity versus one with low complexity or a short versus a long duration project, the risk involved might make a difference in stating a DRM in the contract to start with or not. However, Expert C considers both risk and trust as auxiliary issues, and not the main issues of concern. On thinking about choosing a DRM, it is usually more important to consider time and money aspects first.

Other than culture, risk, and trust, there are other general factors a contractor should usually consider. Sometimes the choice of a DRM is affected by the parties' past experiences with the method; if one of the parties has never been involved in med-arb previously they may resist entering into it for this particular dispute or may not participate in the process fully and openly. Expert C gives an example of such a case, where a summary jury trial is not normally used in the Middle East. Expert C said, "People hate what they do not know." This is in line with the model, where there is a statistical difference between the Middle East and Asia in summary jury trial with a higher score in Asia and with summary jury trial being the least recommended in the Middle East.

4.3.8 Delphi technique conclusions

The most important factors to consider when choosing a DRM in an international contract in the Middle East and Asia are enforceability of the decision followed by national law and jurisdiction; both are related to the country of operation (culture). As for the culture, risk and trust effect on choice of DRMs, each project condition was investigated individually to determine its effect, then all factors were analyzed collectively as a system to determine if there are any interactions.

As for single effects of the factors, Table 4-34 shows the results of the experts' responses on whether culture, risk, and trust affect the choice of DRMs in international construction contracts. It can be seen all experts agreed culture affects DRMs' choice, while the majority (more than 70%) agreed both risk and trust affect the choice of DRMs in international construction contracts.

Table 4-34: Does culture, risk, and trust affect choice of DRMs?

Factor	No. of experts who answered:	
	Yes	No
Culture	9	0
Risk	7	2
Trust [a]	6	2

[a] *One expert answered "depends"*

Although all experts agreed culture has an effect on the choice of DRMs, the most recommended methods used in both the Middle East and Asia are the same (Table 4-35). However, the least recommended in the Middle East is summary jury trial, while in Asia, it is litigation. This may be attributed to the fact that when experts were asked about the effect of culture, it was a general question about all cultures. However, the scores they gave were specifically for the Middle East and Asia. The GLOBE study, on its country clusters categorization diagram, places the Middle Eastern and Asian clusters next to each other in terms of cultural differences. Such slight cultural differences may not be significant to affect the choice of DRMs. As for the DRMs recommended, arbitration is a very attractive option to contracting parties, especially in an international context where the decision reached is enforceable through the courts of many jurisdictions, not necessarily the jurisdiction where the arbitration was held. While litigation is becoming the least popular, due to its high cost and long duration, it becomes even less desirable in an international context, where conflict of laws or jurisdictions may exist.

As for risk, the two most recommended methods were the same in high and low risks, while the least recommended in low risk projects was summary jury trial and in high risk projects was litigation. Finally, looking at trust, low and neutral levels of trust, arbitration is the most recommended, while in high trust, negotiation comes first. A general look at the data reveals arbitration, negotiation, and mediation were the most recommended, while litigation, mini-trial, and summary jury trial were the least recommended. In general, litigation, summary jury trial, and mini-trial were the least recommended methods in all cases (following different orders). These three methods are considered the ones with least parties' control, In all these methods, cases are presented by each party then a third part takes the decision with

no intervention from either parties. The third party could be a judge or jury in the case of litigation, a mock-up jury in the case of a summary jury trial or a retired judge in the case of a mini-trial.

Table 4-35: Highest and least recommended DRMs in different project conditions separately

Factor	Recommended			Not Recommended		
Culture	**Middle East**	**Asia**		**Middle East**	**Asia**	
	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation		Summary Jury Trial Mini-trial Litigation	Litigation Summary Jury Trial Mini-trial	
Risk	**Low**	**High**		**Low**	**High**	
	Arbitration Negotiation Mediation	Arbitration Negotiation DRB		Summary Jury Trial Mini-trial Litigation	Litigation Summary Jury Trial Mini-trial	
Trust	**Low**	**Neutral**	**High**	**Low**	**Neutral**	**High**
	Arbitration DRB Med-Arb	Arbitration Negotiation Mediation	Negotiation Mediation Arbitration	Summary Jury Trial Mini-trial Litigation	Litigation Summary Jury Trial Mini-trial	Litigation Summary Jury Trial Mini-trial

The data were further analyzed using the Mann-Whitney rank-sum and Kruskal Wallis to test the statistical differences between the various DRMs scores within the different categories. Table 4-36 shows a summary of the results of the tests. A statistically significant difference was determined between the Middle East and Asia in the scores of med-arb and summary jury trial, indicating that both med-arb and summary jury have higher scores in Asia compared to the Middle East. As for risk, there is no statistically significant difference between high- and low-risk projects' group's medians for all DRMs.

However, trust levels was shown to affect the scores of DRMs given by experts, generating a statistically significant difference between trust levels medians for arbitration, litigation, mediation, and negotiation. Arbitration and litigation were more likely recommended in low trust, followed by neutral trust, then high trust projects, while mediation and negotiation were more likely recommended in high trust, followed by neutral trust, then low trust projects.

Table 4-36: Summary of Mann-Whitney and Kruskal-Wallis test analysis (significant variables)

Factor	DRM	Test result	Significance
Culture	Med-arb	Z = -2.242	0.025
	Summary Jury Trial	Z = -2.160	0.031
Risk	*None significant*		
Trust	Arbitration	$\chi^2 = 13.243$	0.001
	Mediation	$\chi^2 = 7.179$	0.028
	Negotiation	$\chi^2 = 6.857$	0.032

The agreement between the experts on the ranks of the DRMs in all project conditions was also assessed using Kendall's concordance analysis (Table 4-37). As for the combined analysis for all the variables, MANOVA was performed at the 95% confidence level to assess the statistical significance of the main and interactions effects for culture, risk, and trust on the 10 types of DRMs. Results indicate a difference in the mean scores of DRMs in risk, trust, and their interaction categories. Culture was also seen as a borderline condition in terms of significance.

Table 4-37: Summary of Kendall's concordance analysis

Category	Round	Degrees of freedom	Chi-squared	Kendall's coefficient (*W*)	Significance
Middle East	3	9	29.645	0.471	0.001
	4	9	37.029	0.588	0.000
Asia	3	9	24.044	0.445	0.004
	4	9	29.641	0.549	0.001
High Risk	3	9	25.962	0.412	0.002
	4	9	34.513	0.548	0.000
Low Risk	3	9	31.635	0.502	0.000
	4	9	38.779	0.616	0.000
High Trust	3	9	31.075	0.493	0.000
	4	9	42.342	0.672	0.000
Low Trust	3	9	29.081	0.462	0.001
	4	9	42.560	0.676	0.000
Neutral Trust	3	9	28.740	0.456	0.001
	4	9	37.659	0.598	0.000

The follow-up ANOVA conducted to test each separately revealed the same results as the non-parametric (Mann-Whitney and Kruskal-Wallis tests) showing arbitration, litigation, mediation, and negotiation to be significantly different in different levels of trust; yet, also adding the interaction of risk and trust to affect the scores of negotiation. For low-risk projects, where there is high trust between parties, it is highly recommended by the experts to use negotiation, while in high-risk projects, where there is low trust between parties, it is highly not recommended to use negotiation. The Bonferroni posthoc test was further conducted to compare the trust levels between the statistically significant DRMs. A significant agreement was observed among all experts that increased from Round 3 to Round 4 in all cases. As for the combined analysis for all the variables, MANOVA was performed at the 95% confidence level to assess the statistical significance of the main and the interactions effect of culture, risk, and trust on the 10 types of DRMs. Results indicate a difference in the mean scores of DRMs in risk, trust, and their interaction categories. Culture was also seen as a borderline condition in terms of significance.

The follow-up ANOVA conducted to test each separately revealed the same results as the non-parametric (Mann-Whitney and Kruskal-Wallis tests), showing arbitration, litigation, mediation, and negotiation to be significantly different at different levels of trust; yet, also adding the interaction of risk and trust to affect the scores of negotiation. In low-risk projects, where there is high trust between parties, it is highly recommended by the experts to use negotiation, while in high-risk projects, where there is low trust between parties, it is highly not recommended to use negotiation. The Bonferroni posthoc test was further conducted to compare the trust levels between the statistically significant DRMs.

4.4 DRM-CRT Model

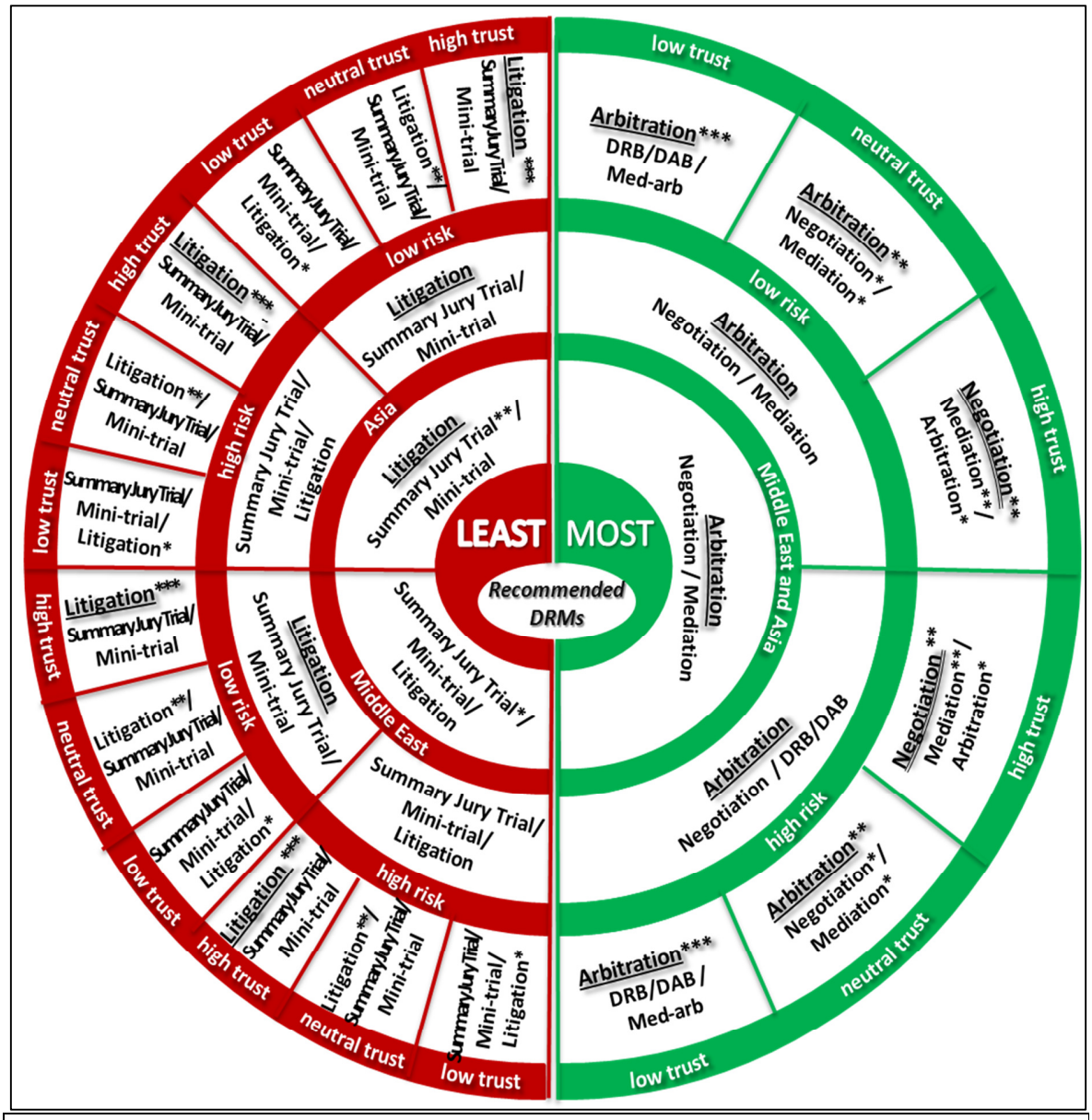
The DRM-CRT model is developed based on the experts' recommendations obtained from the Delphi technique (Figure 4-18). The model encompasses the results of both the descriptive and statistical analysis conducted on the experts' scores. It is divided into two main parts (left and right half semi-circles)—most and least recommended DRMs. The recommendations are categorized, based on project conditions. For example, if a contractor

intends to operate in Asia, a low-risk project, where there is low trust between the contractor and the other party, the first recommended DRM would be arbitration; the least recommended would be summary jury trial. Arbitration is the top most recommended in all cases, except the low trust condition, where negotiation is recommended.

Statistical analysis results are indicated by underline, asterisk, and double underline. Underline indicates difference within the level of a project condition (for example, DRM1 versus DRM2 in Asia). Asterisk indicates difference between levels of the same project condition (DRM1 in the Middle East versus Asia). Double underline indicates results of interactions across the project conditions (DRM 1 across risk and trust). To illustrate, the underlined DRM indicates a DRM was statistically significantly different than the following DRM (purpose 2 of Mann-Whitney test). For example, looking at the least recommended methods in different cultures, in Asia, litigation was the least recommended and was statistically different than summary jury trial. Although summary jury trial in the Middle East had the lowest score, it was not statistically different than mini-trial. This indicates litigation is descriptively and statistically less recommended than summary jury trial in Asia, while in the Middle East both summary jury trial is less recommended than mini-trial, only descriptively by looking at the scores.

A DRM with an asterisk (*) next to it indicates the statistical analysis conducted showed the DRM is different statistically from one level of a single project condition to the other (purpose 1 of Mann-Whitney test). In the case of 'most DRMs recommended', the higher number of asterisks means a higher score; i.e., more recommended. In case of 'least DRMs recommended', the lower the number of asterisks, the lower the score, i.e., least recommended. For example, in most recommended DRMs, in the trust portion, arbitration has a significantly higher score in low trust with 3 asterisks (***), followed by neutral trust with two asterisks (**), then high trust with one asterisk (*). Thus, arbitration is more likely recommended in low trust, followed by neutral trust, then high trust projects. The model also shows the results of interaction across the project conditions. The only DRM that showed

statistically significantly different results is negotiation with the interaction of risk and trust (refer to section 0). This is illustrated by a double underline of negotiation.



KEY

Underline ⇒ *statistical difference within one level of a project condition*
*Asterisk** ⇒ *statistical difference between different levels of the same project condition*
Double underline ⇒ *interaction between the project conditions*

Figure 4-18: DRM-CRT recommendation model

CHAPTER 5: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter integrates the knowledge gained through the quantitative, qualitative, and literature review portions of this study to generate findings and recommendations about the choice of dispute resolution methods (DRMs) in international construction contracts. It begins by reviewing the research objectives and methodology of the study. This is followed by a discussion of the findings and conclusions of the information gathered. Finally, there is a presentation of the limitations of the research and recommendations for future research.

5.1.1 Research objectives

The objectives of this study are to identify the factors affecting the choice of DRMs and explore the effects of culture, risk, and trust on the choice of DRMs in international construction projects. Based on the culture of the country the construction company is operating, the level of trust borne between the contracting parties and the level of risk in the country, a DRM-Culture Risk Trust (DRM-CRT) model is developed. It is the aim of this model to help international contractors in the selection of the appropriate DRM during contract formation, given identified culture characteristics, trust levels, and risk factors. The following research questions were used for this study:

- What factors currently/should affect the companies' decisions to select a specific DRM?
- How does culture affect the choice of DRMs?
- How does trust affect the choice of DRMs?
- How does risk affect the choice of DRMs?
- How do culture, risk, and trust interact in choosing a DRM?

5.1.2 Research methodology

To answer the five research questions for this study, the research started with a literature review of the topic, mainly looking at the various aspects of the study—DRMs, culture, risk,

and trust. A concurrent mixed method design was then employed. Data were collected from two main sources—industry professionals and DRMs experts. The target population for the survey was procurement/contracts departments' employees working in U.S.-based international construction companies that operate in the Middle East and Asia. Data from the industry professionals, mainly about the current DRMs used, were collected, using online surveys. Around 100 surveys were emailed and 42 responses were received. Data obtained from the survey were statistically analyzed, using both descriptive and inferential statistics. Data analysis included using the Fisher's exact test to test if a relationship exists between project location, level of risk, and level of trust (each individually), and the use of each DRM. In addition, a multinomial logistic regression model was developed to estimate the DRM choice (the likelihood of a project to use one of the six DRMs), given the project conditions defined.

A Delphi technique encompassing four rounds of questions was used in parallel to explore in depth more details about the views of DRMs' experts on the effects of culture, risk, and trust on the choice of DRMs. The twelve experts participating in the panel were chosen, based on predefined guidelines that specify their experience and background. These included years of experience in international construction dispute resolution, working with parties from the Middle East and Asia, using various DRMs, number of publications, and degrees obtained.

The Delphi technique results were statistically analyzed, using both descriptive and inferential statistics. Data analysis included Kendall's coefficient of concordance to measure the degree of agreement existing among the experts, the ranks of the DRMs in each project condition. The Mann-Whitney rank-sum test (in cases of a variable with two levels) and Kruskal-Wallis test (in case of a variable with three levels) were used in this study for two purposes. The first purpose was to compare between the individual DRM scores within the project condition, while the second purpose was to determine if there is a statistically significant difference between each DRM and the next DRM in score in each project condition.

Although the data obtained from the Delphi technique were not normally distributed, the data set was large (96 data points). Thus, it was decided to conduct a parametric test, as they are more powerful. Multivariate analysis of variance (MANOVA), a parametric test, was used to obtain a better interpretation of the data, especially to see the effect of interactions between the different factors. Throughout the two methods, validation techniques were used to account for any validity or reliability issue that may be encountered. Follow-up interviews were also conducted with three of the experts who participated in the study to validate the results of the Delphi questionnaires.

5.2 Survey conclusions

The most important factors that companies consider when choosing a DRM are the 'location of project' followed by 'laws'. Both factors are related to the country of operation, i.e., culture. It was also seen that arbitration followed by negotiation and mediation are the most frequently used DRMs in all project conditions. Mini-trial was not mentioned in any project, while litigation was the least used in both cultures. In high-risk projects, litigation was the least used, while low-risk projects, adjudication was the least used. DRB/DAB and adjudication were the least used in low and neutral trust projects, respectively. It was remarkable that negotiation was the least used in high trust projects. Comparing statistically between the uses of different DRMs given different project conditions using Fisher's exact test, the only project condition that showed a statistical significance was DRB/DAB in different trust levels.

5.3 Delphi conclusions

The most important factors recommended by experts to consider when choosing a DRM in an international contract in the Middle East and Asia are enforceability of the decision, followed by 'national law and jurisdiction', both are related to the country of operation (culture). When asking experts whether culture, risk, and trust affect the choice of DRMs, all experts agreed culture does affect choice, seven experts out of nine agreed risk does affect choice, and six out of nine agreed trust does affect choice.

When asked to provide scores for each DRM given different project conditions, for the most recommended DRMs, both the Middle East and Asia were the same. This is not in line with the fact that all experts thought culture affected the choice of DRMs in the initial question. However, the least recommended in the Middle East is summary jury trial, while in Asia, it is litigation. Looking at risk levels, the two most recommended methods were the same in high and low risk, while the least recommended in low-risk projects was summary jury trial and in high-risk projects was litigation. Finally, looking at trust, low and neutral levels of trust, arbitration is the most recommended, while in high trust, negotiation comes first.

Further analysis using the Mann-Whitney rank-sum and Kruskal-Wallis to test the statistical difference between the various DRMs scores with in the different categories, a statistically significant difference was determined between the Middle East and Asia in the scores of med-arb and summary jury trial, indicating both med-arb and summary jury have higher scores in Asia compared to the Middle East. Risk level did not affect the group's median for all DRMs. However, trust levels affected the scores of arbitration, litigation, mediation, and negotiation. Arbitration and litigation were more likely recommended in low trust, followed by neutral trust, then high trust projects, while mediation and negotiation were more likely recommended in high trust, followed by neutral trust, then low trust projects.

Kendall's concordance analysis showed a significant agreement among all experts that increased from Round 3 to Round 4 in all cases. As for the combined analysis for all variables, results indicate a difference in the mean scores of DRMs in risk, trust, and their interaction categories. Culture was also seen as a borderline case in terms of significance. The follow-up ANOVAs testing each DRM separately revealed the same results as the non-parametric (Mann-Whitney and Kruskal-Wallis tests); yet, also adding the interaction of risk and trust to affect the scores of negotiation. Based on the panel's recommendations, a DRM-CRT model was developed to assist international contractors from English-speaking countries in the choice of DRMs, if planning to operate in the Middle East or Asia. This test introduces a new significant factor that affects the choice of negotiation—interaction of risk

and trust. Negotiation was more likely recommended in low risk and high trust projects compared to high risk and low trust projects.

5.4 Survey and Delphi technique results comparison

This section compares between the results obtained from the survey and the Delphi technique. The survey results are a representation of the current practices employed in the industry; whereas, the experts' opinions (Delphi results) act as recommendation to the best practices to be employed in the international construction industry with respect to the choice of DRMs.

Table 5-1 shows a comparison between the survey and the Delphi technique results in terms of factors currently affecting the choice of DRMs versus the ones that should be considered. The first two factors for both industry and experts are related to the country of operation and culture. Location of the project was the most mentioned factor by the contractors, which is directly related to culture. Also, the laws of the country affect which DRM to use. This was further enhanced by the follow-up interviews conducted with the experts, as the contractor needs to know if the decision reached by a certain DRM is enforceable by law, which relates to the enforceability of decisions rated as the top factor by the experts. The third factor, in terms of importance, was the risks for the project and the DRM process. Trust was not one of the top factors neither considered by the contractors for choice of DRMs nor was it listed as one of the top factors by the experts. This is an interesting finding because trust compared to culture and risk resulted in significant differences in the choices of some of the DRMs.

Table 5-1: Comparison of top factors affecting choice of DRMs from industry professionals and experts perspectives

Factor	Industry (survey)	Experts (Delphi)
1	Location of the project	Enforceability of decision
2	Laws	National law and jurisdiction
3	Risks in project	Binding outcome
4	Local customs	Time taken to resolve the dispute
5	Type of contract	Court system
6	Past business relationship	Cost of resolving the dispute
7	Limitation of liability on the contract	Neutral party technical knowledge
8	Level of trust borne with other party	Past experience with the DRM

As for the DRMs used compared to recommended in international construction contracts, Table 5-2 shows a summary of the most/least used and most/least recommended in different project conditions (culture, risk, and trust), based on the survey and Delphi technique results. It is seen that in all project conditions, the most used DRM is arbitration, followed by negotiation or mediation. However, this is not the case in high trust projects where negotiations and mediation are not the most used methods. In fact, negotiation is one of the least used methods. As for the most recommended methods, arbitration and negotiation are the most recommended methods in all project conditions, in line with the most used DRMs. However, the difference between the recommended and the used DRMs is observed in low and high trust conditions, where negotiation is not recommended at all in low trust conditions, while it is the most recommended in high trust level. Thus, what is actually applied in the industry with regard to trust levels is in contradiction to what experts recommend.

The least recommended method for all project conditions was mini-trial, in line with the current project practices, since it was not employed in any of the 27 projects. It was also the least method that experts were involved and had experience. Following different orders in different project conditions, summary jury trial, litigation, and mini-trial were the three least recommended methods. This comes in line with the experts' comments in the follow-up interviews about summary jury trial and mini-trial being rarely used in the Middle East. Although adjudication appeared as one of the least used methods in all project conditions, it was not least likely recommended by experts in any of the project conditions.

In both cultures, mini-trial was followed by litigation and adjudication, as the least used DRMs. This was in line with the least recommended methods in both cultures—mini-trial and litigation. Other than the mini-trial in low risk projects, the least used and least recommended DRMs were different. While adjudication and DRB/DAB were the least used in low risk projects, summary jury trial and litigation were the least recommended. This was also the case in high trust projects. In high-risk projects, mini-trial and litigation were common in least used and least recommended, while adjudication was different than the least

recommended—litigation. This was also the case in neutral trust projects. The least used in low and neutral trust were also adjudication and DRB, which were different from the least recommended. In high trust, the industry least used DRM, litigation (not used in any of the 27 projects) was in line with what the experts recommended.

Table 5-2: Comparison of DRMs used versus recommended

Project Condition		DRM most used	DRM most recommended	DRM least used	DRM least recommended
Culture	Middle East	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation	Mini-trial Litigation Adjudication	Summary Jury Trial Mini-trial Litigation
	Asia	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation	Mini-trial Litigation Adjudication	Litigation Summary Jury Trial Mini-trial
Risk	Low	Arbitration Negotiation Mediation	Arbitration Negotiation Mediation	Mini-trial Adjudication DRB/DAB	Summary Jury Trial Mini-trial Litigation
	High	Arbitration Negotiation Mediation	Arbitration Negotiation DRB/DAB	Mini-trial Litigation Adjudication	Litigation Summary Jury Trial Mini-trial
Trust	Low	Arbitration Negotiation Mediation	Arbitration DRB/DAB/ Med-arb	Mini-trial DRB/DAB Adjudication	Summary Jury Trial Mini-trial Litigation
	Neutral	Arbitration Mediation Negotiation	Arbitration Negotiation Mediation	Mini-trial Adjudication Litigation	Litigation Summary Jury Trial Mini-trial
	High	Arbitration Adjudication DRB/DAB	Negotiation Mediation Arbitration	Mini-trial Litigation Negotiation	Litigation Summary Jury Trial Mini-trial

From the comparisons above and the statistical analysis, it can be seen that culture and risk did not have a significant effect on the choice of the DRMs. However, it can be seen that trust and risk trust interaction had a significant effect on the recommendation scores provided

by the experts in the choice of DRMs. This was also proven statistically through the Mann-Whitney test and the MANOVA. However, trust was not a significant factor that affected the industry in their choice of the DRMs. In fact, there was a contradiction between the experts and industry professionals; experts had negotiations as the most recommended DRM in high trust, while it was the least used DRM in high trust projects. Looking at the factors considered by both industry professionals and experts, trust did not come as one the top factors in choice of DRM.

5.5 Research Contribution

Such results indicate trust is a factor ignored in the industry, although it has a significant effect on the choice of DRMs. As highlighted by previous studies, the ways contracts are setup clearly disagree with the benevolence and openness required to maintain trust (Kadefors 2004; Swan et al. 2002).Trust is not an aspect usually taken into consideration, while drafting a contract document. However, the application of social science concepts, such as trust to a construction project per the experts' recommendations, can lead to better management of the dispute resolution process. From an industry perspective, there emerges a need to increase the level of awareness regarding the trust effect on setting up dispute resolution method clauses. Contract clauses should be drafted to reflect the trust level between parties. The DRM-CRT model developed can help English-speaking international contractors planning to operate in the Middle East and Asia in the choice for the most suitable DRM. From a research perspective, this study proves social science aspects, such as trust, have a significant effect on the drafting of a critical contract clause in the contract, DRM clause. Therefore, it becomes necessary to investigate how such areas of social sciences might affect other aspects of the contract.

5.6 Limitations

Limitations are inherent in all research projects. This study had several limitations related to the methodology used. These are:

- The results of this study reflect the view of its participants and generalization is limited to the population used.

- The response rate for the survey was very small. This was mainly because the population is very small; companies that fit within the scope of this study are limited in number and getting each company to respond to obtain a better response rate was not feasible.
- When comparing between the survey and the Delphi techniques, not all the DRMs stated in the Delphi questionnaire were listed in the survey questions. The experts suggested some after the survey was already sent.
- When conducting follow-up interviews with the experts, it came to the researcher's attention, although in the literature DRMs may have the same name, the details of the process may vary from country-to-country.

5.7 Recommendations for Future Research

Throughout the progression of this research study, areas where future research is needed have been identified. These include:

- This research focused only on international contractors from English-speaking countries planning to operate in the Middle East and Asia. Expanding this research to other culture clusters around the world and comparing clusters that have extreme differences in cultural dimensions may reflect on the choice of DRMs in different cultures.
- It would be a good addition to view at this study from the owner's perspective to determine the factors owners consider when choosing DRMs to employ in the contract. In addition, determine the flexibility for the contractor to negotiate changes in the dispute resolution contract clause. This would be especially significant when there are regulations that define the DRM process application in the country. Also, comparing public versus private projects might reveal some interesting results, due to the limited flexibility of the negotiation process during contracts formation and limited applicability of the element of trust in a low bid environment.
- A comprehensive study from different countries on what the different DRMs detailed processes are would help set the basis for what each DRM really entails; for example, how adjudication is applied in the U.S. compared to Europe.

- A narrower scope of projects in terms of type of the project, duration, and cost may reveal differences in how DRMs are chosen.
- Through this study, it was proven that trust is undermined in contract documents. A study on the effect of trust on other clauses in the construction contract document may reveal that it has an effect on other contract clauses formation.

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APPENDIX 1. SURVEY

Effect of Culture, Risk and Trust on the Choice of Dispute Resolution Methods (DRMs) in International Contracts Survey

Dear Participant,

This survey is developed as part of a PhD research project entitled "Effect of Culture, Risk and Trust on the Choice of Dispute Resolution Methods (DRMs) in International Contracts". The purpose of the study is to investigate the factors affecting the choice of DRM in international contracts. A DRM clause in the contract defines the process of resolving disputes between the contracting parties. It is the aim of this study to help owners and/or international contractors in the selection of the appropriate DRM(s) during contract formation; given identified culture characteristics, trust levels, and risk factors.

I am requesting you to complete the questionnaire in this survey which includes general information about your company and specific questions related to two international projects of your choice. This questionnaire will take about 15 minutes of your time to complete. The information collected will be kept confidential and it will only be used for research purposes. All survey responses will be stored on a password protected computer with limited access to only the researchers. Your participation in this survey is completely voluntary. Please note that you may skip any question at any time that you feel uncomfortable answering.

Your cooperation is extremely vital to the success of this study. For questions or concerns, please contact Ghada M. Gad at gmgad@iastate.edu

Please proceed to the next page →

A. COMPANY & PARTICIPANT GENERAL INFORMATION

A1. Company name: _____

A2. What is the home country of your company? _____

A3. In which regions does your company operate? (*mark all that apply*)
   a. Middle East
   b. Asia
   c. Africa
   d. Latin America/ Caribbean
   e. Europe
   f. US
   g. Canada

A4. Your years of experience in construction industry:
   a. Less than one year
   b. 1 to 5 years
   c. 5 to 10 years
   d. 10 to 15 years
   e. 15 to 20 years
   f. More than 20 years

A5. Your years of experience in construction *international* projects:
   a. Less than one year
   b. 1 to 5 years
   c. 5 to 10 years
   d. 10 to 15 years
   e. 15 to 20 years
   f. More than 20 years

A6. Your years of experience in negotiation and formation of international contracts:
   a. Less than one year
   b. 1 to 5 years
   c. 5 to 10 years
   d. 10 to 15 years
   e. 15 to 20 years
   f. More than 20 years

A7. In general, which factors of the ones listed below affect your company's decision in the choice of a Dispute Resolution Method in international contracts? *(mark all that apply)*
   a. Country of operation
   b. Local customs
   c. Level of trust borne with other party
   d. Past business relationship
   e. Laws
   f. Risks in project
   g. Type of contract (Cost Reimbursable or Lump Sum or Unit Rates)
   h. Limitation of Liability on the contract

A8. Please specify any additional factors that are not listed in the previous question that may affect your company's decision in the choice of a Dispute Resolution Method in international contracts?

_____

B. PROJECT SPECIFIC QUESTIONS

Please refer to TWO projects completed by your company in the past 5 years, or are still in progress in an Asian or a Middle Eastern country and answer the following questions:

PROJECT #1

I-General Project Information

B1. Project name: _____

B2. Project location: _____

B3. Owner Organization Name: _____

B4. Owner Organization Location: _____

B5. Please provide an Owner's representative contact information that you would recommend to participate in this survey:
   a. Name: _____
   b. Position: _____
   c. Address: _____
   d. Telephone: _____
   e. Email: _____

B6. Project type
   a. Building
   b. Heavy/Highway
   c. Industrial
   d. Other, *please specify* _____

Please proceed to the next page →

B7. Total project construction duration:____ months

B8. Total project cost as per contract documents:_____ US dollars

II-Dispute Resolution Method(s)

B9. Which department in your company is responsible for negotiating contract terms with the other contracting party?_____

B10. What method(s) of dispute resolution was defined in the project contract conditions? *(check all that apply)*
   a. Negotiations
   b. Mediation/conciliation
   c. Arbitration
   d. Dispute Review Board/Dispute Adjudication Board
   e. Adjudication
   f. Mini-trial
   g. Litigation
   h. Other(s), *please specify* _____

B11. Were there any country regulations and/or laws that necessitated the selection of the dispute resolution method stated in the project contract?
   a. Yes
   b. No, *Skip QB10*

B12. Please specify the country regulations and/or law that necessitated the selection of the dispute resolution method stated in the project contract. *Skip QB11 & QB12* _____

B13. If No, on what basis were the dispute resolution methods stated in the contract document selected?
   a. It's the normal practice used by our company. *Skip Q.B12*
   b. It's the normal practice used by the other contracting party. *Skip Q.B12*
   c. The dispute resolution method(s) was selected for other reasons

B14. Please state the reasons why the dispute resolution methods stated in the contract document was selected? _____

B15. If you were given the option to select the method of dispute resolution for this project, would you have chosen a different dispute resolution method(s)?
   a. Yes, *please specify which and why?* _____
   b. No

B16. Were the dispute resolution method(s) stated in the contract document employed?
   a. Yes, *please state which method(s) was employed?* _____
   b. No, *if No move to Section II*

B17. Rate your company's level of satisfaction of the dispute resolution method used in terms of the following criteria:

	Very Poor	• Poor	Acceptable	• Good	Very Good
a. Preservation of relationship	□	□	□	□	□
b. Fairness of settlement	□	□	□	□	□
c. Cost of process	□	□	□	□	□
d. Duration of process	□	□	□	□	□
e. Flexibility of process	□	□	□	□	□
f. Degree of control on process outcome	□	□	□	□	□

B18. From your experience of the dispute resolution process employed in this project, do you think if another dispute resolution method was used, your company might have had a higher level of satisfaction for the whole process and settlement reached?
   a. Yes, *please specify which and why?* _____
   b. No

Please proceed to the next page →

III-Risk

Rate ***BOTH the likelihood and the impact*** of the following risks in your project:

Risk	Likelihood of Occurrence					Impact on Project				
	Least likely	Less likely	Moderate	More likely	Most likely	Very Low	Low	Medium	High	Very high
B19. Owner related risks (as cash flow problems, excessive demands and variations during the course of the project)	□	□	□	□	□	□	□	□	□	□
B20. Organizations' relationship risks (as lack of communication and poor relationships between parties)	□	□	□	□	□	□	□	□	□	□
B21. Technical risks (as design and construction risks that may impact the project progress)	□	□	□	□	□	□	□	□	□	□
B22. Contractual risk (as disagreements arising from inconsistent contract documents, inappropriate types of contract, etc…)	□	□	□	□	□	□	□	□	□	□
B23. Schedule delay risks	□	□	□	□	□	□	□	□	□	□
B24. Cost overrun risks	□	□	□	□	□	□	□	□	□	□
B25. Political risks (as wars, civil disorder, changes in laws and regulations, etc…)	□	□	□	□	□	□	□	□	□	□
B26. Legal risks (as the legal system in the host country that regulates the management of claims, disagreements, conflicts and disputes)	□	□	□	□	□	□	□	□	□	□
B27. Economic and financial risks (as inflation, tax rate, monetary restrictions and foreign exchange rates, etc…)	□	□	□	□	□	□	□	□	□	□
B28. Environmental risks (or climatic risks)	□	□	□	□	□	□	□	□	□	□
B29. Social risks (as security problems, language barriers, different cultural traditions, religion and custom backgrounds, and bribery and corruption)	□	□	□	□	□	□	□	□	□	□

Please proceed to the next page →

III-Trust

Please choose the level that most closely describes your opinion regarding the relationship ***between your company and the other contracting party company's management:***

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
B30. I think management tells the truth in negotiations.	□	□	□	□	□	□	□
B31. I think management meets its negotiated obligations to our department.	□	□	□	□	□	□	□
B32. In my opinion, management is reliable.	□	□	□	□	□	□	□
B33. I think that the people in management succeed by stepping on other people.	□	□	□	□	□	□	□
B34. I feel that management tries to get the upper hand.	□	□	□	□	□	□	□
B35. I think that management takes advantage of our problems.	□	□	□	□	□	□	□
B36. I feel that management negotiates with us honestly.	□	□	□	□	□	□	□
B37. I feel that management will keep its word.	□	□	□	□	□	□	□
B38. I think management does not mislead us.	□	□	□	□	□	□	□
B39. I feel that management tries to get out of its commitments.	□	□	□	□	□	□	□
B40. I feel that management negotiates joint expectations fairly.	□	□	□	□	□	□	□
B41. I feel that management takes advantage of people who are vulnerable.	□	□	□	□	□	□	□

Please proceed to the next page →

PROJECT #2

I-General Project Information

B42. Project name: _____

B43. Project location: _____

B44. Owner Organization Name: _____

B45. Owner Organization Location: _____

B46. Please provide an Owner's representative contact information that you would recommend to participate in this survey:
   a. Name: _____
   b. Position: _____
   c. Address: _____
   d. Telephone: _____
   e. Email: _____

B47. Project type
   a. Building
   b. Heavy/Highway
   c. Industrial
   d. Other, *please specify* _____

B48. Total project construction duration: _____ months

B49. Total project cost as per contract documents: _____ US dollars

II-Dispute Resolution Method(s)

B50. Which department in your company is responsible for negotiating contract terms with the other contracting party? _____

B51. What method(s) of dispute resolution was defined in the project contract conditions? *(check all that apply)*
   a. Negotiations
   b. Mediation/conciliation
   c. Arbitration
   d. Dispute Review Board/Dispute Adjudication Board
   e. Adjudication
   f. Mini-trial
   g. Litigation
   h. Other(s), *please specify* _____

B52. Were there any country regulations and/or laws that necessitated the selection of the dispute resolution method stated in the project contract?
   a. Yes
   b. No, *Skip Q.B50*

B53. Please specify the country regulations and/or law that necessitated the selection of the dispute resolution method stated in the project contract. *Skip Q.B51 & Q.B52* _____

B54. If No, on what basis were the dispute resolution methods stated in the contract document selected?
   a. It's the normal practice used by our company. *Skip Q.B52*
   b. It's the normal practice used by the other contracting party. *Skip Q.B52*
   c. The dispute resolution method(s) was selected for other reasons

B55. Please state the reasons why the dispute resolution methods stated in the contract document was selected? _____

B56. If you were given the option to select the method of dispute resolution for this project, would you have chosen a different dispute resolution method(s)?
   a. Yes, *please specify which and why?* _____
   b. No

B57. Were the dispute resolution method(s) stated in the contract document employed?
   a. Yes, *please state which method(s) was employed?* _____
   b. No, *move to Section II*

Please proceed to the next page →

B58. Rate your company's level of satisfaction of the dispute resolution method used in terms of the following criteria:

	Very Poor	• Poor	Acceptable	• Good	Very Good
a. Preservation of relationship	□	□	□	□	□
b. Fairness of settlement	□	□	□	□	□
c. Cost of process	□	□	□	□	□
d. Duration of process	□	□	□	□	□
e. Flexibility of process	□	□	□	□	□
f. Degree of control on process outcome	□	□	□	□	□

B59. From your experience of the dispute resolution process employed in this project, do you think if another dispute resolution method was used, your company might have had a higher level of satisfaction for the whole process and settlement reached?

a. Yes, *please specify which and why?*

_____

_____

_____

b. No

II-Risk

Rate **both the likelihood and the impact** of the following risks in your project:

Risk	Likelihood of Occurrence					Impact on Project				
	Least likely	Less likely	Moderate	More likely	Most likely	Very Low	Low	Medium	High	Very high
B60. Owner related risks (as cash flow problems, excessive demands and variations during the course of the project)	□	□	□	□	□	□	□	□	□	□
B61. Organizations' relationship risks (as lack of communication and poor relationships between parties)	□	□	□	□	□	□	□	□	□	□
B62. Technical risks (as design and construction risks that may impact the project progress)	□	□	□	□	□	□	□	□	□	□
B63. Contractual risk (as disagreements arising from inconsistent contract documents, inappropriate types of contract, etc…)	□	□	□	□	□	□	□	□	□	□
B64. Schedule delay risks	□	□	□	□	□	□	□	□	□	□
B65. Cost overrun risks	□	□	□	□	□	□	□	□	□	□
B66. Political risks (as wars, civil disorder, changes in laws and regulations, etc…)	□	□	□	□	□	□	□	□	□	□
B67. Legal risks (as the legal system in the host country that regulates the management of claims, disagreements, conflicts and disputes)	□	□	□	□	□	□	□	□	□	□
B68. Economic and financial risks (as inflation, tax rate, monetary restrictions and foreign exchange rates, etc…)	□	□	□	□	□	□	□	□	□	□
B69. Environmental risks (or climatic risks)	□	□	□	□	□	□	□	□	□	□
B70. Social risks (as security problems, language barriers, different cultural traditions, religion and custom backgrounds, and bribery and corruption)	□	□	□	□	□	□	□	□	□	□

Please proceed to the next page →

III-Trust

Please choose the level that most closely describes your opinion regarding the relationship ***between your company and the other contracting party company's management:***

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
B71. I think management tells the truth in negotiations.	□	□	□	□	□	□	□
B72. I think management meets its negotiated obligations to our department.	□	□	□	□	□	□	□
B73. In my opinion, management is reliable.	□	□	□	□	□	□	□
B74. I think that the people in management succeed by stepping on other people.	□	□	□	□	□	□	□
B75. I feel that management tries to get the upper hand.	□	□	□	□	□	□	□
B76. I think that management takes advantage of our problems.	□	□	□	□	□	□	□
B77. I feel that management negotiates with us honestly.	□	□	□	□	□	□	□
B78. I feel that management will keep its word.	□	□	□	□	□	□	□
B79. I think management does not mislead us.	□	□	□	□	□	□	□
B80. I feel that management tries to get out of its commitments.	□	□	□	□	□	□	□
B81. I feel that management negotiates joint expectations fairly.	□	□	□	□	□	□	□
B82. I feel that management takes advantage of people who are vulnerable.	□	□	□	□	□	□	□

Thank you for completing the questionnaire

APPENDIX 2. DELPHI TECHNIQUE SURVEYS

FIRST ROUND-DISPUTE RESOLUTION METHODS STUDY

Dear Expert,

Thank you for your willingness to participate in the *effect of culture, risk and trust on the choice of dispute resolution methods (DRMs) in international* construction *contracts* research study. You will be receiving three rounds of short questionnaires that will be sent by email (including the one in this email), in attempt to reach a consensus among the experts regarding the factors that affect the choice of DRMs. We expect that your involvement in this process will take no more than 20 minutes of your time (in total).

Please complete the first round by answering the questions below (fill in the blue highlighted parts). The first round (the longest) constitutes two main sections; general information on the expert's experience, and questions regarding the factors that affect the choice of DRMs in international construction contracts. Responses from the first round will be summarized to form the basis of the second round. This round will take about 10 minutes of your time to complete. We hope to have all the results compiled by **August 6, 2011,** when you can expect to receive the second round of questions.

The information collected will be kept confidential and it will only be used in aggregate for research purposes. All survey responses will be stored on a password protected computer with limited access to the researcher. Your participation in this survey is completely voluntary.

Your volunteer commitment adds greatly to this study. Should you have any questions, please contact me at gmgad@iastate.edu or +1-515-441-0217. Thank you for your interest and participation.

Sincerely,
Ghada M. Gad
PhD Student & Research Assistant
Civil, Construction & Environmental Engineering
Iowa State University

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FIRST ROUND-DISPUTE RESOLUTION METHODS STUDY

Research Questions:

1. From your experience, list all the factors that you can think of that may affect the selection of specific DRM in international construction contracts? Please explain why those factors affect the DRM choice?

	Factor	Explain in a few words why it affects the choice of DRM
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
More		

2. From your experience, do you think that the culture of the contracting parties has an effect on the choice of DRM in an international construction contract? (i.e., if one of the contracting parties is from the US and the other is from Asia)? **(bold your answer):**

Yes No

Explain.

Please proceed to the next page →

3. From your experience, do you think that the trust between the contracting parties has an effect on the choice of DRM in an international construction contract? (Trust, in this study, is measured by how one organization perceives the competence of the other organization based on its past performance, capability, reputation, organizational role and financial status) **(bold your answer):**

   Yes No

   Explain.

4. From your experience, do you think that the risk level in the project has an effect on the choice of DRM in an international construction contract? (Risk is defined as the possibility that an event, its impact, and interaction may turn out differently than anticipated) **(bold your answer):**

   Yes No

   Explain.

General Questions:

The answers you provide for the questions below will be dealt with in-aggregate and mainly used for statistical analytical purposes in the study.

5. Please indicate the degrees that you have earned:

Degree	Major / Field of Concentration
Bachelors	
Masters	
Doctorate	
Other degrees related to dispute resolution methods	
Others	

6. Please indicate your years of experience in academia (if any):

No position in academia	
Lecturer	
Assistant Professor	
Associate Professor	
Professor	
Others (please specify)	

7. Please indicate your professional licensure/certification:

8. Please indicate your publishing and conference activity in the topics of dispute resolution methods in construction contracts:

Publications in peer-reviewed journals	
Books or book chapters	
Conference presentations	
Trade publications	
Other (please specify)	

Please proceed to the next page →

9. Please indicate your experience in the construction industry and number of years:

10. Your years of experience in international dispute resolution **(highlight or bold your answer):**
    f. Less than one year
    g. 1 to 5 years
    h. 5 to 10 years
    i. 10 to 15 years
    j. 15 to 20 years
    k. 20 to 30 years
    l. More than 30 years

11. Your years of experience in international dispute resolution in construction projects **(highlight or bold your answer):**
    a. Less than one year
    b. 1 to 5 years
    c. 5 to 10 years
    d. 10 to 15 years
    e. 15 to 20 years
    f. 20 to 30 years
    g. More than 30 years

12. What type of dispute resolution method have you been involved in? **(highlight or bold your answer):**
    a. Negotiations
    b. Mediation/conciliation
    c. Arbitration
    d. Dispute Review Board/Dispute Adjudication Board
    e. Adjudication
    f. Mini-trial
    g. Litigation
    h. Other(s), *please specify* _____

Please proceed to the next page →

13. Please provide an estimate of the number of international construction cases that you have been involved in?

_____ cases

14. From which regions of the world were the disputing parties that you dealt with? **(highlight or bold all that apply):**
    h. Middle East
    i. Asia
    j. Africa
    k. Latin America/ Caribbean
    l. Europe
    m. US
    n. Canada
    o. Other, ***please specify*** _____

15. What type of disputes were you involved in? **(highlight or bold all that apply):**
    a. Scope of work
    b. Plans & specifications
    c. Cost overruns
    d. Time delays
    e. Differing site conditions
    f. Design issues
    g. Construction defects
    h. Professional liability
    i. Other, ***please specify*** _____

16. Please list and briefly describe any elements of your academic or professional experience that you have not included in the previous questions:

Thank you for your time. I will be sending the 2nd round after receipt of responses from all experts. For questions or concerns, please contact Ghada M. Gad at gmgad@iastate.edu or +1-515-441-0217

SECOND ROUND – DISPUTE RESOLUTION METHODS STUDY

Dear Expert,

Thank you for completing Round 1 of the Dispute Resolution Methods study survey. I appreciate the time and effort spent to complete the first round. I apologize for the delay in sending the second round as scheduled; I was facing some technical issues. This second round compiles all the factors generated by the panel of experts in the first round. You are asked to rate the factors in terms of their importance in the choice of DRM in international construction contracts **given a stated scenario**. The survey is intended to be completed in less than 5 minutes.

Please complete the second round by September 10, 2011, by filling in the attached word document, saving it and sending it to gmgad@iastate.edu. A pdf document is also attached for your convenience, if you prefer filling it as a hard copy. You can fill it as a hard copy and fax it to +1-515-294-3845, or scan it and send by email to gmgad@iastate.edu. Responses from the second round will be summarized to form the basis of the third round. We hope to have all the results compiled by September 16, 2011,when you can expect to receive the third round of questions.

The information collected will be kept confidential and it will only be used in aggregate for research purposes. All survey responses will be stored on a password protected computer with limited access to the researcher. Your participation in this survey is completely voluntary. Should you have any questions, please contact me at gmgad@iastate.edu or +1-515-441-0217. Thank you for your interest and participation.

Sincerely,
Ghada M. Gad
PhD Student & Research Assistant
Civil, Construction & Environmental Engineering
Iowa State University
Cell: +1-515-441-0217

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SECOND ROUND – DISPUTE RESOLUTION METHODS STUDY

From the 1st round, the experts generated 84 factors that affect the choice of Dispute Resolution Methods (DRM) in an international construction contract. Factors with similar meaning were grouped yielding a total of 27 different factors. The frequency of mentioning each factor and % of experts stating each factor from the first round is provided below for your information.

Assume a US-based international contractor is planning to operate in the Middle East and/or Asia and is seeking your advice on the factors to consider when selecting DRM(s) to state in the international contract with the owner. The contractor is currently in the contract formation stage. ***Given this situation, please rate the listed factors in terms of their importance in the choice of DRM, click on the circle that best describes the level of importance with 1: not important and 5: very important.***

no	Factor	Frequency from 1st round		*Not Important…Important….Very Important*				
		No. of responses	% of experts	1	2	3	4	5
1	Cost of resolving the dispute	9	82%					
2	Time taken to resolve the dispute	7	64%					
3	National Law & Jurisdiction	5	45%					
4	Neutral party technical knowledge	5	45%					
5	Complexity of the contract/work	4	36%					
6	Confidentiality and privacy	4	36%					
7	Nationality of the parties	4	36%					
8	Past experience with the DRM	4	36%					
9	Binding outcome	3	27%					
10	Contract or Funder or Insurance requirements (mandated)	3	27%					
11	Court System	3	27%					
12	Enforceability of decision	3	27%					
13	Flexibility of the process	3	27%					
14	Location of the project	3	27%					
15	Flexibility in selection of the neutral	3	27%					
16	Location of the hearings	2	18%					
17	Maintaining good relationship between parties on the long term	2	18%					
18	Nature & size of the dispute	2	18%					

Please proceed to the next page →

19	Value of the contract	2	18%	☐	☐	☐	☐	☐
20	Cross-border dimension (e.g.: electronic ADR)	1	9%	☐	☐	☐	☐	☐
21	Duration/Term of the contract	1	9%	☐	☐	☐	☐	☐
22	Language used in the DRM process	1	9%	☐	☐	☐	☐	☐
23	Neutral party level of involvement	1	9%	☐	☐	☐	☐	☐
24	Political considerations (Public Boards)	1	9%	☐	☐	☐	☐	☐
25	Need for legal precedent	1	9%	☐	☐	☐	☐	☐
26	The need to bring in third parties to the process such as PM or architect	1	9%	☐	☐	☐	☐	☐
27	Division of neutral's compensation among parties	1	9%	☐	☐	☐	☐	☐

Thank you for your time. I will be sending the 3rd round after receipt of responses from all experts. For questions or concerns, please contact Ghada M. Gad at gmgad@iastate.edu or +1-515-441-0217

THIRD ROUND – DISPUTE RESOLUTION METHODS STUDY

Dear Expert,

Thank you for completing Round 2 of the Dispute Resolution Methods (DRMs) study. I appreciate the time and effort spent to complete the first and second rounds. This third round is composed of three questions:

The first questions gives you the opportunity to revise your response from the 1st round regarding culture, risk and trust effect on the choice of DRMs in international contracts.

1. The second question compiles the factors rated as important by the panel of experts in the second round and relates them to the choice of specific DRMs in an international construction contracts.
2. The third question asks you to rate the suitability of specific DRM given certain project conditions.

The survey is intended to be completed in approximately 15 minutes. **Please complete the third round by October 20, 2011.** For your convenience, you can complete the survey using any of the following options:

- Filling in the **attached word document**, saving it and sending it to gmgad@iastate.edu , or
- Printing the attached pdf document, filling it as a **hard copy** and faxing it to +1-515-294-3845, or scanning it and sending by email to gmgad@iastate.edu, or
- Replying to this email with the best time to call you to complete it **over the phone**.

Responses from the third round will be summarized to form the basis of the ***fourth and last round*** which will be mainly giving you the opportunity to revise your responses to reach consensus. We hope to have all the results compiled by October 25, 2011, when you can expect to receive the fourth and last round of questions. The information collected will be kept confidential and it will only be used in aggregate for research purposes. All survey responses will be stored on a password protected computer with limited access to the researcher. Your participation in this survey is completely voluntary.

I would really like to thank you for your commitment and help. Your valued opinion and experience adds greatly to this study. Should you have any questions, please contact me at gmgad@iastate.edu or +1-515-441-0217.

Sincerely,
Ghada M. Gad
PhD Candidate & Research Assistant
Civil, Construction & Environmental Engineering
Iowa State University

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THIRD ROUND – DISPUTE RESOLUTION METHODS STUDY

Question 1:

In the 1st round: the experts were asked whether, from their experience, they think that the culture of the contracting parties, risk level in the project and trust between the contracting parties, have an effect on the choice of DRM in an international construction contract. The table below summarizes the responses of all the experts. The purpose of this question is to reach a consensus among the experts. Accordingly, **please either revise your response or leave as is**. The results and the justifications provided by the experts for their responses are shown in the Appendix**.**

From Round 1: **Do the factors below affect the choice of DRM in international construction contracts?**	**Experts' Responses**		Your response in 1st round	**Please have a look at the experts' explanation of their responses in the Appendix.** • **If you will revise your response, mark "revise response". If not, mark "leave as is":**		
	Yes	**No**				
Culture of contracting parties	10	1	Yes	☐ revise response	☒ leave as is	*Comments…*
Risk level of project	8	3	No	☐ revise response	☒ leave as is	*Comments…*
Trust between parties	6	4	No	☐ revise response	☒ leave as is	*Comments…*

Please proceed to the next page →

Question 2:

In the 2nd round: the experts were asked to rate the 27 factors generated from the first round in terms of their importance in the choice of DRM in an international contract being negotiated by a US-based international contractor operating in the Middle East and/or Asia, from 1 to 5 with 1: not important and 5: very important. Almost 50% of the experts agreed that 13 factors are rated greater than 3 in terms of their importance. Those factors are included in the table below.

Rate the factors in terms of their effect on the choice of the respective Dispute Resolution Method (DRM) in an international construction contract, from -3 to 3, *with;*

-3	**-2**	**-1**	**0**	**+1**	**+2**	**+3**
Major negative effect,	Moderate negative effect	Minor negative effect,	No effect	Minor positive effect	Moderate positive effect and	Major positive effect

Example:

*If **cost of resolving the dispute** has a **"major positive effect"** on your choice of "negotiation" in an international contract, i.e., will make you **most** likely to choose **negotiation**. **Write "+3"***

*If **cost of resolving the dispute** has a **"major negative effect"** on your choice of "litigation" in an international contract, i.e., will make you **least** likely to choose **litigation**. **Write "-3"***

Please proceed to the next page →

	DRM / Factor	Negotiations	Mediation/ Conciliation	Dispute Review Board/ Dispute Adjudication Board	Adjudication	Arbitration	Med-Arb	Mini-trial	Early-Neutral Evaluations	Summary Jury Trial	Litigation
1	Cost of resolving the dispute										
2	Time taken to resolve the dispute										
3	National Law & Jurisdiction										
4	Neutral party's technical knowledge										
5	Complexity of the contract/work										
6	Confidentiality and privacy										
7	Nationality of the parties										
8	Past experience with the DRM										
9	Binding outcome										
10	Contract or Funder or Insurance requirements (mandated)										
11	Court System										
12	Enforceability of decision										
13	Language used in the DRM										

Please proceed to the next page →

Question 3:

Assume a US-based international contractor is planning to operate in the Middle East and/or Asia is seeking your advice on which DRM(s) to specify in the contract given certain project risk levels and trust level between parties. **Please enter a score from 10 (least favorable) to 110 (most favorable) to indicate the suitability of each DRM given the project conditions (country, risk & trust) defined in the first 3 columns**.

Example:

If you believe **Mediation** is the most favorable method to choose in the **Middle East in a high risk & low trust project**, you may enter a score around **"100".** Whereas if **Litigation** is the least favorable, you may enter a score around **"20"**

Project Conditions			*DRMs*									
Country	*Project Risk Level*	*Trust Level*	*Negotiations*	*Mediation/ Conciliation*	*Dispute Review Board/ Dispute Adjudication Board*	*Adjudication*	*Med-Arb*	*Arbitration*	*Early-Neutral Evaluations*	*Summary Jury Trial*	*Mini-trial*	*Litigation*
Middle East	*high risk*	*neutral*	*80*	*100*	*70*	*60*	*60*	*80*	*40*	*30*	*30*	*20*

Please proceed to the next page →

Project Conditions			DRMs									
Country	Project Risk Level	Trust Level	Negotiations	Mediation/ Conciliation	Dispute Review Board/ Dispute Adjudication Board	Adjudication	Med-Arb	Arbitration	Early-Neutral Evaluations	Summary Jury Trial	Mini-trial	Litigation
Middle East	high risk	neutral										
	high risk	high trust										
	high risk	low trust										
	low risk	neutral										
	low risk	high trust										
	low risk	low trust										
Asia	low risk	neutral										
	high risk	high trust										
	high risk	low trust										
	low risk	neutral										
	low risk	high trust										
	low risk	low trust										

Thank you for your time. I will be sending the 4th and last round after receipt of responses from all experts. For questions or concerns, please contact Ghada M. Gad at gmgad@iastate.edu or +1-515-441-0217

Appendix:

Does CULTURE affect the choice of DRM in international construction contracts?	**Explanation provided by experts**
Yes	• Some contractors tend to think their country's judicial system is fair and are often highly skeptical of the judicial systems of other nations. • depends on what each party is familiar with • International parties would prefer international arbitration in Paris of Switzerland due to neutrality reasons and familiarity with the ICC rules. • People with different cultures prefer to see a method not governed by the culture of their other party of the contract • Contractors from more developed jurisdictions are hesitant to agree to litigation being the DRM particularly before local courts. • Different nationalities have very different views on which type of dispute resolution they prefer. • Culture shouldn't affect what the things that is done, however it does. For example, Sharia law where there are certain requirements you won't find in civil and common law. • The US is more prone to try to settle among themselves, then accept litigation as a solution, with each side spending a great deal to justify their positions. Also, I think US parties have more faith in the integrity and reliability of the court system to reach a consistent result. I think certain other cultures are more prone to discussions leading to resolution, a more consensus approach. This would be my experience with Japan and Korea, as well as Latin America and the Middle-East. Unfortunately, those approaches often have no time limit, so the discussions can be prolonged. Which is why a structured approach to negotiation, mediation and conciliation is probably the best approach, then arbitration is required. • Sometimes. There is a perception that Asian cultures prefer a DRM that involves, at least a stage of the process embracing a less formal negotiation as a preliminary to a more formal process. • International construction projects involve multinational participants from different political, legal, economic, and cultural backgrounds. • Parties to international projects are also concerned with the clarity of local laws and the interpretation of those contracts governed by local laws. Transglobal collaboration calls for greater cultural understanding and sensitivity in terms of personnel management by the concerned parties. Human problems are involved, such as language, communication, and the understanding of cultural differences.
No	• I think the DRMs are mainly the same across the world in international construction contracts: settlement negotiations, some form of expert resolution (engineer decision, adjudication, dispute boards), and then arbitration.

Does RISK affect the choice of DRM in international construction contracts?	Explanation provided by experts
Yes	• The higher the risk, the more likely it is that disputes will arise. If the parties anticipate more disputes then they are likely want to employ a system that resolves issues more quickly than traditional judicial system. • Where the indemnity and liability provisions are elaborate and extensive and the nature of the job involves a higher level of exposure to either party, particularly the contractor, the DRM tends to be more complex, occasionally a combination of both arbitration and litigation, in that while disputes are generally to be referred to arbitration, the parties are also able to seek limited injunctive relief from local courts. • I think this is a minor concern but the greater the risk the more likely that the procedures will be formalized and the more likely in my view is the choice of an international body to administer the resolution process • Depending on risk in project (size of contract, nature of project, location, etc…), you may have one arbitrator or 3 arbitrators, an expedited hearing, neutral venue in Paris in a contract between 2 parties from Libya and America. One needs to find the measurement of risk in the DRMs... arbitration is final... adjudication some insurance added to the process as mechanism is added...risk in the procedures itself. • The larger the project and the greater the risk, the more interest is placed upon international arbitration in a neutral country. • Projects cost more to execute (supply and demand issues) • Price increases for equipment and bulk materials • Scarcity of project management and engineering services • Escalation -- specialty commodities, equipment and labor • Profit margins squeezed Complex projects now designed on global basis • New competitors • US/UK not dominant players in world market • Foreign governments unbalance the playing field Contractors face more risk • Increased reliance on remote design & scheduling services creates risk on the execution side • Heightened responsibility to integrate services from wherever and whatever source • Applicable/controlling design standards • Geographically acceptable construction practices • Using design and/or consulting services from outside the US Possible violations of applicable governing rules and regulations
No	• Every project has risks and any particular level of risk does not, in my experience, influence the DRM. • No logical connection between risk level and dispute method • It does not as the dispute depends on the behavior of the parties which is not predictable.

Does TRUST affect the choice of DRM in international construction contracts?	Explanation provided by experts
Yes	• Trust is always an issue if taking a dispute to DRM. If one party does not trust the other then that party is more likely to insist upon a more formal structure for resolving the disputes with legal safeguards, etc. • If a party does not trust the other party it will be unwilling to agree any unusual procedure in the dispute resolution clause • This may play a part and should be considered. • Depends. In sophisticated construction transactions the element of trust or the level of the parties' relationship does not play a significant role in the choice of DRM. However, in many contracts of relatively small contract value between various local organizations, the choice of DRM does often depend also on the relationships, for example, where there is a longstanding business relationship, the DRM provisions may not be sufficiently detailed. • As a general matter, US based construction and engineering companies do not want to be subject to the jurisdiction or rulings of foreign courts, especially those with a systematic problem with corruption and bribery, or a strong bias against out of country parties. • The less the trust, the more likely a binding formal enforceable process is needed. • Dispute resolution techniques will only work if the parties are willing to accept them voluntarily. Therefore, it is imperative for parties to trust the process
No	• When it comes to a dispute, there is no trust so that is not a factor when thinking about a DRM. • Trust can not stop a dispute from occurring. • Depends. In sophisticated construction transactions the element of trust or the level of the parties' relationship does not play a significant role in the choice of DRM. However, in many contracts of relatively small contract value between various local organizations, the choice of DRM does often depend also on the relationships, for example, where there is a longstanding business relationship, the DRM provisions may not be sufficiently detailed. • I am in fact not aware of this being an issue • Nothing to do with those factors... trust is reflected in a neutral tribunal and venue… Procedures and the place where it will happen. For e.g. ICC law allows little domestic interference with procedures.

FOURTH & LAST ROUND – DISPUTE RESOLUTION METHODS STUDY

Dear Expert,

Thank you for completing Round 3 of the Dispute Resolution Methods (DRMs) study. I appreciate the time and effort spent to complete the first three rounds. I recognize that the surveys required a significant time investment to be completed. **The fourth round and LAST ROUND concludes the Delphi process for this study**. I would really like to thank you for your commitment to this study all through.

This **fourth and last round** aims at reaching a consensus among the experts. It is composed of the same questions you answered in round 3. However, this time you are given the opportunity to revise your responses given the group median. The survey should not take more than 15 minutes as you are asked to review your previous responses and provide comments as necessary. **Please complete the fourth round by December 16, 2011.** I would really appreciate it if you respond by this date as we will be approaching a very busy time of the year and the end of the school semester too.

For your convenience, you can complete the survey using any of the following options:

- Filling in the attached **word document**, saving it and sending it to gmgad@iastate.edu , or
- Printing the attached pdf document, filling it as a **hard copy** and faxing it to +1-515-294-3845, or scanning it and sending by email to gmgad@iastate.edu, or
- Replying to this email with the best time to call you to complete it **over the phone**.

I will be more than happy to share the results of this study once completed, if you wish. The information collected will be kept confidential and it will only be used in aggregate for research purposes. Your participation in this survey is completely voluntary. I would really like to thank you for your commitment and help. Your valued opinion and experience adds greatly to this study. Should you have any questions, please contact me at gmgad@iastate.edu or +1-515-441-0217.

Sincerely,
Ghada M. Gad
PhD Candidate & Research Assistant
Civil, Construction & Environmental Engineering
Iowa State University
Cell: +1-515-441-0217

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FOURTH & LAST ROUND – DISPUTE RESOLUTION METHODS STUDY

QUESTION 1:

The purpose of this question is to try to reach a consensus among the experts on the ratings from round 3. In the 3rd round, the experts were asked to rate the factors listed in the table on the next page in terms of their effect on the choice of the respective Dispute Resolution Method (DRM) in an international construction contract, from -3 to 3, *with;*

-3	-2	-1	0	+1	+2	+3
Major negative effect	Moderate negative effect	Minor negative effect	No effect	Minor positive effect	Moderate positive effect	Major positive effect

Listed below are **2 ratings**; **your response** and **the group median**. Accordingly, please take one of the following actions in each cell (in the row named "Action"):

1. If your response is 0.5 units above or below the group median, it is shaded in grey and you may choose not to change it.
2. If your response is more than 0.5 units above or below the group median, **it is outlined** and you may choose to:
    a. Accept the group median rating by inserting **"ok".**
    b. Maintain your original response by inserting an **"x"** in the cell. If you choose to maintain the same response, please provide a reason for this decision in the space provided after the table.
    c. Indicate a totally new response by **placing a new rating**. If you choose to revise your response (with a response *more than 0.5 units above or below the group median*), please provide a reason for this decision in the space provided after the table.

Please proceed to the next page ⟶

#	FACTOR	Response	DISPUTE RESOLUTION METHODS									
			Negotiations	Mediation/ Conciliation	DAB	Adjudication	Arbitration	Med-Arb	Mini-trial	Early-Neutral Evaluations	Summary Jury Trial	Litigation
1	Cost of resolving the dispute	Yours										
		Group	3	2	1	1	-1	-1	0	0	-2	-3
		Action										
2	Time taken to resolve the dispute	Yours										
		Group	3	2	2	2	-0.5	-0.5	0	1	-2	-3
		Action										
3	National Law & Jurisdiction	Yours										
		Group	1.5	2	0.5	0.5	1.5	0	0	0	-2	-2.5
		Action										
4	Neutral party's technical knowledge	Yours										
		Group	2	2	2.5	1.5	2	1	0	1.5	0	-1.5
		Action										
5	Complexity of the contract/work	Yours										
		Group	2	3	2	0.5	1	1	0	0.5	0	-3
		Action										
6	Confidentiality and privacy	Yours										
		Group	3	2	1.5	1	1	1	0	1	0	-3
		Action										
7	Nationality of the parties	Yours										
		Group	2	1.5	0	0	0.5	0	0	0.5	0	-1.5
		Action										
8	Past experience with the DRM	Yours										
		Group	2	2	1.5	1.5	1	1	1	0.5	0	-1.5
		Action										
9	Binding outcome	Yours										
		Group	-1.5	-2	0	0.5	3	0.5	-1	-0.5	-2	3
		Action										

Please proceed to the next page →

#	FACTOR	Response	DISPUTE RESOLUTION METHODS									
			Negotiations	Mediation/ Conciliation	DAB	Adjudication	Arbitration	Med-Arb	Mini-trial	Early-Neutral Evaluations	Summary Jury Trial	Litigation
10	Contract/Funder/ Insurance requirements (mandated)	Yours										
		Group	0	0.5	0	0	0.5	0	0	0	0	1.5
		Action										
11	Court System	Yours										
		Group	0.5	0.5	0	0	0	0	0	0	-2	-3
		Action										
12	Enforceability of decision	Yours										
		Group	0	0	0	1	3	1	0	0	0	3
		Action										
13	Language used in the DRM	Yours										
		Group	2.5	2	2	1	2	1.5	1	1	1	-2
		Action										

Please provide explanation for **maintaining original response** or **placing a new rating**:

#	Factor	Explanation
1	Cost of resolving the dispute	
2	Time taken to resolve the dispute	
3	National Law & Jurisdiction	
4	Neutral party's technical knowledge	
5	Complexity of the contract/work	
6	Confidentiality and privacy	

Please proceed to the next page →

#	Factor	Explanation
7	Nationality of the parties	
8	Past experience with the DRM	
9	Binding outcome	
10	Contract/Funder/ Insurance requirements (mandated)	
11	Court System	
12	Enforceability of decision	
13	Language used in the DRM	

Please proceed to the next page →

QUESTION 2:

The purpose of this question is to try to reach a consensus among the experts on the scores from round 3. In the 3rd round: the experts were asked enter a score from 10 (least favorable) to 110 (most favorable) to indicate the suitability of each DRM given the project conditions (country, risk & trust) defined below.

Listed below are **2 ratings**; **your response** and **the group median**. Accordingly, please take one of the following actions in each cell (in the row named "Action"):

1. If your response is 10 units above or below the group median, it is shaded in grey and you may choose not to change it.
2. If your response is more than 10 units above or below the group median, **it is outlined** and you may choose to:
    a. Accept the group median rating by inserting **"ok".**
    b. Maintain your original response by inserting an **"x"** in the cell. If you choose to maintain the same response, please provide a reason for this decision in the space provided after the table.
    c. Indicate a totally new response by **placing a new rating**. If you choose to revise your response (with a response *more than 0.5 units above or below the group median*), please provide a reason for this decision in the space provided after the table.

Please proceed to the next page

Condition	Country	Response	Middle East						Asia					
	Risk Level		high risk			low risk			high risk			low risk		
	Trust Level		neutral	high	low	neutral	high	low	neutral	high	low	neutral	high	low
DRMs	Negotiations	Yours												
		Group	75	80	50	70	90	70	75	80	40	70	90	70
		Action												
	Mediation/ Conciliation	Yours												
		Group	70	80	60	70	80	65	70	80	50	70	80	65
		Action												
	DRB/DAB	Yours												
		Group	75	70	70	65	80	70	80	80	70	65	80	70
		Action												
	Adjudication	Yours												
		Group	65	65	60	60	70	65	70	80	65	60	80	65
		Action												
	Med-Arb	Yours												
		Group	65	60	60	65	65	65	65	80	55	65	80	60
		Action												
	Arbitration	Yours												
		Group	90	80	100	85	80	100	90	90	105	95	90	105
		Action												
	Early-Neutral Evaluations	Yours												
		Group	45	55	45	45	45	40	50	50	35	45	50	35
		Action												
	Summary Jury Trial	Yours												
		Group	20	20	20	20	20	20	20	20	25	25	25	25
		Action												
	Mini-trial	Yours												
		Group	20	20	20	30	30	20	25	25	25	25	25	25
		Action												
	Litigation	Yours												
		Group	20	20	60	20	20	25	15	15	40	15	15	20
		Action												

Please proceed to the next page ⟶

Please provide explanation for **maintaining original response** or **placing a new rating**:

#	Factor	Explanation
1	Negotiations	
2	Mediation/ Conciliation	
3	Dispute Review Board/ Dispute Adjudication Board	
4	Adjudication	
5	Med-Arb	
6	Arbitration	
7	Early-Neutral Evaluations	
8	Summary Jury Trial	
9	Mini-trial	
10	Litigation	

QUESTION 3:

Would you be interested in participating in a follow-up phone interview to discuss the results of this study for 20 minutes at the time of your convenience?

Yes No

Thank you so much for completing the fourth and last round of this study.
Your commitment and valuable contribution added significantly to this research.
I will be more than happy to share the results of this study once done with the analysis, if you wish.
If you have any questions or comments, please contact me at gmgad@iastate.edu or +1-515-441-0217

Sample Round Email Reminder

Dear Mr. Wilson,

About a week ago, I sent you the third round of questions for the study entitled the "Effect of Culture, Risk and Trust on the Choice of Dispute Resolution Methods (DRMs) in International Contracts". I would appreciate if you take around 15 minutes of your time to complete the second round (document attached in both pdf and word versions). If you would like to complete the survey over phone, please email gmgad@iastate.edu or call me on +1-515-441-0217 with the best time to call you.

I am especially grateful for your help and really appreciate your commitment to this study. I hope the results of this study will be of benefit to the construction industry. Once I receive your response, I will be able to compile all the experts' responses and send out the fourth and last round of questions. Should you have any questions, please contact me at gmgad@iastate.edu or +1-515-441-0217.

Regards,
Ghada M. Gad
PhD Candidate & Research Assistant
Civil, Construction and Environmental Engineering
Iowa State University

APPENDIX 3. FISHER'S EXACT TEST

CULTURE

Project Location * Negotiations

Crosstab

			Negotiations		
			No	Yes	Total
Project Location	Middle East	Count	6	12	18
		Expected Count	8.0	10.0	18.0
	Asia	Count	6	3	9
		Expected Count	4.0	5.0	9.0
Total		Count	12	15	27
		Expected Count	12.0	15.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.127	.109
N of Valid Cases	27				

Project Location * Mediation/conciliation

Crosstab

			Mediation/conciliation		
			No	Yes	Total
Project Location	Middle East	Count	11	7	18
		Expected Count	11.3	6.7	18.0
	Asia	Count	6	3	9
		Expected Count	5.7	3.3	9.0
Total		Count	17	10	27
		Expected Count	17.0	10.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				1.000	.561
N of Valid Cases	27				

Project Location * Arbitration

Crosstab

			Arbitration		
			No	Yes	Total
Project Location	Middle East	Count	3	15	18
		Expected Count	2.0	16.0	18.0
	Asia	Count	0	9	9
		Expected Count	1.0	8.0	9.0
Total		Count	3	24	27
		Expected Count	3.0	24.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.529	.279
N of Valid Cases	27				

Project Location * Dispute Review Board/Dispute Adjudication Board

Crosstab

			Dispute Review Board/Dispute Adjudication Board		
			No	Yes	Total
Project Location	Middle East	Count	13	5	18
		Expected Count	14.0	4.0	18.0
	Asia	Count	8	1	9
		Expected Count	7.0	2.0	9.0
Total		Count	21	6	27
		Expected Count	21.0	6.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.628	.323
N of Valid Cases	27				

Project Location * Adjudication

Crosstab

			Adjudication		
			No	Yes	Total
Project Location	Middle East	Count	14	4	18
		Expected Count	15.3	2.7	18.0
	Asia	Count	9	0	9
		Expected Count	7.7	1.3	9.0
Total		Count	23	4	27
		Expected Count	23.0	4.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.268	.174
N of Valid Cases	27				

Project Location * Litigation

Crosstab

			Litigation		
			No	Yes	Total
Project Location	Middle East	Count	14	4	18
		Expected Count	15.3	2.7	18.0
	Asia	Count	9	0	9
		Expected Count	7.7	1.3	9.0
Total		Count	23	4	27
		Expected Count	23.0	4.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.268	.174
N of Valid Cases	27				

RISK

Total Risk categorized (2) * Negotiation

Crosstab

			Total Risk categorized (2)		
			Low Risk	High Risk	Total
Negotiations	No	Count	7	5	12
		Expected Count	7.1	4.9	12.0
	Yes	Count	9	6	15
		Expected Count	8.9	6.1	15.0
Total		Count	16	11	27
		Expected Count	16.0	11.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				1.000	.619
N of Valid Cases	27				

Total Risk categorized (2) * Mediation/conciliation

Crosstab

			Mediation/conciliation		
			No	Yes	Total
Total Risk categorized (2)	Low Risk	Count	10	6	16
		Expected Count	10.1	5.9	16.0
	High Risk	Count	7	4	11
		Expected Count	6.9	4.1	11.0
Total		Count	17	10	27
		Expected Count	17.0	10.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				1.000	.637
N of Valid Cases	27				

Total Risk categorized (2) * Arbitration

Crosstab

			Arbitration		
			No	Yes	Total
Total Risk categorized (2)	Low Risk	Count	2	14	16
		Expected Count	1.8	14.2	16.0
	High Risk	Count	1	10	11
		Expected Count	1.2	9.8	11.0
Total		Count	3	24	27
		Expected Count	3.0	24.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				1.000	.643
N of Valid Cases	27				

Total Risk categorized (2) * Dispute Review Board/Dispute Adjudication Board

Crosstab

			Dispute Review Board/Dispute Adjudication Board		
			No	Yes	Total
Total Risk categorized (2)	Low Risk	Count	13	3	16
		Expected Count	12.4	3.6	16.0
	High Risk	Count	8	3	11
		Expected Count	8.6	2.4	11.0
Total		Count	21	6	27
		Expected Count	21.0	6.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.662	.472
N of Valid Cases	27				

Total Risk categorized (2) * Adjudication

Crosstab

			Adjudication		
			No	Yes	Total
Total Risk categorized (2)	Low Risk	Count	15	1	16
		Expected Count	13.6	2.4	16.0
	High Risk	Count	8	3	11
		Expected Count	9.4	1.6	11.0
Total		Count	23	4	27
		Expected Count	23.0	4.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.273	.169
N of Valid Cases	27				

Total Risk categorized (2) * Litigation

Crosstab

			Litigation		
			No	Yes	Total
Total Risk categorized (2)	Low Risk	Count	12	4	16
		Expected Count	13.6	2.4	16.0
	High Risk	Count	11	0	11
		Expected Count	9.4	1.6	11.0
Total		Count	23	4	27
		Expected Count	23.0	4.0	27.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Fisher's Exact Test				.123	.104
N of Valid Cases	27				

TRUST

Total Trust categorized 3 levels * Negotiations

Crosstab

			Negotiation		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	5	6	11
	Neutral Trust	Count	3	8	11
	High Trust	Count	4	1	5
Total		Count	12	15	27

Fisher's Exact Test p-value (2-sided)	0.115

Total Trust categorized 3 levels * Mediation

Crosstab

			Mediation		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	6	5	11
	Neutral Trust	Count	7	4	11
	High Trust	Count	4	1	5
Total		Count	17	10	27

Fisher's Exact Test p-value (2-sided)	0.871

Total Trust categorized 3 levels * Arbitration

Crosstab

			Arbitration		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	0	11	11
	Neutral Trust	Count	2	9	11
	High Trust	Count	1	4	5
Total		Count	3	24	27

Fisher's Exact Test p-value (2-sided)	0.378

Total Trust categorized 3 levels * Dispute Review Board/Dispute Adjudication Board Crosstab

			DAB/DRB		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	11	0	11
	Neutral Trust	Count	6	5	11
	High Trust	Count	4	1	5
Total		Count	21	6	27

Fisher's Exact Test p-value (2-sided)	0.034

Total Trust categorized 3 levels * Adjudication Crosstab

			Adjudication		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	10	1	11
	Neutral Trust	Count	10	1	11
	High Trust	Count	3	2	5
Total		Count	23	5	27

Fisher's Exact Test p-value (2-sided)	0.207

Total Trust categorized 3 levels * Litigation Crosstab

			Litigation		
			No	Yes	Total
Total Trust categorized 2 levels	Low Trust	Count	9	2	11
	Neutral Trust	Count	9	2	11
	High Trust	Count	5	0	5
Total		Count	23	4	27

Fisher's Exact Test p-value (2-sided)	0.483

APPENDIX 4. KENDALL'S CONCORDANCE COEFFICIENT – MEASURING EXPERTS' AGREEMENT

CULTURE

Middle East – Round 3

Ranks[a]

	Mean Rank
Negotiations	7.07
Mediation	6.43
DRB	7.21
Adjudication	5.93
MedArb	5.64
Arbitration	8.86
Early Neutral	4.64
SJT	3.43
Mini-trial	3.43
Litigation	2.36

a. Round = 3, Culture = ME

Test Statistics[b]

N	7
Kendall's W[a]	.471
Chi-Square	29.645
df	9
Asymp. Sig.	.001

a. Kendall's Coefficient of Concordance
b. Round = 3, Culture = ME

Middle East – Round 4

Ranks[a]

	Mean Rank
Negotiations	7.36
Mediation	7.14
DRB	7.14
Adjudication	5.57
MedArb	6.29
Arbitration	8.86
EarlyNeutral	4.79
SJT	1.86
Minitrial	3.00
Litigation	3.00

a. Round = 4, Culture = ME

Test Statistics[b]

N	7
Kendall's W[a]	.588
Chi-Square	37.029
df	9
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance
b. Round = 4, Culture = ME

Asia – Round 3

Ranks[a]

	Mean Rank
Negotiations	7.42
Mediation	6.25
DRB	6.92
Adjudication	5.92
MedArb	5.83
Arbitration	8.67
EarlyNeutral	4.58
SJT	3.75
Minitrial	3.42
Litigation	2.25

a. Round = 3, Culture = Asia

Test Statistics[b]

N	6
Kendall's W[a]	.445
Chi-Square	24.044
df	9
Asymp. Sig.	.004

a. Kendall's Coefficient of Concordance
b. Round = 3, Culture = Asia

Asia – Round 4

Ranks[a]

	Mean Rank
Negotiations	7.25
Mediation	7.00
DRB	7.25
Adjudication	5.50
MedArb	6.42
Arbitration	8.67
EarlyNeutral	4.75
SJT	2.75
Minitrial	3.42
Litigation	2.00

a. Round = 4, Culture = Asia

Test Statistics[b]

N	6
Kendall's W[a]	.549
Chi-Square	29.641
df	9
Asymp. Sig.	.001

a. Kendall's Coefficient of Concordance
b. Round = 4, Culture = Asia

RISK

Ranks

Risk	Round		Mean Rank
high	3	Negotiations	6.50
		Mediation	5.64
		DRB	7.07
		Adjudication	6.36
		MedArb	5.29
		Arbitration	8.86
		EarlyNeutral	5.79
		SJT	3.86
		Minitrial	2.86
		Litigation	2.79
	4	Negotiations	6.36
		Mediation	6.86
		DRB	7.50
		Adjudication	6.07
		MedArb	6.14
		Arbitration	8.86
		EarlyNeutral	5.21
		SJT	1.86
		Minitrial	2.86
		Litigation	3.29
low	3	Negotiations	7.14
		Mediation	7.36
		DRB	6.93
		Adjudication	5.64
		MedArb	5.79
		Arbitration	8.71
		EarlyNeutral	4.36
		SJT	3.07
		Minitrial	3.79
		Litigation	2.21
	4	Negotiations	7.36
		Mediation	7.79
		DRB	6.86
		Adjudication	5.50
		MedArb	6.36
		Arbitration	8.79

	EarlyNeutral	4.57
	SJT	2.71
	Minitrial	3.14
	Litigation	1.93

Test Statistics

high	3	N	7
		Kendall's W[a]	.412
		Chi-Square	25.962
		df	9
		Asymp. Sig.	.002
	4	N	7
		Kendall's W[a]	.548
		Chi-Square	34.513
		df	9
		Asymp. Sig.	.000
low	3	N	7
		Kendall's W[a]	.502
		Chi-Square	31.635
		df	9
		Asymp. Sig.	.000
	4	N	7
		Kendall's W[a]	.616
		Chi-Square	38.779
		df	9
		Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

TRUST

Ranks

Trust	Round		Mean Rank
high	3	Negotiations	8.64
		Mediation	7.14
		DRB	6.71
		Adjudication	5.79
		MedArb	5.43
		Arbitration	7.57
		EarlyNeutral	4.79
		SJT	3.14
		Minitrial	3.50
		Litigation	2.29
	4	Negotiations	9.43
		Mediation	7.64
		DRB	6.21
		Adjudication	5.36
		MedArb	6.36
		Arbitration	7.71
		EarlyNeutral	4.43
		SJT	2.50
		Minitrial	3.29
		Litigation	2.07
low	3	Negotiations	6.00
		Mediation	5.57
		DRB	7.07
		Adjudication	6.50
		MedArb	5.79
		Arbitration	9.64
		EarlyNeutral	3.93
		SJT	3.14
		Minitrial	3.29
		Litigation	4.07
	4	Negotiations	5.21
		Mediation	6.36
		DRB	7.79
		Adjudication	6.36
		MedArb	6.57
		Arbitration	10.00
		EarlyNeutral	4.71

		SJT	2.21
		Minitrial	2.36
		Litigation	3.43
neut	3	Negotiations	7.50
		Mediation	6.14
		DRB	6.79
		Adjudication	5.64
		MedArb	5.21
		Arbitration	8.71
		EarlyNeutral	5.93
		SJT	3.64
		Minitrial	3.07
		Litigation	2.36
	4	Negotiations	8.14
		Mediation	6.86
		DRB	6.93
		Adjudication	5.21
		MedArb	6.14
		Arbitration	8.71
		EarlyNeutral	5.14
		SJT	2.50
		Minitrial	3.29
		Litigation	2.07

Test Statistics

high	3	N	7
		Kendall's W[a]	.493
		Chi-Square	31.075
		df	9
		Asymp. Sig.	.000
	4	N	7
		Kendall's W[a]	.672
		Chi-Square	42.342
		df	9
		Asymp. Sig.	.000
low	3	N	7
		Kendall's W[a]	.462
		Chi-Square	29.081
		df	9
		Asymp. Sig.	.001

	4	N	7
		Kendall's W[a]	.676
		Chi-Square	42.560
		df	9
		Asymp. Sig.	.000
neut	3	N	7
		Kendall's W[a]	.456
		Chi-Square	28.740
		df	9
		Asymp. Sig.	.001
	4	N	7
		Kendall's W[a]	.598
		Chi-Square	37.659
		df	9
		Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

APPENDIX 5. MANN-WHITNEY RANK-SUM TEST – PURPOSE 1: COMPARING BETWEEN PROJECT CONDITION LEVELS

CULTURE

Ranks

DRM		Culture	N	Mean Rank	Sum of Ranks
Adjudication	Score given by expert in Round 4	Asia	36	43.04	1549.50
		ME	48	42.09	2020.50
		Total	84		
Arbitration	Score given by expert in Round 4	Asia	36	46.22	1664.00
		ME	48	39.71	1906.00
		Total	84		
DRB/DAB	Score given by expert in Round 4	Asia	36	45.17	1626.00
		ME	48	40.50	1944.00
		Total	84		
Early Neutral Evaluation	Score given by expert in Round 4	Asia	36	42.22	1520.00
		ME	48	42.71	2050.00
		Total	84		
Litigation	Score given by expert in Round 4	Asia	36	38.64	1391.00
		ME	48	45.40	2179.00
		Total	84		
Med-Arb	Score given by expert in Round 4	Asia	36	49.17	1770.00
		ME	48	37.50	1800.00
		Total	84		
Mediation	Score given by expert in Round 4	Asia	36	44.46	1600.50
		ME	48	41.03	1969.50
		Total	84		
Mini-trial	Score given by expert in Round 4	Asia	36	44.58	1605.00
		ME	42	35.14	1476.00
		Total	78		
Negotiation	Score given by expert in Round 4	Asia	36	43.36	1561.00
		ME	48	41.85	2009.00
		Total	84		
Summary Jury Trial	Score given by expert in Round 4	Asia	36	45.33	1632.00
		ME	42	34.50	1449.00
		Total	78		

Test Statistics[a]

DRM		Score given by expert in Round 4
Adjudication	Mann-Whitney U	844.500
	Wilcoxon W	2020.500
	Z	-.178
	Asymp. Sig. (2-tailed)	.859
Arbitration	Mann-Whitney U	730.000
	Wilcoxon W	1906.000
	Z	-1.236
	Asymp. Sig. (2-tailed)	.216
DRB/DAB	Mann-Whitney U	768.000
	Wilcoxon W	1944.000
	Z	-.889
	Asymp. Sig. (2-tailed)	.374
Early Neutral Evaluation	Mann-Whitney U	854.000
	Wilcoxon W	1520.000
	Z	-.091
	Asymp. Sig. (2-tailed)	.927
Litigation	Mann-Whitney U	725.000
	Wilcoxon W	1391.000
	Z	-1.290
	Asymp. Sig. (2-tailed)	.197
Med-Arb	Mann-Whitney U	624.000
	Wilcoxon W	1800.000
	Z	-2.242
	Asymp. Sig. (2-tailed)	.025
Mediation	Mann-Whitney U	793.500
	Wilcoxon W	1969.500
	Z	-.654
	Asymp. Sig. (2-tailed)	.513
Mini-trial	Mann-Whitney U	573.000
	Wilcoxon W	1476.000
	Z	-1.882
	Asymp. Sig. (2-tailed)	.060
Negotiation	Mann-Whitney U	833.000
	Wilcoxon W	2009.000
	Z	-.284
	Asymp. Sig. (2-tailed)	.776
Summary Jury Trial	Mann-Whitney U	546.000
	Wilcoxon W	1449.000
	Z	-2.160
	Asymp. Sig. (2-tailed)	.031

a. Grouping Variable: Culture

RISK

Ranks				
	Risk level	N	Mean Rank	Sum of Ranks
Adjudication_Score	Low Risk	42	41.95	1762.00
	High Risk	42	43.05	1808.00
	Total	84		
Arbitration_Score	Low Risk	42	42.77	1796.50
	High Risk	42	42.23	1773.50
	Total	84		
DAB_Score	Low Risk	42	39.95	1678.00
	High Risk	42	45.05	1892.00
	Total	84		
Early Neutral Evaluation_Score	Low Risk	42	39.81	1672.00
	High Risk	42	45.19	1898.00
	Total	84		
Litigation_Score	Low Risk	42	39.39	1654.50
	High Risk	42	45.61	1915.50
	Total	84		
MedArb_Score	Low Risk	42	44.05	1850.00
	High Risk	42	40.95	1720.00
	Total	84		
Mediation_Score	Low Risk	42	45.70	1919.50
	High Risk	42	39.30	1650.50
	Total	84		
MiniTrial_Score	Low Risk	48	51.56	2475.00
	High Risk	48	45.44	2181.00
	Total	96		
Negotiation_Score	Low Risk	42	44.02	1849.00
	High Risk	42	40.98	1721.00
	Total	84		
Summary Jury Trial_Score	Low Risk	48	51.28	2461.50
	High Risk	48	45.72	2194.50
	Total	96		

Test Statistics[a]

DRM		Score given by expert in Round 4
Adjudication	Mann-Whitney U	859.000
	Wilcoxon W	1762.000
	Z	-.208
	Asymp. Sig. (2-tailed)	.835
Arbitration	Mann-Whitney U	870.500
	Wilcoxon W	1773.500
	Z	-.105
	Asymp. Sig. (2-tailed)	.916
DAB	Mann-Whitney U	775.000
	Wilcoxon W	1678.000
	Z	-.981
	Asymp. Sig. (2-tailed)	.327
Early Neutral Evaluation	Mann-Whitney U	769.000
	Wilcoxon W	1672.000
	Z	-1.022
	Asymp. Sig. (2-tailed)	.307
Litigation	Mann-Whitney U	751.500
	Wilcoxon W	1654.500
	Z	-1.199
	Asymp. Sig. (2-tailed)	.231
Med-Arb	Mann-Whitney U	817.000
	Wilcoxon W	1720.000
	Z	-.601
	Asymp. Sig. (2-tailed)	.548
Mediation	Mann-Whitney U	747.500
	Wilcoxon W	1650.500
	Z	-1.235
	Asymp. Sig. (2-tailed)	.217
Mini-trial	Mann-Whitney U	613.500
	Wilcoxon W	1393.500
	Z	-1.507
	Asymp. Sig. (2-tailed)	.132
Negotiation	Mann-Whitney U	803.000
	Wilcoxon W	1706.000
	Z	-.717
	Asymp. Sig. (2-tailed)	.473
Summary Jury Trial	Mann-Whitney U	627.000
	Wilcoxon W	1407.000
	Z	-1.369
	Asymp. Sig. (2-tailed)	.171

a. Grouping Variable: Risk level

TRUST

Ranks

DRM		Trust level	N	Mean Rank
Adjudication	Score given by expert in Round 4	Low Trust	28	40.48
		High Trust	28	47.57
		Neutral	28	39.45
		Total	84	
Arbitration	Score given by expert in Round 4	Low Trust	28	63.04
		High Trust	28	27.43
		Neutral	28	37.04
		Total	84	
DAB	Score given by expert in Round 4	Low Trust	28	38.77
		High Trust	28	48.54
		Neutral	28	40.20
		Total	84	
Early Neutral Evaluation	Score given by expert in Round 4	Low Trust	28	36.77
		High Trust	28	47.11
		Neutral	28	43.63
		Total	84	
Litigation	Score given by expert in Round 4	Low Trust	28	55.02
		High Trust	28	34.96
		Neutral	28	37.52
		Total	84	
Med-Arb	Score given by expert in Round 4	Low Trust	28	37.59
		High Trust	28	49.09
		Neutral	28	40.82
		Total	84	
Mediation	Score given by expert in Round 4	Low Trust	28	26.96
		High Trust	28	57.41
		Neutral	28	43.13
		Total	84	
Mini-trial	Score given by expert in Round 4	Low Trust	26	35.73
		High Trust	26	41.56
		Neutral	26	41.21
		Total	78	
Negotiation	Score given by expert in Round 4	Low Trust	28	22.70
		High Trust	28	62.32
		Neutral	28	42.48
		Total	84	
Summary Jury Trial	Score given by expert in Round 4	Low Trust	26	43.15
		High Trust	26	38.08
		Neutral	26	37.27
		Total	78	

Test Statistics[a,b]

DRM		Score given by expert in Round 4
Adjudication	Chi-Square	1.879
	df	2
	Asymp. Sig.	.391
Arbitration	Chi-Square	33.286
	df	2
	Asymp. Sig.	.000
DAB	Chi-Square	2.752
	df	2
	Asymp. Sig.	.253
Early Neutral Evaluation	Chi-Square	2.662
	df	2
	Asymp. Sig.	.264
Litigation	Chi-Square	11.828
	df	2
	Asymp. Sig.	.003
Med-Arb	Chi-Square	3.535
	df	2
	Asymp. Sig.	.171
Mediation	Chi-Square	22.995
	df	2
	Asymp. Sig.	.000
Mini-trial	Chi-Square	1.139
	df	2
	Asymp. Sig.	.566
Negotiation	Chi-Square	38.026
	df	2
	Asymp. Sig.	.000
Summary Jury Trial	Chi-Square	1.085
	df	2
	Asymp. Sig.	.581

a. Kruskal Wallis Test
b. Grouping Variable: Trust level

APPENDIX 6. MANN-WHITNEY RANK-SUM TEST – PURPOSE 2: COMPARING BETWEEN DRMS IN EACH PROJECT CONDITION

ASIA

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	36	43.51	1566.50
	Negotiation	36	29.49	1061.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	395.500
Wilcoxon W	1061.500
Z	-2.880
Asymp. Sig. (2-tailed)	.004

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	36	35.04	1261.50
	Negotiation	36	37.96	1366.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	595.500
Wilcoxon W	1261.500
Z	-.603
Asymp. Sig. (2-tailed)	.546

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Med-Arb	36	36.46	1312.50
	Mediation	36	36.54	1315.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	646.500
Wilcoxon W	1312.500
Z	-.017
Asymp. Sig. (2-tailed)	.986

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	36	36.76	1323.50
	Med-Arb	36	36.24	1304.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	638.500
Wilcoxon W	1304.500
Z	-.111
Asymp. Sig. (2-tailed)	.912

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	36	32.38	1165.50
	DAB	36	40.63	1462.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	499.500
Wilcoxon W	1165.500
Z	-1.694
Asymp. Sig. (2-tailed)	.090

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	36	37.71	1357.50
	Early Neutral Evaluation	36	35.29	1270.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	604.500
Wilcoxon W	1270.500
Z	-.495
Asymp. Sig. (2-tailed)	.621

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	36	49.33	1776.00
	Mini-trial	36	23.67	852.00
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	186.000
Wilcoxon W	852.000
Z	-5.266
Asymp. Sig. (2-tailed)	.000

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	36	39.08	1407.00
	Summary Jury Trial	36	33.92	1221.00
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	555.000
Wilcoxon W	1221.000
Z	-1.090
Asymp. Sig. (2-tailed)	.276

a. Culture = Asia
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	36	31.68	1140.50
	Summary Jury Trial	36	41.32	1487.50
	Total	72		

a. Culture = Asia

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	474.500
Wilcoxon W	1140.500
Z	-1.988
Asymp. Sig. (2-tailed)	.047

a. Culture = Asia
b. Grouping Variable: DRM

MIDDLE EAST

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	48	57.49	2759.50
	Negotiation	48	39.51	1896.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	720.500
Wilcoxon W	1896.500
Z	-3.214
Asymp. Sig. (2-tailed)	.001

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	48	46.49	2231.50
	Negotiation	48	50.51	2424.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	1055.500
Wilcoxon W	2231.500
Z	-.720
Asymp. Sig. (2-tailed)	.472

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	48	47.66	2287.50
	Mediation	48	49.34	2368.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	1111.500
Wilcoxon W	2287.500
Z	-.305
Asymp. Sig. (2-tailed)	.760

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	48	52.31	2511.00
	Med-Arb	48	44.69	2145.00
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	969.000
Wilcoxon W	2145.000
Z	-1.362
Asymp. Sig. (2-tailed)	.173

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	48	44.91	2155.50
	Med-Arb	48	52.09	2500.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	979.500
Wilcoxon W	2155.500
Z	-1.276
Asymp. Sig. (2-tailed)	.202

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	48	53.91	2587.50
	Early Neutral Evaluation	48	43.09	2068.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	892.500
Wilcoxon W	2068.500
Z	-1.914
Asymp. Sig. (2-tailed)	.056

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	48	61.22	2938.50
	Litigation	48	35.78	1717.50
	Total	96		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	541.500
Wilcoxon W	1717.500
Z	-4.502
Asymp. Sig. (2-tailed)	.000

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	48	43.98	2111.00
	Mini-trial	42	47.24	1984.00
	Total	90		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	935.000
Wilcoxon W	2111.000
Z	-.610
Asymp. Sig. (2-tailed)	.542

a. Culture = ME
b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	42	46.43	1950.00
	Summary Jury Trial	42	38.57	1620.00
	Total	84		

a. Culture = ME

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	717.000
Wilcoxon W	1620.000
Z	-1.543
Asymp. Sig. (2-tailed)	.123

a. Culture = ME
b. Grouping Variable: DRM

LOW RISK

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	42	49.75	2089.50
	Negotiation	42	35.25	1480.50
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	577.500
Wilcoxon W	1480.500
Z	-2.759
Asymp. Sig. (2-tailed)	.006

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	42	40.89	1717.50
	Negotiation	42	44.11	1852.50
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	814.500
Wilcoxon W	1717.500
Z	-.619
Asymp. Sig. (2-tailed)	.536

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Med-Arb	42	38.63	1622.50
	Mediation	42	46.37	1947.50
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	719.500
Wilcoxon W	1622.500
Z	-1.486
Asymp. Sig. (2-tailed)	.137

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	42	42.94	1803.50
	Med-Arb	42	42.06	1766.50
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	863.500
Wilcoxon W	1766.500
Z	-.168
Asymp. Sig. (2-tailed)	.866

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	42	37.30	1566.50
	DAB	42	47.70	2003.50
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	663.500
Wilcoxon W	1566.500
Z	-1.981
Asymp. Sig. (2-tailed)	.048

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	42	46.74	1963.00
	Early Neutral Evaluation	42	38.26	1607.00
	Total	84		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	704.000
Wilcoxon W	1607.000
Z	-1.603
Asymp. Sig. (2-tailed)	.109

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	42	54.27	2279.50
	Mini-trial	39	26.71	1041.50
	Total	81		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	261.500
Wilcoxon W	1041.500
Z	-5.313
Asymp. Sig. (2-tailed)	.000

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	39	43.31	1689.00
	Summary Jury Trial	39	35.69	1392.00
	Total	78		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	612.000
Wilcoxon W	1392.000
Z	-1.519
Asymp. Sig. (2-tailed)	.129

a. Risk level = Low Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	42	35.07	1473.00
	Summary Jury Trial	39	47.38	1848.00
	Total	81		

a. Risk level = Low Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	570.000
Wilcoxon W	1473.000
Z	-2.408
Asymp. Sig. (2-tailed)	.016

a. Risk level = Low Risk

b. Grouping Variable: DRM

HIGH RISK

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	42	51.12	2147.00
	Negotiation	42	33.88	1423.00
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	520.000
Wilcoxon W	1423.000
Z	-3.303
Asymp. Sig. (2-tailed)	.001

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	42	40.77	1712.50
	Negotiation	42	44.23	1857.50
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	809.500
Wilcoxon W	1712.500
Z	-.660
Asymp. Sig. (2-tailed)	.510

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	42	44.37	1863.50
	Mediation	42	40.63	1706.50
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	803.500
Wilcoxon W	1706.500
Z	-.723
Asymp. Sig. (2-tailed)	.470

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Med-Arb	42	41.01	1722.50
	Mediation	42	43.99	1847.50
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	819.500
Wilcoxon W	1722.500
Z	-.572
Asymp. Sig. (2-tailed)	.567

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	42	39.45	1657.00
	Med-Arb	42	45.55	1913.00
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	754.000
Wilcoxon W	1657.000
Z	-1.155
Asymp. Sig. (2-tailed)	.248

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	42	44.64	1875.00
	Early Neutral Evaluation	42	40.36	1695.00
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	792.000
Wilcoxon W	1695.000
Z	-.812
Asymp. Sig. (2-tailed)	.417

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	42	52.86	2220.00
	Litigation	42	32.14	1350.00
	Total	84		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	447.000
Wilcoxon W	1350.000
Z	-3.914
Asymp. Sig. (2-tailed)	.000

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	42	39.68	1666.50
	Mini-trial	39	42.42	1654.50
	Total	81		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	763.500
Wilcoxon W	1666.500
Z	-.532
Asymp. Sig. (2-tailed)	.594

a. Risk level = High Risk

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	39	43.19	1684.50
	Summary Jury Trial	39	35.81	1396.50
	Total	78		

a. Risk level = High Risk

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	616.500
Wilcoxon W	1396.500
Z	-1.475
Asymp. Sig. (2-tailed)	.140

a. Risk level = High Risk

b. Grouping Variable: DRM

LOW TRUST

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	28	41.50	1162.00
	DAB	28	15.50	434.00
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	28.000
Wilcoxon W	434.000
Z	-6.105
Asymp. Sig. (2-tailed)	.000

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	28	29.96	839.00
	Med-Arb	28	27.04	757.00
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	351.000
Wilcoxon W	757.000
Z	-.689
Asymp. Sig. (2-tailed)	.491

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Med-Arb	28	29.59	828.50
	Mediation	28	27.41	767.50
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	361.500
Wilcoxon W	767.500
Z	-.507
Asymp. Sig. (2-tailed)	.612

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	28	30.71	860.00
	Negotiation	28	26.29	736.00
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	330.000
Wilcoxon W	736.000
Z	-1.029
Asymp. Sig. (2-tailed)	.304

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	28.45	796.50
	Negotiation	28	28.55	799.50
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	390.500
Wilcoxon W	796.500
Z	-.025
Asymp. Sig. (2-tailed)	.980

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	31.20	873.50
	Early Neutral Evaluation	28	25.80	722.50
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	316.500
Wilcoxon W	722.500
Z	-1.244
Asymp. Sig. (2-tailed)	.213

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	28	31.46	881.00
	Litigation	28	25.54	715.00
	Total	56		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	309.000
Wilcoxon W	715.000
Z	-1.371
Asymp. Sig. (2-tailed)	.171

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	28	30.93	866.00
	Mini-trial	26	23.81	619.00
	Total	54		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	268.000
Wilcoxon W	619.000
Z	-1.678
Asymp. Sig. (2-tailed)	.093

a. Trust level = Low Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	26	26.54	690.00
	Summary Jury Trial	26	26.46	688.00
	Total	52		

a. Trust level = Low Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	337.000
Wilcoxon W	688.000
Z	-.019
Asymp. Sig. (2-tailed)	.985

a. Trust level = Low Trust

b. Grouping Variable: DRM

NEUTRAL TRUST

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	28	33.16	928.50
	Negotiation	28	23.84	667.50
	Total	56		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	261.500
Wilcoxon W	667.500
Z	-2.162
Asymp. Sig. (2-tailed)	.031

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	28	26.86	752.00
	Negotiation	28	30.14	844.00
	Total	56		

a. Trust level = Neutra

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	346.000
Wilcoxon W	752.000
Z	-.800
Asymp. Sig. (2-tailed)	.424

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	28	27.32	765.00
	Mediation	28	29.68	831.00
	Total	56		

a. Trust level = Neutra

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	359.000
Wilcoxon W	765.000
Z	-.556
Asymp. Sig. (2-tailed)	.578

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	28	29.61	829.00
	Med-Arb	28	27.39	767.00
	Total	56		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	361.000
Wilcoxon W	767.000
Z	-.527
Asymp. Sig. (2-tailed)	.598

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	24.57	688.00
	Med-Arb	28	32.43	908.00
	Total	56		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	282.000
Wilcoxon W	688.000
Z	-1.827
Asymp. Sig. (2-tailed)	.068

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	29.75	833.00
	Early Neutral Evaluation	28	27.25	763.00
	Total	56		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	357.000
Wilcoxon W	763.000
Z	-.578
Asymp. Sig. (2-tailed)	.563

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	28	36.86	1032.00
	Mini-trial	26	17.42	453.00
	Total	54		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	102.000
Wilcoxon W	453.000
Z	-4.576
Asymp. Sig. (2-tailed)	.000

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	26	30.10	782.50
	Summary Jury Trial	26	22.90	595.50
	Total	52		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	244.500
Wilcoxon W	595.500
Z	-1.748
Asymp. Sig. (2-tailed)	.080

a. Trust level = Neutral

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	28	24.98	699.50
	Summary Jury Trial	26	30.21	785.50
	Total	54		

a. Trust level = Neutral

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	293.500
Wilcoxon W	699.500
Z	-1.264
Asymp. Sig. (2-tailed)	.206

a. Trust level = Neutral

b. Grouping Variable: DRM

HIGH TRUST

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mediation	28	22.98	643.50
	Negotiation	28	34.02	952.50
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	237.500
Wilcoxon W	643.500
Z	-2.706
Asymp. Sig. (2-tailed)	.007

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	28	28.14	788.00
	Mediation	28	28.86	808.00
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	382.000
Wilcoxon W	788.000
Z	-.177
Asymp. Sig. (2-tailed)	.859

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Arbitration	28	29.93	838.00
	DAB	28	27.07	758.00
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	352.000
Wilcoxon W	758.000
Z	-.671
Asymp. Sig. (2-tailed)	.502

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	DAB	28	29.50	826.00
	Med-Arb	28	27.50	770.00
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	364.000
Wilcoxon W	770.000
Z	-.468
Asymp. Sig. (2-tailed)	.640

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	26.27	735.50
	Med-Arb	28	30.73	860.50
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	329.500
Wilcoxon W	735.500
Z	-1.038
Asymp. Sig. (2-tailed)	.299

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Adjudication	28	31.25	875.00
	Early Neutral Evaluation	28	25.75	721.00
	Total	56		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	315.000
Wilcoxon W	721.000
Z	-1.277
Asymp. Sig. (2-tailed)	.202

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Early Neutral Evaluation	28	36.71	1028.00
	Mini-trial	26	17.58	457.00
	Total	54		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	106.000
Wilcoxon W	457.000
Z	-4.498
Asymp. Sig. (2-tailed)	.000

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Mini-trial	26	30.00	780.00
	Summary Jury Trial	26	23.00	598.00
	Total	52		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	247.000
Wilcoxon W	598.000
Z	-1.702
Asymp. Sig. (2-tailed)	.089

a. Trust level = High Trust

b. Grouping Variable: DRM

Ranks[a]

	DRM	N	Mean Rank	Sum of Ranks
Score given by expert in Round 4	Litigation	28	23.43	656.00
	Summary Jury Trial	26	31.88	829.00
	Total	54		

a. Trust level = High Trust

Test Statistics[a,b]

	Score given by expert in Round 4
Mann-Whitney U	250.000
Wilcoxon W	656.000
Z	-2.048
Asymp. Sig. (2-tailed)	.041

a. Trust level = High Trust

b. Grouping Variable: DRM

APPENDIX 7. MULTIVARIATE ANALYSIS OF VARIANCE (MANOVA)

Correlations

		Adjudication_Score	Arbitration_Score	DAB_Score	Early Neutral Evaluation_Score	Litigation_Score	MedArb_Score	Mediation_Score	MiniTrial_Score	Negotiation_Score	Summary Jury Trial_
Adjudication_Score	Pearson Correlation	1	-.083	.694	.699	-.160	.186	.480	.522	.222	.492
	Sig. (2-tailed)		.453	.000	.000	.145	.090	.000	.000	.042	.000
	N	84	84	84	84	84	84	84	78	84	78
Arbitration_Score	Pearson Correlation	-.083	1	-.156	-.269	.139	.051	-.572	-.544	-.509	-.481
	Sig. (2-tailed)	.453		.156	.013	.208	.643	.000	.000	.000	.000
	N	84	84	84	84	84	84	84	78	84	78
DAB_Score	Pearson Correlation	.694	-.156	1	.771	-.483	-.032	.508	.462	.165	.389
	Sig. (2-tailed)	.000	.156		.000	.000	.773	.000	.000	.134	.000
	N	84	84	84	84	84	84	84	78	84	78
Early Neutral Evaluation_Score	Pearson Correlation	.699	-.269	.771	1	-.174	.294	.624	.705	.302	.679
	Sig. (2-tailed)	.000	.013	.000		.114	.007	.000	.000	.005	.000
	N	84	84	84	84	84	84	84	78	84	78

Litigation_Score	Pearson Correlation	-.160	.139	-.483	-.174	1	.171	-.228	.175	-.312	.255
	Sig. (2-tailed)	.145	.208	.000	.114		.119	.037	.125	.004	.024
	N	84	84	84	84	84	84	84	78	84	78
MedArb_Score	Pearson Correlation	.186	.051	-.032	.294	.171	1	.384	.291	.452	.340
	Sig. (2-tailed)	.090	.643	.773	.007	.119		.000	.010	.000	.002
	N	84	84	84	84	84	84	84	78	84	78
Mediation_Score	Pearson Correlation	.480	-.572	.508	.624	-.228	.384	1	.706	.702	.685
	Sig. (2-tailed)	.000	.000	.000	.000	.037	.000		.000	.000	.000
	N	84	84	84	84	84	84	84	78	84	78
MiniTrial_Score	Pearson Correlation	.522	-.544	.462	.705	.175	.291	.706	1	.291	.954
	Sig. (2-tailed)	.000	.000	.000	.000	.125	.010	.000		.010	.000
	N	78	78	78	78	78	78	78	78	78	78
Negotiation_Score	Pearson Correlation	.222	-.509	.165	.302	-.312	.452	.702	.291	1	.255
	Sig. (2-tailed)	.042	.000	.134	.005	.004	.000	.000	.010		.024
	N	84	84	84	84	84	84	84	78	84	78
Summary Jury Trial_Score	Pearson Correlation	.492	-.481	.389	.679	.255	.340	.685	.954	.255	1
	Sig. (2-tailed)	.000	.000	.000	.000	.024	.002	.000	.000	.024	
	N	78	78	78	78	78	78	78	78	78	78

Descriptive Statistics

	Culture	Risk level	Trust level	Mean	Std. Deviation	N
Adjudication_ Score	Asia	Low Risk	Low Trust	58.33	32.965	6
			High Trust	66.67	38.297	6
			Neutral	53.33	30.768	6
			Total	59.44	32.580	18
		High Risk	Low Trust	58.33	32.965	6
			High Trust	66.67	38.297	6
			Neutral	61.67	35.449	6
			Total	62.22	33.660	18
		Total	Low Trust	58.33	31.431	12
			High Trust	66.67	36.515	12
			Neutral	57.50	31.945	12
			Total	60.83	32.678	36
	ME	Low Risk	Low Trust	60.00	30.414	7
			High Trust	64.29	33.594	7
			Neutral	55.71	29.358	7
			Total	60.00	29.791	21
		High Risk	Low Trust	58.57	30.237	7
			High Trust	62.14	33.399	7
			Neutral	62.14	31.867	7
			Total	60.95	30.275	21
		Total	Low Trust	59.29	29.145	14
			High Trust	63.21	32.202	14
			Neutral	58.93	29.624	14
			Total	60.48	29.669	42
	Total	Low Risk	Low Trust	59.23	30.266	13
			High Trust	65.38	34.306	13
			Neutral	54.62	28.756	13
			Total	59.74	30.693	39
		High Risk	Low Trust	58.46	30.165	13
			High Trust	64.23	34.269	13
			Neutral	61.92	32.116	13
			Total	61.54	31.459	39
		Total	Low Trust	58.85	29.608	26
			High Trust	64.81	33.600	26
			Neutral	58.27	30.098	26
			Total	60.64	30.889	78
Arbitration_S core	Asia	Low Risk	Low Trust	106.67	4.082	6
			High Trust	85.00	20.736	6
			Neutral	87.50	20.917	6

			Total	93.06	18.953	18
		High Risk	Low Trust	106.67	4.082	6
			High Trust	83.33	18.619	6
			Neutral	85.00	20.736	6
			Total	91.67	18.787	18
		Total	Low Trust	106.67	3.892	12
			High Trust	84.17	18.809	12
			Neutral	86.25	19.900	12
			Total	92.36	18.612	36
	ME	Low Risk	Low Trust	102.86	7.559	7
			High Trust	78.57	17.728	7
			Neutral	84.29	18.803	7
			Total	88.57	18.176	21
		High Risk	Low Trust	102.86	7.559	7
			High Trust	77.14	14.960	7
			Neutral	88.57	20.354	7
			Total	89.52	18.021	21
		Total	Low Trust	102.86	7.263	14
			High Trust	77.86	15.777	14
			Neutral	86.43	18.956	14
			Total	89.05	17.883	42
	Total	Low Risk	Low Trust	104.62	6.279	13
			High Trust	81.54	18.640	13
			Neutral	85.77	19.023	13
			Total	90.64	18.431	39
		High Risk	Low Trust	104.62	6.279	13
			High Trust	80.00	16.330	13
			Neutral	86.92	19.742	13
			Total	90.51	18.166	39
		Total	Low Trust	104.62	6.152	26
			High Trust	80.77	17.187	26
			Neutral	86.35	19.003	26
			Total	90.58	18.180	78
DAB_Score	Asia	Low Risk	Low Trust	70.00	22.804	6
			High Trust	78.33	26.394	6
			Neutral	67.50	22.967	6
			Total	71.94	23.145	18
		High Risk	Low Trust	70.00	22.804	6
			High Trust	78.33	26.394	6
			Neutral	75.00	23.452	6
			Total	74.44	23.066	18
		Total	Low Trust	70.00	21.742	12

			High Trust	78.33	25.166	12
			Neutral	71.25	22.475	12
			Total	73.19	22.808	36
	ME	Low Risk	Low Trust	70.00	20.817	7
			High Trust	75.71	24.398	7
			Neutral	67.86	20.988	7
			Total	71.19	21.266	21
		High Risk	Low Trust	70.00	20.817	7
			High Trust	72.86	23.604	7
			Neutral	72.86	21.185	7
			Total	71.90	20.825	21
		Total	Low Trust	70.00	20.000	14
			High Trust	74.29	23.110	14
			Neutral	70.36	20.425	14
			Total	71.55	20.792	42
	Total	Low Risk	Low Trust	70.00	20.817	13
			High Trust	76.92	24.285	13
			Neutral	67.69	20.978	13
			Total	71.54	21.859	39
		High Risk	Low Trust	70.00	20.817	13
			High Trust	75.38	24.019	13
			Neutral	73.85	21.326	13
			Total	73.08	21.631	39
		Total	Low Trust	70.00	20.396	26
			High Trust	76.15	23.677	26
			Neutral	70.77	20.962	26
			Total	72.31	21.618	78
Early Neutral Evaluation_Score	Asia	Low Risk	Low Trust	50.00	26.646	6
			High Trust	56.67	24.221	6
			Neutral	57.50	26.599	6
			Total	54.72	24.523	18
		High Risk	Low Trust	51.67	27.689	6
			High Trust	63.33	30.111	6
			Neutral	63.33	30.111	6
			Total	59.44	28.122	18
		Total	Low Trust	50.83	25.922	12
			High Trust	60.00	26.285	12
			Neutral	60.42	27.258	12
			Total	57.08	26.114	36
	ME	Low Risk	Low Trust	51.43	23.401	7
			High Trust	52.86	22.704	7
			Neutral	56.43	24.446	7

			Total	53.57	22.424	21
		High Risk	Low Trust	54.29	23.528	7
			High Trust	64.29	26.209	7
			Neutral	58.57	28.970	7
			Total	59.05	25.329	21
		Total	Low Trust	52.86	22.593	14
			High Trust	58.57	24.292	14
			Neutral	57.50	25.776	14
			Total	56.31	23.789	42
	Total	Low Risk	Low Trust	50.77	23.879	13
			High Trust	54.62	22.496	13
			Neutral	56.92	24.370	13
			Total	54.10	23.109	39
		High Risk	Low Trust	53.08	24.456	13
			High Trust	63.85	26.860	13
			Neutral	60.77	28.347	13
			Total	59.23	26.296	39
		Total	Low Trust	51.92	23.710	26
			High Trust	59.23	24.726	26
			Neutral	58.85	25.973	26
			Total	56.67	24.728	78
Litigation_Score	Asia	Low Risk	Low Trust	25.00	23.452	6
			High Trust	23.33	27.869	6
			Neutral	23.33	27.869	6
			Total	23.89	24.885	18
		High Risk	Low Trust	51.67	18.348	6
			High Trust	21.67	23.805	6
			Neutral	23.33	23.594	6
			Total	32.22	25.101	18
		Total	Low Trust	38.33	24.433	12
			High Trust	22.50	24.726	12
			Neutral	23.33	24.618	12
			Total	28.06	24.994	36
	ME	Low Risk	Low Trust	28.57	19.303	7
			High Trust	24.29	25.071	7
			Neutral	24.29	25.071	7
			Total	25.71	22.208	21
		High Risk	Low Trust	51.43	21.931	7
			High Trust	22.86	21.381	7
			Neutral	22.86	21.381	7
			Total	32.38	24.679	21
		Total	Low Trust	40.00	23.122	14

			High Trust	23.57	22.398	14
			Neutral	23.57	22.398	14
			Total	29.05	23.432	42
	Total	Low Risk	Low Trust	26.92	20.467	13
			High Trust	23.85	25.261	13
			Neutral	23.85	25.261	13
			Total	24.87	23.184	39
		High Risk	Low Trust	51.54	19.513	13
			High Trust	22.31	21.565	13
			Neutral	23.08	21.461	13
			Total	32.31	24.544	39
		Total	Low Trust	39.23	23.268	26
			High Trust	23.08	23.025	26
			Neutral	23.46	22.968	26
			Total	28.59	24.012	78
MedArb_Score	Asia	Low Risk	Low Trust	75.00	19.748	6
			High Trust	83.33	8.165	6
			Neutral	72.50	8.216	6
			Total	76.94	13.300	18
		High Risk	Low Trust	69.17	18.280	6
			High Trust	85.00	12.247	6
			Neutral	72.50	8.216	6
			Total	75.56	14.541	18
		Total	Low Trust	72.08	18.397	12
			High Trust	84.17	9.962	12
			Neutral	72.50	7.833	12
			Total	76.25	13.752	36
	ME	Low Risk	Low Trust	72.86	21.185	7
			High Trust	71.43	18.420	7
			Neutral	68.57	14.351	7
			Total	70.95	17.365	21
		High Risk	Low Trust	68.57	18.645	7
			High Trust	71.43	21.931	7
			Neutral	68.57	14.351	7
			Total	69.52	17.671	21
		Total	Low Trust	70.71	19.301	14
			High Trust	71.43	19.457	14
			Neutral	68.57	13.788	14
			Total	70.24	17.319	42
	Total	Low Risk	Low Trust	73.85	19.701	13
			High Trust	76.92	15.349	13
			Neutral	70.38	11.630	13

			Total	73.72	15.716	39
		High Risk	Low Trust	68.85	17.696	13
			High Trust	77.69	18.777	13
			Neutral	70.38	11.630	13
			Total	72.31	16.377	39
		Total	Low Trust	71.35	18.523	26
			High Trust	77.31	16.807	26
			Neutral	70.38	11.395	26
			Total	73.01	15.961	78
Mediation_Score	Asia	Low Risk	Low Trust	75.00	16.125	6
			High Trust	86.67	15.055	6
			Neutral	78.33	16.021	6
			Total	80.00	15.624	18
		High Risk	Low Trust	58.33	19.408	6
			High Trust	83.33	13.663	6
			Neutral	78.33	16.021	6
			Total	73.33	19.097	18
		Total	Low Trust	66.67	19.109	12
			High Trust	85.00	13.817	12
			Neutral	78.33	15.275	12
			Total	76.67	17.525	36
	ME	Low Risk	Low Trust	72.86	15.774	7
			High Trust	84.29	15.119	7
			Neutral	75.71	16.183	7
			Total	77.62	15.702	21
		High Risk	Low Trust	62.86	14.960	7
			High Trust	81.43	13.452	7
			Neutral	75.71	16.183	7
			Total	73.33	16.228	21
		Total	Low Trust	67.86	15.654	14
			High Trust	82.86	13.828	14
			Neutral	75.71	15.549	14
			Total	75.48	15.919	42
	Total	Low Risk	Low Trust	73.85	15.296	13
			High Trust	85.38	14.500	13
			Neutral	76.92	15.484	13
			Total	78.72	15.505	39
		High Risk	Low Trust	60.77	16.564	13
			High Trust	82.31	13.009	13
			Neutral	76.92	15.484	13
			Total	73.33	17.371	39
		Total	Low Trust	67.31	16.984	26

			High Trust	83.85	13.587	26
			Neutral	76.92	15.171	26
			Total	76.03	16.580	78
MiniTrial_Score	Asia	Low Risk	Low Trust	34.17	22.675	6
			High Trust	34.17	22.675	6
			Neutral	34.17	22.675	6
			Total	34.17	21.300	18
		High Risk	Low Trust	34.17	22.675	6
			High Trust	34.17	22.675	6
			Neutral	34.17	22.675	6
			Total	34.17	21.300	18
		Total	Low Trust	34.17	21.620	12
			High Trust	34.17	21.620	12
			Neutral	34.17	21.620	12
			Total	34.17	20.993	36
	ME	Low Risk	Low Trust	27.14	24.300	7
			High Trust	35.71	20.702	7
			Neutral	34.29	20.702	7
			Total	32.38	21.191	21
		High Risk	Low Trust	27.14	24.300	7
			High Trust	27.14	24.300	7
			Neutral	27.14	24.300	7
			Total	27.14	23.053	21
		Total	Low Trust	27.14	23.346	14
			High Trust	31.43	22.138	14
			Neutral	30.71	22.001	14
			Total	29.76	22.030	42
	Total	Low Risk	Low Trust	30.38	22.864	13
			High Trust	35.00	20.716	13
			Neutral	34.23	20.701	13
			Total	33.21	20.979	39
		High Risk	Low Trust	30.38	22.864	13
			High Trust	30.38	22.864	13
			Neutral	30.38	22.864	13
			Total	30.38	22.254	39
		Total	Low Trust	30.38	22.402	26
			High Trust	32.69	21.505	26
			Neutral	32.31	21.458	26
			Total	31.79	21.532	78
Negotiation_Score	Asia	Low Risk	Low Trust	81.67	18.348	6
			High Trust	96.67	12.111	6
			Neutral	76.67	17.512	6

			Total	85.00	17.573	18
		High Risk	Low Trust	56.67	32.042	6
			High Trust	90.00	15.492	6
			Neutral	86.67	18.348	6
			Total	77.78	26.636	18
		Total	Low Trust	69.17	28.110	12
			High Trust	93.33	13.707	12
			Neutral	81.67	17.880	12
			Total	81.39	22.539	36
	ME	Low Risk	Low Trust	78.57	18.645	7
			High Trust	94.29	12.724	7
			Neutral	74.29	17.182	7
			Total	82.38	17.862	21
		High Risk	Low Trust	61.43	26.095	7
			High Trust	88.57	14.639	7
			Neutral	82.86	19.548	7
			Total	77.62	22.947	21
		Total	Low Trust	70.00	23.534	14
			High Trust	91.43	13.506	14
			Neutral	78.57	18.232	14
			Total	80.00	20.452	42
	Total	Low Risk	Low Trust	80.00	17.795	13
			High Trust	95.38	11.983	13
			Neutral	75.38	16.641	13
			Total	83.59	17.545	39
		High Risk	Low Trust	59.23	27.827	13
			High Trust	89.23	14.412	13
			Neutral	84.62	18.310	13
			Total	77.69	24.383	39
		Total	Low Trust	69.62	25.216	26
			High Trust	92.31	13.359	26
			Neutral	80.00	17.776	26
			Total	80.64	21.310	78
Summary Jury Trial_Score	Asia	Low Risk	Low Trust	40.00	26.646	6
			High Trust	35.83	26.724	6
			Neutral	35.83	26.724	6
			Total	37.22	25.160	18
		High Risk	Low Trust	35.83	26.724	6
			High Trust	28.33	31.252	6
			Neutral	28.33	31.252	6
			Total	30.83	28.245	18
		Total	Low Trust	37.92	25.536	12

		High Trust	32.08	27.998	12
		Neutral	32.08	27.998	12
		Total	34.03	26.560	36
ME	Low Risk	Low Trust	28.57	27.946	7
		High Trust	28.57	27.946	7
		Neutral	28.57	27.946	7
		Total	28.57	26.511	21
	High Risk	Low Trust	28.57	27.946	7
		High Trust	28.57	27.946	7
		Neutral	27.14	28.702	7
		Total	28.10	26.762	21
	Total	Low Trust	28.57	26.849	14
		High Trust	28.57	26.849	14
		Neutral	27.86	27.225	14
		Total	28.33	26.311	42
Total	Low Risk	Low Trust	33.85	26.860	13
		High Trust	31.92	26.500	13
		Neutral	31.92	26.500	13
		Total	32.56	25.927	39
	High Risk	Low Trust	31.92	26.500	13
		High Trust	28.46	28.239	13
		Neutral	27.69	28.622	13
		Total	29.36	27.125	39
	Total	Low Trust	32.88	26.160	26
		High Trust	30.19	26.888	26
		Neutral	29.81	27.110	26
		Total	30.96	26.409	78

Multivariate Tests[d]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Intercept	Pillai's Trace	.996	1307.004[a]	10.000	57.000	.000	.996	13070.03	1.000
Culture	Pillai's Trace	.252	1.924[a]	10.000	57.000	.060	.252	19.239	.808
Risk	Pillai's Trace	.288	2.303[a]	10.000	57.000	.024	.288	23.030	.886
Trust	Pillai's Trace	1.002	5.825	20.000	116.000	.000	.501	116.498	1.000
Culture * Risk	Pillai's Trace	.225	1.659[a]	10.000	57.000	.113	.225	16.588	.732
Culture * Trust	Pillai's Trace	.187	.600	20.000	116.000	.906	.094	11.995	.427
Risk * Trust	Pillai's Trace	.470	1.780	20.000	116.000	.031	.235	35.605	.954
Culture * Risk * Trust	Pillai's Trace	.080	.241	20.000	116.000	1.000	.040	4.819	.166

a. Exact statistic
b. Computed using alpha = .05
c. The statistic is an upper bound on F that yields a lower bound on the significance level.
d. Design: Intercept + Culture + Risk + Trust + Culture * Risk + Culture * Trust + Risk * Trust + Culture * Risk * Trust

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Adjudication_Score	.198	11	66	.997
Arbitration_Score	1.338	11	66	.224
DAB_Score	.168	11	66	.999
Early Neutral Evaluation_Score	.330	11	66	.976
Litigation_Score	.102	11	66	1.000
MedArb_Score	.770	11	66	.668
Mediation_Score	.246	11	66	.993
MiniTrial_Score	.016	11	66	1.000
Negotiation_Score	.380	11	66	.959
Summary Jury Trial_Score	.039	11	66	1.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Culture + Risk + Trust + Culture * Risk + Culture * Trust + Risk * Trust + Culture * Risk * Trust

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	Adjudication_Score	1153.663[a]	11	104.878	.096	1.000	.016	1.053	.077
	Arbitration_Score	980.449[d]	11	776.374	3.030	.002	.336	33.334	.975
	DAB_Score	1719.643[e]	11	89.132	.168	.999	.027	1.849	.102
	Early Neutral Evaluation_Score	8428.205[f]	11	156.331	.227	.995	.037	2.502	.124
	Litigation_Score	2066.392[g]	11	766.200	1.406	.191	.190	15.466	.681
	MedArb_Score	4915.568[h]	11	187.854	.706	.728	.105	7.771	.350
	Mediation_Score	1001.190[i]	11	446.870	1.815	.069	.232	19.962	.815
	MiniTrial_Score	17306.227[j]	11	91.017	.127	1.000	.021	1.398	.088
	Negotiation_Score	1250.824[k]	11	1573.293	6.026	.000	.501	66.288	1.000
	Summary Jury Trial_Score		11	113.711	.191	.998	.031	2.101	.110
Intercept	Adjudication_Score	285264.011	1	285264.011	260.356	.000	.798	260.356	1.000
	Arbitration_Score	637930.777	1	637930.777	2490.012	.000	.974	2490.012	1.000
	DAB_Score	406112.828	1	406112.828	765.722	.000	.921	765.722	1.000
	Early Neutral Evaluation_Score	249246.223	1	249246.223	362.630	.000	.846	362.630	1.000

	Litigation_Score	63208.822	1	63208.822	115.990	.000	.637	115.990	1.000
	MedArb_Score	415969.849	1	415969.849	1564.278	.000	.960	1564.278	1.000
	Mediation_Score	448704.396	1	448704.396	1822.163	.000	.965	1822.163	1.000
	MiniTrial_Score	87079.396	1	87079.396	121.552	.000	.648	121.552	1.000
	Negotiation_Score	466908.455	1	466908.455	1788.407	.000	.964	1788.407	1.000
	Summary Jury Trial_Score	68087.370	1	68087.370	114.350	.000	.634	114.350	1.000
Culture	Adjudication_Score	2.473	1	2.473	.002	.962	.000	.002	.050
	Arbitration_Score	212.828	1	212.828	.831	.365	.012	.831	.146
	DAB_Score	52.572	1	52.572	.099	.754	.001	.099	.061
	Early Neutral Evaluation_Score	11.607	1	11.607	.017	.897	.000	.017	.052
	Litigation_Score	19.078	1	19.078	.035	.852	.001	.035	.054
	MedArb_Score	700.618	1	700.618	2.635	.109	.038	2.635	.359
	Mediation_Score	27.473	1	27.473	.112	.739	.002	.112	.063
	MiniTrial_Score	417.857	1	417.857	.583	.448	.009	.583	.117
	Negotiation_Score	16.148	1	16.148	.062	.804	.001	.062	.057
	Summary Jury Trial_Score	577.114	1	577.114	.969	.328	.014	.969	.163
Risk	Adjudication_Score	67.430	1	67.430	.062	.805	.001	.062	.057
	Arbitration_Score	.923	1	.923	.004	.952	.000	.004	.050
	DAB_Score	50.069	1	50.069	.094	.760	.001	.094	.061
	Early Neutral Evaluation_Score	504.037	1	504.037	.733	.395	.011	.733	.135
	Litigation_Score	1090.385	1	1090.385	2.001	.162	.029	2.001	.286
	MedArb_Score	38.469	1	38.469	.145	.705	.002	.145	.066
	Mediation_Score	581.319	1	581.319	2.361	.129	.035	2.361	.328
	MiniTrial_Score	132.967	1	132.967	.186	.668	.003	.186	.071
	Negotiation_Score	696.001	1	696.001	2.666	.107	.039	2.666	.363
	Summary Jury Trial_Score	228.396	1	228.396	.384	.538	.006	.384	.094
Trust	Adjudication_Score	716.667	2	358.333	.327	.722	.010	.654	.100
	Arbitration_Score	8028.129	2	4014.064	15.668	.000	.322	31.336	.999
	DAB_Score	609.722	2	304.861	.575	.566	.017	1.150	.142
	Early Neutral Evaluation_Score	913.782	2	456.891	.665	.518	.020	1.329	.157
	Litigation_Score	4370.757	2	2185.379	4.010	.023	.108	8.020	.698
	MedArb_Score	813.507	2	406.754	1.530	.224	.044	3.059	.314
	Mediation_Score	3624.908	2	1812.454	7.360	.001	.182	14.721	.929
	MiniTrial_Score	68.132	2	34.066	.048	.954	.001	.095	.057
	Negotiation_Score	13548.413	2	6774.206	25.947	.000	.440	51.895	1.000

	Summary Jury Trial_Score	166.728	2	83.364	.140	.870	.004	.280	.071
Culture * Risk	Adjudication_Score	16.148	1	16.148	.015	.904	.000	.015	.052
	Arbitration_Score	26.564	1	26.564	.104	.748	.002	.104	.062
	DAB_Score	15.453	1	15.453	.029	.865	.000	.029	.053
	Early Neutral Evaluation_Score	2.755	1	2.755	.004	.950	.000	.004	.050
	Litigation_Score	13.462	1	13.462	.025	.876	.000	.025	.053
	MedArb_Score	.008	1	.008	.000	.996	.000	.000	.050
	Mediation_Score	27.473	1	27.473	.112	.739	.002	.112	.063
	MiniTrial_Score	132.967	1	132.967	.186	.668	.003	.186	.071
	Negotiation_Score	29.335	1	29.335	.112	.739	.002	.112	.063
	Summary Jury Trial_Score	169.422	1	169.422	.285	.596	.004	.285	.082
Culture * Trust	Adjudication_Score	93.590	2	46.795	.043	.958	.001	.085	.056
	Arbitration_Score	138.385	2	69.193	.270	.764	.008	.540	.091
	DAB_Score	58.440	2	29.220	.055	.946	.002	.110	.058
	Early Neutral Evaluation_Score	83.013	2	41.506	.060	.941	.002	.121	.059
	Litigation_Score	6.654	2	3.327	.006	.994	.000	.012	.051
	MedArb_Score	459.661	2	229.831	.864	.426	.026	1.729	.193
	Mediation_Score	55.678	2	27.839	.113	.893	.003	.226	.067
	MiniTrial_Score	68.132	2	34.066	.048	.954	.001	.095	.057
	Negotiation_Score	102.259	2	51.129	.196	.823	.006	.392	.079
	Summary Jury Trial_Score	130.830	2	65.415	.110	.896	.003	.220	.066
Risk * Trust	Adjudication_Score	295.299	2	147.650	.135	.874	.004	.270	.070
	Arbitration_Score	19.704	2	9.852	.038	.962	.001	.077	.056
	DAB_Score	215.522	2	107.761	.203	.817	.006	.406	.080
	Early Neutral Evaluation_Score	160.730	2	80.365	.117	.890	.004	.234	.067
	Litigation_Score	2890.293	2	1445.147	2.652	.078	.074	5.304	.509
	MedArb_Score	131.426	2	65.713	.247	.782	.007	.494	.087
	Mediation_Score	629.304	2	314.652	1.278	.285	.037	2.556	.268
	MiniTrial_Score	68.132	2	34.066	.048	.954	.001	.095	.057
	Negotiation_Score	2977.717	2	1488.858	5.703	.005	.147	11.406	.849
	Summary Jury Trial_Score	19.292	2	9.646	.016	.984	.000	.032	.052
Culture * Risk * Trust	Adjudication_Score	.427	2	.214	.000	1.000	.000	.000	.050
	Arbitration_Score	47.909	2	23.955	.094	.911	.003	.187	.064
	DAB_Score	7.830	2	3.915	.007	.993	.000	.015	.051
	Early Neutral Evaluation_Score	58.165	2	29.083	.042	.959	.001	.085	.056
	Litigation_Score	13.370	2	6.685	.012	.988	.000	.025	.052
	MedArb_Score	8.349	2	4.174	.016	.984	.000	.031	.052
	Mediation_Score	44.689	2	22.344	.091	.913	.003	.181	.063
	MiniTrial_Score	68.132	2	34.066	.048	.954	.001	.095	.057

	Negotiation_Score	75.153	2	37.576	.144	.866	.004	.288	.071
	Summary Jury Trial_Score	9.035	2	4.518	.008	.992	.000	.015	.051
Error	Adjudication_Score	72314.286	66	1095.671					
	Arbitration_Score	16908.929	66	256.196					
	DAB_Score	35004.167	66	530.366					
	Early Neutral Evaluation_Score	45363.690	66	687.329					
	Litigation_Score	35966.667	66	544.949					
	MedArb_Score	17550.595	66	265.918					
	Mediation_Score	16252.381	66	246.248					
	MiniTrial_Score	47282.143	66	716.396					
	Negotiation_Score	17230.952	66	261.075					
	Summary Jury Trial_Score	39298.214	66	595.427					
Total	Adjudication_Score	360300.00	78						
	Arbitration_Score	665375.00	78						
	DAB_Score	443800.00	78						
	Early Neutral Evaluation_Score	297550.00	78						
	Litigation_Score	108150.00	78						
	MedArb_Score	435425.00	78						
	Mediation_Score	472000.00	78						
	MiniTrial_Score	134950.00	78						
	Negotiation_Score	503800.00	78						
	Summary Jury Trial_Score	108075.0	78						
Corrected Total	Adjudication_Score	73467.949	77						
	Arbitration_Score	25449.038	77						
	DAB_Score	35984.615	77						
	Early Neutral Evaluation_Score	47083.333	77						
	Litigation_Score	44394.872	77						
	MedArb_Score	19616.987	77						
	Mediation_Score	21167.949	77						
	MiniTrial_Score	48283.333	77						
	Negotiation_Score	34537.179	77						
	Summary Jury Trial_Score	40549.038	77						

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Adjudication_Score	.198	11	66	.997
Arbitration_Score	1.338	11	66	.224
DAB_Score	.168	11	66	.999
Early Neutral Evaluation_Score	.330	11	66	.976
Litigation_Score	.102	11	66	1.000
MedArb_Score	.770	11	66	.668
Mediation_Score	.246	11	66	.993
MiniTrial_Score	.016	11	66	1.000
Negotiation_Score	.380	11	66	.959
Summary Jury Trial_Score	.039	11	66	1.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. R Squared = .016 (Adjusted R Squared = -.148)
b. Computed using alpha = .05
c. R Squared = .336 (Adjusted R Squared = .225)
d. R Squared = .027 (Adjusted R Squared = -.135)
e. R Squared = .037 (Adjusted R Squared = -.124)
f. R Squared = .190 (Adjusted R Squared = .055)
g. R Squared = .105 (Adjusted R Squared = -.044)
h. R Squared = .232 (Adjusted R Squared = .104)
i. R Squared = .021 (Adjusted R Squared = -.142)
j. R Squared = .501 (Adjusted R Squared = .418)
k. R Squared = .031 (Adjusted R Squared = -.131)

Bonferroni **Multiple Comparisons**

Dependent Variable	(I) Trust level	(J) Trust level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Adjudication_Score	Low Trust	High Trust	-5.96	9.181	1.000	-28.51	16.59
		Neutral	.58	9.181	1.000	-21.98	23.13
	High Trust	Low Trust	5.96	9.181	1.000	-16.59	28.51
		Neutral	6.54	9.181	1.000	-16.01	29.09
	Neutral	Low Trust	-.58	9.181	1.000	-23.13	21.98
		High Trust	-6.54	9.181	1.000	-29.09	16.01
Arbitration_Score	Low Trust	High Trust	18.27*	4.439	.000	12.94	34.75
		Neutral	-23.85*	4.439	.000	7.36	29.17
	High Trust	Low Trust		4.439	.000	-34.75	-12.94
		Neutral	-5.58	4.439	.640	-16.48	5.33
	Neutral	Low Trust		4.439	.000	-29.17	-7.36
		High Trust	5.58	4.439	.640	-5.33	16.48
DAB_Score	Low Trust	High Trust	-6.15	6.387	1.000	-21.84	9.54
		Neutral	-.77	6.387	1.000	-16.46	14.92
	High Trust	Low Trust	6.15	6.387	1.000	-9.54	21.84
		Neutral	5.38	6.387	1.000	-10.31	21.08
	Neutral	Low Trust	.77	6.387	1.000	-14.92	16.46
		High Trust	-5.38	6.387	1.000	-21.08	10.31
Early Neutral Evaluation_Score	Low Trust	High Trust	-7.31	7.271	.956	-25.17	10.55
		Neutral	-6.92	7.271	1.000	-24.79	10.94
	High Trust	Low Trust	7.31	7.271	.956	-10.55	25.17
		Neutral	.38	7.271	1.000	-17.48	18.25
	Neutral	Low Trust	6.92	7.271	1.000	-10.94	24.79
		High Trust	-.38	7.271	1.000	-18.25	17.48
Litigation_Score	Low Trust	High Trust		6.475	.045	.25	32.06
		Neutral	15.77	6.475	.053	-.14	31.67
	High Trust	Low Trust		6.475	.045	-32.06	-.25
		Neutral	-.38	6.475	1.000	-16.29	15.52
	Neutral	Low Trust	-15.77	6.475	.053	-31.67	.14
		High Trust	.38	6.475	1.000	-15.52	16.29
MedArb_Score	Low Trust	High Trust	-5.96	4.523	.576	-17.07	5.15
		Neutral	.96	4.523	1.000	-10.15	12.07
	High Trust	Low Trust	5.96	4.523	.576	-5.15	17.07
		Neutral	6.92	4.523	.392	-4.19	18.03
	Neutral	Low Trust	-.96	4.523	1.000	-12.07	10.15
		High Trust	-6.92	4.523	.392	-18.03	4.19

Mediation_Score	Low Trust	High Trust	-16.54*	4.352	.001	-27.23	-5.85
		Neutral	-9.62	4.352	.092	-20.31	1.08
	High Trust	Low Trust	16.54*	4.352	.001	5.85	27.23
		Neutral	6.92	4.352	.349	-3.77	17.61
	Neutral	Low Trust	9.62	4.352	.092	-1.08	20.31
		High Trust	-6.92	4.352	.349	-17.61	3.77
MiniTrial_Score	Low Trust	High Trust	-2.31	7.423	1.000	-20.54	15.93
		Neutral	-1.92	7.423	1.000	-20.16	16.31
	High Trust	Low Trust	2.31	7.423	1.000	-15.93	20.54
		Neutral	.38	7.423	1.000	-17.85	18.62
	Neutral	Low Trust	1.92	7.423	1.000	-16.31	20.16
		High Trust	-.38	7.423	1.000	-18.62	17.85
Negotiation_Score	Low Trust	High Trust	-19.62*	4.481	.000	-42.93	-20.91
		Neutral	31.92*	4.481	.000	-30.62	-8.61
	High Trust	Low Trust	12.31*	4.481	.000	20.91	42.93
		Neutral	19.62*	4.481	.023	1.30	23.32
	Neutral	Low Trust	-12.31*	4.481	.000	8.61	30.62
		High Trust		4.481	.023	-23.32	-1.30
Summary Jury Trial_Score	Low Trust	High Trust	2.69	6.768	1.000	-13.93	19.32
		Neutral	3.08	6.768	1.000	-13.55	19.70
	High Trust	Low Trust	-2.69	6.768	1.000	-19.32	13.93
		Neutral	.38	6.768	1.000	-16.24	17.01
	Neutral	Low Trust	-3.08	6.768	1.000	-19.70	13.55
		High Trust	-.38	6.768	1.000	-17.01	16.24

Based on observed means. The error term is Mean Square(Error) = 595.427.
*. The mean difference is significant at the .05 level.

APPENDIX 8. MULTINOMIAL LOGISTIC REGRESSION – DRM CHOICE MODEL

DRM not grouped

Case Processing Summary

		N	Marginal Percentage
DRM type	Adjudication	4	6.3%
	Arbitration	24	38.1%
	DRB/DAB	6	9.5%
	Litigation	4	6.3%
	Mediation	10	15.9%
	Negotiation	15	23.8%
Project Location	Middle East	47	74.6%
	Asia	16	25.4%
Valid		63	100.0%
Missing		0	
Total		63	
Subpopulation			

a. The dependent variable has only one value observed in 5 (22.7%) subpopulations.

Model Fitting Information

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	120.958			
Final	104.661	16.297	15	.363

Pseudo R-Square

Cox and Snell	.228
Nagelkerke	.238
McFadden	.082

Likelihood Ratio Tests

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	104.661[a]	.000	0	.
TOTRISK	110.103	5.442	5	.364
OTITTOTAL	107.105	2.444	5	.785
PLOCATE	111.785	7.125	5	.212

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Parameter Estimates

DRM type[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Adjudication	Intercept	-20.220	2.212	83.593	1	.000			
	TOTRISK	.751	.762	.970	1	.325	2.119	.476	9.435
	OTITTOTAL	-.038	.248	.023	1	.879	.963	.592	1.566
	[PLOCATE=1]	17.990	.000	.	1	.	65017350	65017350	65017350
	[PLOCATE=2]		.	.	0	.	.	.	.
Arbitration	Intercept	1.689	1.235	1.871	1	.171			
	TOTRISK	-.207	.425	.236	1	.627	.813	.354	1.871
	OTITTOTAL	-.029	.126	.055	1	.815	.971	.759	1.242
	[PLOCATE=1]	-.864	.788	1.202	1	.273	.421	.090	1.975
	[PLOCATE=2]		.	.	0	.	.	.	.
DRB/DAB	Intercept	-2.869	2.226	1.661	1	.197			
	TOTRISK	-.069	.590	.014	1	.907	.934	.294	2.966
	OTITTOTAL	.204	.192	1.127	1	.288	1.226	.842	1.786
	[PLOCATE=1]	.104	1.297	.006	1	.936	1.109	.087	14.099
	[PLOCATE=2]		.	.	0	.	.	.	.
Litigation	Intercept	-.138	4159	.000	1	1.000			.[c]
	TOTRISK	-17.043	4159	.000	1	.997	3.965E-8	.000	
	OTITTOTAL	-.156	.241	.419	1	.517	.855	.533	1.372
	[PLOCATE=1]	17.934	.000	.	1	.	61451856	61451856.	6145185 6.
	[PLOCATE=2]		.	.	0	.	.	.	.
Mediation	Intercept	.129	1.529	.007	1	.933			
	TOTRISK	-.243	.523	.216	1	.642	.784	.282	2.186
	OTITTOTAL	.035	.152	.053	1	.817	1.036	.768	1.397
	[PLOCATE=1]	-.594	.962	.381	1	.537	.552	.084	3.638
	[PLOCATE=2]		.	.	0	.	.	.	.

a. The reference category is: NEG.
b. This parameter is set to zero because it is redundant.
c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

DRM grouped

Case Processing Summary

		N	Marginal Percentage
DRM type	ADJDR (adjudication and DRB)	10	15.9%
	Arbitration	24	38.1%
	Litigation	4	6.3%
	Mediation	10	15.9%
	NEG	15	23.8%
Project Location	Middle East	47	74.6%
	Asia	16	25.4%
Valid		63	100.0%
Missing		0	
Total		63	
Subpopulation			

a. The dependent variable has only one value observed in 5 (22.7%) subpopulations.

Model Fitting Information

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	110.270			
Final	96.327	13.943	12	.304

Pseudo R-Square

Cox and Snell	.199
Nagelkerke	.210
McFadden	.075

Likelihood Ratio Tests

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	96.327[a]	.000	0	.
OTITTOTAL	98.077	1.750	4	.782
TOTRISK	100.725	4.397	4	.355
PLOCATE	102.073	5.746	4	.219

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Parameter Estimates

DRM type[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
ADJDR	Intercept	-2.658	1.908	1.941	1	.164			
	OTITTOTAL	.128	.165	.604	1	.437	1.137	.823	1.570
	TOTRISK	.214	.498	.184	1	.668	1.238	.466	3.289
	[PLOCATE=1]	.726	1.251	.337	1	.562	2.068	.178	24.009
	[PLOCATE=2]		.	.	0	.	.	.	.
Arbitration	Intercept	1.696	1.236	1.883	1	.170			
	OTITTOTAL	-.032	.125	.064	1	.800	.969	.759	1.237
	TOTRISK	-.201	.424	.224	1	.636	.818	.356	1.879
	[PLOCATE=1]	-.861	.785	1.201	1	.273	.423	.091	1.971
	[PLOCATE=2]		.	.	0	.	.	.	.
Litigation	Intercept	-.141	4084.782	.000	1	1.000			
	OTITTOTAL	-.156	.241	.422	1	.516	.855	.534	1.371
	TOTRISK	-17.026	4084.781	.000	1	.997	4.034E-8	.000	
	[PLOCATE=1]	17.925	.000	.	1	.	60900367.013	60900367.013	60900367.013
	[PLOCATE=2]		.	.	0	.	.	.	.
Mediation	Intercept	.134	1.531	.008	1	.930			
	OTITTOTAL	.033	.151	.048	1	.827	1.034	.768	1.391
	TOTRISK	-.239	.523	.208	1	.648	.788	.283	2.194
	[PLOCATE=1]	-.585	.959	.373	1	.542	.557	.085	3.647
	[PLOCATE=2]		.	.	0	.	.	.	.

a. The reference category is: NEG.

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.