



## **Risk Perception in Multicultural Project Teams**

**إدراك المخاطر في الفريق المتعدد الثقافات**

**by**

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of the requirements for the degree of  
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## **ABSTRACT**

In projects, managing risks is essential for project success and delivery. However, personal judgment of decision-makers can affect risk management. Subjective evaluation of risk, known as “risk perception,” is an important concept. According to the literature, multicultural project teams are faced with many risks. Researchers argue that different cultures have different attitudes and reactions to risk. In the UAE, cultural diversity in the business environment has been increasing dramatically. Therefore, the main aim of this dissertation is to examine the concept of risk perception in multicultural project teams in the UAE. The relationship between individuals’ specific characteristics (culture, gender and personality) and risk perception was examined in real life project teams. This was undertaken through firstly, thoroughly reviewing the existing literature on several topics including risk perception, decision-making, and culture. Secondly, the study’s variables were investigated through a questionnaire. The major findings indicate that there is a variance in risk perception of team members from different cultural backgrounds. The variance was noted in response to different risk factors and to the probability and impact components of risk. Gender variance has been also noted. No relationship has been found between personality and risk perception. Implications of these findings are discussed and recommendations for both practitioners and future research are provided.

## الملخص

في المشاريع، تعتبر إدارة المخاطر أمراً أساسياً لنجاح المشروع وتسليمها. ومع ذلك، يمكن أن يؤثر الحكم الشخصي لصانعي القرار على إدارة المخاطر. التقييم الموضوعي للمخاطر، المعروفة باسم "إدراك المخاطر"، هو مفهوم مهم.

وفقاً لاستعراض الأدبيات تواجه فرق المشروع متعددة الثقافات العديد من المخاطر، ويقول الباحثون إن الثقافات المختلفة لها مواقف وردود فعل مختلفة في المخاطرة. في دولة الإمارات العربية المتحدة، يتزايد التنوع الثقافي في بيئة الأعمال بشكل كبير، ولذلك فإن الهدف الرئيسي من هذه الأطروحة هو دراسة مفهوم إدراك المخاطر في فرق المشاريع متعددة الثقافات في دولة الإمارات العربية المتحدة.

لقد تمت دراسة العلاقة بين الخصائص الفردية للأفراد (الثقافة والجنس والشخصية) وإدراك المخاطر في مشاريع حقيقة وحيث تم ذلك من خلال: أولاً، مراجعة شاملة للدراسات الموجودة حول العديد من الموضوعات بما في ذلك إدراك المخاطر وصنع القرار والثقافة. ثانياً، لقد تم دراسة المتغيرات من خلال استبانة. وتشير النتائج الرئيسية إلى وجود تباين في إدراك المخاطر لأعضاء الفريق المكون من خلفيات ثقافية مختلفة. ولوحظ التباين في الاستجابة للعوامل المختلفة من المخاطر من ناحية احتمالية الوقع والأثر المترتب على هذه المخاطر. كما لوحظت بعض الفروق بين الجنسين. ولكن لم يتم العثور على علاقة قوية بين الشخصية وإدراك المخاطر. وتم مناقشة الآثار المترتبة على هذه النتائج مع عرض توصيات لكل من المهنيين والباحثين.

## **DEDICATION**

This thesis is dedicated to my loving husband, my other half... For all your incredible support and continues encouragement. You are the source of my power and the reason

I never give up. You are my biggest motivation in life. Thank you for always believing in me.

To my two beautiful children ‘Sultan’ & ‘Shouq’... The best children a mother could hope for; happy, loving and caring. Thank you for your patience whenever mommy was busy working on her dissertation.

To my dear parents... Thank you for ALWAYS being there for me and my family. Thank you for your unconditional love and support.

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## **CHAPTER ONE: Introduction**

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### **1.1 Introduction**

Risk management is essential for project success and delivery. Nevertheless, decision-maker's subjective risk assessment and evaluation known as "risk perception" can influence the overall risk management (Yildiz et al. 2014). The first chapter of the thesis provides a background and overview of the research topic- Risk Perception. It defines the research drives, problem, scope, aims and objectives, questions, hypothesis, and significance. In addition, it describes the research strategy and how this dissertation is structured.

### **1.2 Research Overview**

*"Risk perception is a highly personal process of decision making, based on an individual's frame of reference developed over a lifetime, among many other factors."*  
(Brown 2014, p. 277)

As per Yildiz et al. (2014), in project-based industries, managing risks is essential for project success and delivery. Projects are faced with numerous risks and uncertainties that differ in nature and impact leading to undesirable outcomes if occurred (Yildiz et al. 2014). In order to mitigate risks, risk management is an important discipline in project management (Abotsi et al. 2014). However, personal and subjective judgment of decision-makers when assessing risks can affect the overall risk management process and risk ratings. With various attitudes toward risks, different assumptions, and subjectivity with risk assessment, decision involving risk management can significantly vary (Yildiz et al. 2014). The process of assessing risk usually includes a perception of the circumstances meaning that "*there is some interpretation of the*

*objective reality*" (Roszkowski & Davey 2010, p. 44). Different individuals presented with same risks might evaluate the information regarding risk in a different way (Roszkowski & Davey, 2010).

Risk perception can be referred to as personal evaluation of risk (Williams and Noyes 2007). Williams & Noyes (2007) argue that it is reasonable to assume that personal risk perception probably influences decisions. Researchers assume that an evident relationship between risk perception and decision-making exists (Chen *et al.* 2015). Exploring the study of risk perception is complex and interesting since it is related to complicated mixture of factors including social, cultural, psychological, political and economic factors (Vance *et al.* 2014).

The notion of risk is based on probability and magnitude where the possibility of an event to occur and the extent of its effect are used to measure the risk. Therefore, both probability and impact are essential to risk perception. Nevertheless, some researchers argue that some people's risk perception is affected by the magnitude more than the probability, which makes risk magnitude more powerful in shaping perception (Chen *et al.* 2015). Risk assessment techniques relay on calculations based on the chance of occurrence and impact on project delivery, which greatly depend on decision-makers' judgments and past knowledge (Yildiz *et al.* 2014). As per Fung *et al.* (2012), although risks are evaluated with mathematical guidance, risk assessment certainly is dependent on individual's judgments. Many factors can influence decision-makers' risk perception such as age, gender, culture and nationality, beliefs and values. Therefore, one can say that traditional process of risk assessment is inevitably subjective (Yildiz *et al.* 2014).

Liu *et al.* (2015) argue that cultural influence in projects is inevitable and is essential for successful risk management. Project team members from diversified cultures can pose conflict and impact on project success. Different cultures have different attitudes and reactions to problems in life in general which are deeply influenced by cultural roots. This has a major impact on project risk management (Lie *et al.* 2015). As per Essinger & Rosen (1991), a risk is defined as a degree of the anticipated variance between expectations and realizations. Therefore, culture influences how risk is perceived and operationalized in project-based environments. Nevertheless, although it has been found that culture influences project risk perception, the exact cultural

consequences on project performance is not fully understood (Liu et al. 2015, Fellows & Liu 2013).

People working in a team have different level of knowledge, different past experience and come from different cultures. Hence, those individuals' perception of risk will vary as well as their perceived risk (Yildiz et al. 2014). Williams & Noyes (2007, p.1) argue that "the potential for error resulting from an incorrect perception of risk is latent in every situation." With the increasing cross-cultural interactions in economics, politics and business, it is essential to understand and recognize the existence of cultural differences influencing risk perception in project team members (Weber & Hsee 1998).

Examining the topic of risk perception in multicultural teams is apparently important in a country like the UAE. The UAE is one of the ten most diverse regions in the world, and specifically, one of the most culturally diverse countries worldwide (Albadri 2012). In 2008, 99% of jobs in the private sector were occupied by expatriates coming from various countries worldwide (Ahmad 2008). Cultural diversity in the UAE has been looked at before, but nothing has been found on risk perception in multicultural teams within the UAE. This study aims at exploring a new angle of multicultural project teams that specifically looks at risk perception and how people from various cultures react toward different risks.

### **1.3 Research Problem**

Risk perception is affected by various factors and most importantly cultural differences, personality, gender, past knowledge and experience. This has been long studied in psychology, health, hazards and environment (Wang et al. 2015). However, several gaps in the study of risk perception and decision-making have been highlighted by different researchers. As per Wang et al. (2015), there is practical and theoretical limitation in the literature as it has rarely described and fully examined the characteristics and behaviors of decision-makers' risk perception. Decision-makers view and perceive risk in a different manner. In many cases, looking at past

experience, personalities, culture and background in depth is essential. To understand behaviors and decision involving risks, subjective and personal factors are important (Wang et al. 2015). Although past studies have highlighted a number of factors influencing risk perception, they have seldom presented an extensive knowledge on how individuals describe and perceive risk (Wang et al. 2016).

It was noticed that empirical studies examining the influence of culture on risk perception was done through cross-cultural studies, which examined groups of individuals working in different countries. For instance, comparing Canadian and Chinese, or comparing Westerns and Eastern where both groups work in different countries. However, this study is interested in examining this relationship in a new context. This study is looking at multicultural teams members working together in project-based organizations. This relationship has never been examined before which is the foundation of this dissertation.

In addition, in general, the study of multicultural team behavior in project management has many gaps. As per Jetu et al. (2011, p. 57), “Significant gaps still exist in our understanding of how cultural patterns influence project team behavior in project team settings.”

## **1.4 Research Scope**

The main purpose of this study is to examine the concept of risk perception in multicultural project teams. It has been found that various factors influence risk perception, but this study will choose to only examine demographic factors (age, gender, national culture) and personality. The relationship between the study’s variables is examined through questionnaires. The context of this research is multicultural teams within organizations in the UAE (specifically Dubai, Abu Dhabi and Sharjah).

## **1.5 Research Aim and Objectives**

The main aim of this study is to examine the concept of risk perception in multicultural project teams and the factors that impact risk perception. This will be done through examining the relationship between risk perception and demographic variables- mainly culture- in real life multicultural groups working together in project-based environment in UAE. Analyzing the factors that shape and influence risk perception is essential to understand the impact on decision-making involving risk in project management context.

The objectives are:

1. To critically assess and review the existing literature and the theories/studies of risk perception and decision-making.
2. To create a conceptual model based on the literature review that provides an understanding of the concept of risk perception and its factors.
3. To examine the relationship between risk perception and the identified factors (culture, gender and personality) in multicultural project teams in the UAE.
4. To provide suggestions and recommendations for decision-makers working in organizations with multicultural project teams.

## **1.6 Research Questions**

1. What are the most important factors that shape individuals' risk perception?
2. What are the most important theories of risk perception and decision-making?
3. Does risk perception varies according to different cultures and groups?
4. Does risk perception influence the process of decision-making in projects?

5. Can the findings of the literature review be generalized to project teams in the UAE?

## **1.7 Research Hypotheses**

➤ **Hypothesis 1 (H1):**

“There is a difference in risk perception of project team members from different cultures”

The literature highlights that one of the main factors that affect people's risk perception is the culture they come from and the group they belong to (Liu et al. 2015, Cheung et al. 2013). This has been examined in cross-cultural studies where risk perception of people from different countries was investigated and compared (Weber & Hsee 1998). This study aims to investigate this relationship within team members and people working together coming from different cultures.

➤ **Hypothesis 2 (H2):**

“There is a difference between female and male's risk perception working in project teams”

The literature reviewed showed that demographic variables such as age, gender and educational background influence risk perception (Abotsi et al. 2014, Cheung et al. 2013). The study aims to examine the relationship between gender and risk perception in UAE teams working in projects. Due to time limitation, selecting participants with variation in age and educational background was not possible. Hence, it will not be tested.

➤ **Hypothesis 3 (H3):**

“There is a relationship between personality and risk perception”

It has been found that one of the factors influencing risk perception is personality. This relationship will be examined in this research's context.

➤ **Hypothesis 4 (H4):**

“Project team members from different cultures differ in terms of the relative importance they attach to the probability and impact components of risk”

The concept of risk is based on probability and impact. Both probability and impact are essential to risk perception. Nevertheless, some researchers argue that some people's risk perception is affected by the magnitude more than the probability, which makes risk magnitude more powerful in shaping their perception (Chen et al. 2015). The study aims to examine whether people from different cultures react differently to the probability and impact components of risk.

## **1.8 Significance**

Nowadays, projects are becoming more complex where teams with people from different cultures work together, share knowledge and make decisions regularly that involve risks. The literature discusses the impact culture has on risk perception and theories are presented, but there is a lack of empirical data to examine this relationship. This study will collect the related literature of risk perception, culture and decision-making and then will add the empirical evidence of this complex relationship. This relationship has been studied for long time in areas such as health, psychology, environment and politics (Wang et al. 2015). However, examining this relationship in project-based environments and business organizations is not well documented which what this study is trying to do. As projects in the business context are becoming more important, this relationship needs to be examined in projects to provide project management with the right tactics to manage risk and make more effective decisions.

## **1.9 Research Strategy**

The strategy followed in this research is discussed more in details in chapter 4. Below a brief outline of the strategy is presented

1. To fully understand the theoretical perspective of risk perception in general and in multicultural teams in specific and to understand the influence of culture and other variables, a literature review was conducted. This step gave the foundation to develop the study instrument and facilitated the analysis of the data gathered.
2. Based on the literature review, a questionnaire was developed. Employees of project-based organizations working in teams were approached to complete the questionnaire. The total number of gathered questionnaires was 180 from different cultural backgrounds. The results of the questionnaires were analyzed using different statistical tests.
3. After data analysis, a discussion of the findings and data interpretation were presented followed by conclusions and recommendations.

## **1.10 Research Outline**

The dissertation is organized into eight chapters, which are:

- Chapter 1 – Introduction: The first chapter includes the research overview, research problem, scope, research aims and objectives, research questions, hypotheses, significance, research strategy and research outline.
- Chapter 2 – Literature Review Part One: This chapter looks into the literature related to risk perception. It provides definitions of important concepts in project management, history of risk perception, important theories related to risk perception and decision-making and factors of risk perception.
- Chapter 3 – Literature Review Part Two: This chapter defines decision-making and group decision-making. It also highlights factors of decision-making.

- Chapter 4 – This chapter defines culture and important terms related to culture in project management. It also discusses UAE’s cultural diversity.
- Chapter 5 – Research Design and Methodology: This chapter highlights the research philosophy, approach, methodological choice, strategy, time horizon, conceptual framework and the instrument used to test the hypotheses. It further discusses pilot questionnaire, study sample, procedures and finally, the ethical considerations are mentioned.
- Chapter 6 – Data Analysis and Results: In this chapter, the analysis of the questionnaire is presented and the statistical tests.
- Chapter 7 – Discussion and Limitations: This chapter presents the discussion of the questionnaire’s findings and explanation of the results with researcher’s views supported by information from the literature review. The limitations of this study are also mentioned.
- Chapter 8 – Conclusions and Recommendations: The final chapter provides conclusions of the dissertation. Recommendations are then provided for both future research and practitioners.

## **1.11 Summary**

This chapter introduced the research topic which is risk perception. The research problem is identified that is derived from the gaps in the literature. The aim of the thesis is to examine risk perception in multicultural project teams in the UAE. Research objectives has bee set as well as research questions. In addition, four hypotheses have been developed which the research aims to investigate through the research strategy mentioned. The thesis is organized into eight chapters.

## **CHAPTER TWO: Literature Review Part 1**

---

### **2.1 Introduction**

The thesis main aim is to understand the concept of risk perception in multicultural teams in project-based environments. In order to establish the theoretical understanding (influence and the relationships), an extensive literature review is presented in the following chapter. Several concepts important for this thesis will be discussed thoroughly which are risk perception, decision-making and culture. Therefore, the literature review of the thesis is divided into three chapters:

#### **Part One: Risk Perception**

The first part focuses on defining important terms in project management which includes project, project management, project teams, risk, risk management, enterprise risk management, and risk perception in project context. In addition, this chapter will discuss the history of risk perception in the literature and will establish an understanding of the factors that influence risk perception.

#### **Part Two: Decision-making**

The second part focuses on decision-making in project context. It defines decision-making and group decision-making. It provides general background on decision-making and the factors that impact decision-making.

#### **Part Three: Culture**

The third part of the literature review will discuss the concept of culture, diversity, cultural diversity, national culture, and multicultural teams. Since the context of this research is examining risk perception in multicultural teams in the UAE, UAE cultural diversity will also be discussed.

## **2.2 Risk Perception**

*“Perception of risk goes beyond the individual, and it is a social and cultural construct reflecting values, symbols, history, and ideology.”*

(Riaz & Hunjra 2015, p. 971)

Projects are faced with numerous risks and unknown events varying in nature and magnitude leading to undesirable outcomes if occurred. Therefore, identifying risks is essential. Different methods have been widely used and can be found in the literature. Nevertheless, researchers argue that the reliability of some risk management techniques such as risk ratings could be inaccurate since managers or responsible personal in projects such as decision makers tend to apply their subjective judgments while analyzing risks. According to Yildiz et al. (2014, p. 520), “it is possible that different decision-makers may come up with very different risk ratings not only because of their different attitudes to risk but also different assumptions regarding controllability/manageability of risks.” Therefore, understanding the mechanism and factors influencing risk perception and individual contributions to risk is important. The studies on risk perception and risk behavior are mostly based on the theory of behavioral decision, which are found in the field of psychology (Wang et al. 2015). In this chapter, risk perception will be thoroughly reviewed in the existing literature including definitions, history, theories and the main factors will be highlighted. Project, project management and project teams will be firstly defined since this thesis looks at risk perception in project management context.

## **2.3 Definitions**

### **2.3.1 Projects**

As per Stankevičienė et al. (2007, p. 91), a project is “a new form of modern organization management, that allows to distribute effectively the reserve forces of the organization and to use the potential.” According to Project Management Body of Knowledge (PMI 2004, p. 4), a project is defined as “a temporary endeavor undertaken to create a unique product or service.” A project is described as temporary because its start and end dates are definite. It does not mean that projects have a short period of time as some projects may take years, but are always temporary

undertakings. Examples of projects includes construction of a new infrastructure, the implementation of a new business processes or building a new system (Marinaccio & Trojanowski 2012). Projects share the following characteristics (Marks 2012):

- Clear objective or objectives
- Constraints (scope, cost, quality and time)
- Fixed time
- Fixed budget
- Project team members
- Change and uncertainty
- Uniqueness

Projects are a vital element to the development and existence of organizations. Through projects, organizations can develop both products and services. In addition, projects are an important tool for organizations to react to the changes in the surrounding environment and competitive market. Thus, usually organizations invest huge amount of money for project funding (Marinaccio & Trojanowski 2012). Various industries and business sectors are becoming more and more project-based, such as IT sectors, construction sector and management consulting. The construction industry is perhaps the biggest and most complicated project-based sector (Meng & Boyd 2017). Projects are divided into phases. Different standards suggest dividing project into different phases; some into three, four or five (Maksymovych 2016). Project Management Institute PMBoK divides projects into four stages, which are initiation, organizing and preparing, executing and closing (PMI 22004). Others propose to divide project into concept, planning, implementation and completion (Maksymovych 2016).

### **2.3.2 Project Management**

As per Marks (2012, p.1), project management is “the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realized”. Project management is known as the most effective tool of managing a project (Marks 2012). According to PMBoK (PMI 2004, p.6), “project management is the application of knowledge, skills, tools, and techniques to project activities to meet

the project requirements.” The use of project management is increasing as an effective method to increase project productivity. There are reports on the increase utilization of project management practices and techniques by project management practitioners (Mir & Pinnington 2014). Project management is practiced by effectively applying project management methods. Project management processes are classified into five Process Groups (PMI 2004):

- 1- Initiation
- 2- Planning
- 3- Executing
- 4- Monitoring and Controlling
- 5- Closing

### **2.3.3 Project Team**

According to Brooks (2006, p. 84), a group is “any number of people who interact with one another, who are psychologically aware of one another, and who perceive themselves to be a group.” Many authors try to distinguish between groups and teams and explain the difference. They simply suggest that a team is a distinct form of group with extra characteristics. This includes having a clear and common purpose, goals and aims, common communication network, high level of interdependence and well definable membership (Fisher et al. 1997). A team can be defined as (Jacobsson & Hallgren 2016, p.586) “a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.” Sundstrom et al. (1990 p. 120) defined teams as “a small group of individuals who share responsibility for outcomes for their organizations.”

Organizations often create project teams to run and manage different project processes (Marinaccio & Trojanowski 2012). As per Jacobsson & Hallgren (2016), there is no doubt that project teams are important and essential to organizations in the modern society. This includes both personalized groups of few persons or in the essence of large organizations with bigger teams. A project team consists of group of individuals who work with each other to complete all the required tasks that allow them to achieve the project’s goal. It is essential for project success that project team members effectively work together and collaborate (Petter & Carter 2017). As per the

PMBoK, a project team is made of the project manager and the members who work together to complete the project's tasks to accomplish the goals. So, project team consists of the project manager, project management personnel and possibly additional group members who are not included in the management of the project but perform some of the work. This group is made of members from different knowledge and with specific skills needed for project completion. The composition and dynamic of project team vary greatly but the important role the project manager plays as a leading person is always constant (PMI 2004).

### **2.3.4 Risk**

According to Williams et al. (2008), risk can be compared to beauty; it can be identified, but is difficult to fully describe and define. They further add that it is well recognized in the literature that risk is complicated and multidimensional. According to the PMBoK (PMI 2004, p. 127), "project risk is an uncertain event or condition that, if it occurs, has a positive or a negative effect on a project objective." In the literature, many researchers defined risk. Academics and practitioners always argue about how should risk be defined. Risk usually involves two schools of thought. Previously, risk was defined based on the concept of probabilities of incidents with negative impacts like a loss. While this school of thought is widely used in the discipline of project management, the more recent academic concept of risk includes both good and bad impacts of risk and are referred to as opportunities and threats (Lehtiranta 2014). As per Jaafari, (2001, 89), "Risk is defined as the exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude." Risk, in project management, is referred to as (Koleczko 2012, p. 77) "the measure of the probability and consequence of not achieving a defined project goal". In project context, Gokmen (2014, p.176) defines risk as "the possibility of a chosen activity or action to bring about a loss or damage and to determine, evaluate and give priority to unexpected event". Thomé et al. (2016), define risk in construction context as the variance of either budget or time estimates and is measured by the likelihood of the event with the effect of the risk if occurred. In other studies, risk is linked with the variation of the expected uncertain consequences. Therefore, risk presents the possibility of different outcomes than the predicted ones (Hartono et al. 2014). Researchers argue that there is no universal definition for risk

as the literature presents many different understandings of risk (Lehtiranta 2014, Aven 2012). The definitions vary; while some focus on probability and chance, others focus on unwanted consequences and threats and some link risk with uncertainty (Aven 2012). As per Aven & Renn (2009, p. 1), the following definitions of risk can be found in the literature:

	<b>Definition</b>	<b>Author</b>
<b>1</b>	Risk equals the expected loss	Willis 2007
<b>2</b>	Risk equals the expected disutility	Campbell 2005
<b>3</b>	Risk is the probability of an adverse outcome	Graham and Weiner 1995
<b>4</b>	Risk is a measure of the probability and severity of adverse effects	Lowrance 1976
<b>5</b>	Risk is the combination of probability of an event and its consequences	ISO 2002
<b>6</b>	Risk is defined as a set of scenarios si, each of which has a probability pi and a consequence ci	Kaplan and Garrick 1981; Kaplan 1991
<b>7</b>	Risk is equal to the two-dimensional combination of events/consequences and associated uncertainties (will the events occur, what will be the consequences)	Aven 2007
<b>8</b>	Risk refers to uncertainty of outcome, of actions and events	Cabinet Office
<b>9</b>	Risk is a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain	Rosa 1998, 2003
<b>10</b>	Risk is an uncertain consequence of an event or an activity with respect to something that humans value	IRGC 2005

**Table 2. 1 Risk Definitions in the Literature (Aven & Renn 2009, p. 1)**

Aven & Renn (2009) divide those definitions into two groups. In the first six definitions, risk is presented by the probabilities and expected values. In the definitions from 7 to 10, risk is explained by events and uncertainties.

Althaus (2005) paper thoroughly reviewed the beginning of the word risk and how it evolved in the history in different disciplines. According to Althaus (2005, p. 571) “The history literature shows that risk is not only described as a phenomenon in its own right, but is also used as a framework within which other events and issues can be described and analyzed.” She further argues that the concept of risk is used in various disciplines without using the exact name. Furthermore, quantitative understanding usually rules the history of risk. As per Thomé et al. (2016), the concept of risk is multidimensional with various definitions and can be measured with many measures depending on the study field. For example, “in finance, risk is the fluctuation around the value of an expected return and comprises both gains and losses. In decision theory, risk is based on the availability of probability distributions (2016, p. 1331).”

Althaus (2005) also provided the understanding of risk across different disciplines where every discipline uses a certain form of knowledge of risk and uncertainty. Below is a table from Althaus (2005, p. 569) research.

Discipline	How it views risk	Knowledge applied to the unknown
Logic and mathematics	Risk as a calculable phenomenon	Calculations
Science and medicine	Risk as an objective reality	Principles, postulates, and calculations
Social sciences - Anthropology - Sociology - Economics	Risk as a cultural phenomenon  Risk as a societal phenomenon  Risk as a decisional phenomenon	Culture  Social constructs or frameworks  Decision-making principles and postulates

Law	Risk as a fault of conduct and a judicable phenomenon	Rules
Psychology	Risk as a behavioral and cognitive phenomenon	Cognition
Linguistics	Risk as a concept	Terminology and meaning
History and the humanities: - History - The Arts (literature, music, poetry, theatre, art, ect)	Risk as a story Risk as an emotional phenomenon	Narrative Emotion
Religion	Risk as an act of faith	Revelation
Philosophy	Risk as a problematic phenomenon	Wisdom

**Table 2. 2 Risk in Various Disciplines (Althaus 2005, p. 569)**

In most cases, the word “uncertainty” is linked with risk. In project management, the notion of uncertainty is helpful in capturing the two faces of risk, threats and opportunities. Uncertainty management does not only look at dealing with threats, opportunities and their effects, but also distinguishes and manages different causes of uncertainty that influence projects (Lehtiranta 2014). As per Gokmen (2014, p. 176), “uncertainty is the deficiency of certainty among multiple possibilities that could lead to unsolicited after maths.” At project level, differentiating between risk and uncertainty in terms of measurements, costs and mitigation provides project management with greater understanding to deal with future uncertain events (Koleczko 2012).

### **2.3.5 Risk Management**

In every project environment, risk is present. Therefore, if risks are not addressed efficiently in project management processes, undesired outcomes might happen such as time and budget overrun. Thus, risk management is essential to projects and has been widely studied and examined (Zhang 2016). According to Carvalho & Rabechini (2015), the practice of project management, nowadays, is widely influenced by the implementation of reference guides like Project Management Body of Knowledge. Such guides stress strongly on the importance of project risk management. Nevertheless, as per Carvalho & Rabechini (2015), there is a huge gap between the concept and the implementation of risk management in real life projects. Risk management (RM) is defined as a set of organized tasks and events in order to control and manage the organization in terms of the possible risks (Lehtiranta 2014). The aims of project risk management are first, to expand the possibility and effect of positive occurrences and second, to reduce the possibility and effect of undesirable circumstances (PMI 2004). Project risk management has three stages: risk identification, risk assessment and risk response. In the first phase, risks are recognized and registered. In risk assessment phase, project risks are examined and evaluated based on their different aspects, which includes the likelihood and influence. In risk response phase, risk exposure is mitigated through building, choosing and applying techniques and strategies. Risk response is essential in minimizing adverse effects of risks. If the right risk response tactics are chosen, risk exposure and impact can be reduced (Zhang 2016). Nowadays, risk and uncertainty management are keystones that project management focuses on (Koleczko 2012). As per Hartono et al. (2014), when project risk management is applied accurately, it can be one of the main reasons contributing to project completion and organization's long run achievements. Risk involves almost all aspects of project management from accounting to finance to marketing and project operation. Moreover, risk affects other disciplines related to projects such as engineering and team members' behavior (Koleczko 2012). Thus, risk management is very essential.

### **2.3.6 Enterprise Risk Management**

Enterprise risk management (ERM) is defined as (Fraser & Simkins 2010, p. 33) "a process, effected by the entity's board of directors, management, and other personnel,

applied in strategy setting and across the enterprise.” It is created to recognize the possible occurrences which could impact the enterprise and to control risks to not exceed the limit preferred by the enterprise. In addition, it is designed to assure the entity that the objectives are accomplished (Fraser & Simkins 2010). As per Arnold et al. (2014), nowadays, ERM is known as a standard way of organizational governance as well as the main focus for both public and private organizations to manage operations internally and externally and the company’s relationships.

ERM is different than traditional RM. In ERM, the overall goal is to increase the chances that the strategic aims and objectives of the enterprise are achieved to preserve and enhance the value. This is done through strategically looking at the interconnected impacts of different risk factors. On the other hand, in traditional RM, risk factors are usually considered by business unit managers with minimum knowledge of how certain risks might influence other risk features of the business such as strategic risks (Fraser & Simkins 2010).

### **2.3.7 Risk Perception**

The concept of perception is widely used in different psychological contexts (Özleblebicıa & Şahin 2015). A “perception” is the procedure where the human brain builds and creates illustrations of objects and theories using the sensory information it receives along with past experiences. According to Romo et al. (2012, p. 914), the process of perception “is a result of a chain of event consisting of phenomena such as detection, memory, discrimination, categorization and decision making.” A perception can also be defined as the identification, interpretation and realization of the physical and social manners around us (Özleblebicıa & Şahin 2015). According to the Oxford Dictionary- as cited by Özleblebicıa & Şahin (2015 p. 296)- perception is defined as “the way in which something is regarded, understood, or interpreted.” Yıldız et al. (2014) refer to risk attitudes particularly as the differences humans have in the way they determine and decide on risky and uncertain work or personal choices. Whereas they refer to risk perception as (2014, p. 520) “process of cognitive appraisal which can reflect how people evaluate risk.” In project management, project managers risk perception is defined as his/her personal evaluation of the possible risks in the project (Liu & Chiu 2016).

Williams & Noyes (2007) simply refer to risk perception as a person's evaluation of the risk presented in a circumstance relying on the person's personal assessment of the options. Risk perception is also defined as a person's feelings and insights of the surrounding objective risks affected by personal judgment and thoughts (Wang et al. 2016). Sitken and Pablo (1992) provide a short but very interesting and informative definition. They define risk perception as (1992, pp.12) "a decision maker's assessment of the risk inherent in a situation." Their definition is very important in project management as it links risk perception to decision-making.

Acar & Gök's (2011) definition of risk perception includes two components of risk, likelihood and magnitude. They define it as the subjective evaluation of the likelihood of a certain incidence or accident occurring and how individuals are worried about the outcome's magnitude. They refer to the magnitude as the extent of damage if the plan does not go as desired.

Damm et al. (2013) view risk perception as the subjective assessment of risk. As per Sjöberg et al. (2004, p. 8), "risk perception is the subjective assessment of the probability of a specified type of accident happening and how concerned we are with the consequences." They add that risk perception consists of both evaluation of likelihood and the effect of unwanted result. Additionally, they argue that risk perception is not only about the individual but also include elements from both social and cultural influences revealing values, history, philosophy and ethics. Veland & Aven (2013) say that risk perception is the judgment and faith that a person, crowd or society have regarding risks. Additionally, individual's risk perception is affected by the person's own risk assessment. As per Veland & Aven (2013, p. 36), "Risk perception research shows that relative frequencies are substituted by the strength of belief that people have about the occurrence of any undesirable effect."

From the various definitions of risk perception derived from the literature, it can be seen that the concept of risk perception is complex and multidimensional where many elements interact. This includes elements from the human side such as the cognitive capacity, elements from humans' origin such as beliefs and values and elements from humans' surroundings such as risky situations. This fact can leads us to the

conclusion that measuring risk perception is complex and requires extensive research and examination. For the context of this research, the definition Sitken and Pablo provide which links risk perception and decision-making is very useful. In addition, some definitions such as Acar & Gök's (2011) define risk perception by how individual react to the two components of risk, probability and impact. Their definition is also adapted in this research.

## **2.4 History of Risk Perception**

As per Wang et al. (2016), risk perception was first introduced in the literature by Bauer (1960) who examined this concept in his study of consumer behavior from a psychological perspective. Bauer (1960) suggested that since risk perception is subjective, consumer behavior is uncertain and is affected by people's evaluation of mental representation of goods and services (Laroche et al. 2004). Roszkowski & Davey (2010) also suggest that by the 1960s, research on perceived risk and perception started to appear to understand the factors of risk and the surrounding circumstances. Sjöberg et al. (2004) argue that the concept of risk perception emerged as a significant factor in the study of policy in the 1960s mainly to understand public opposition to nuclear energy and technology. The idea Sowby (1965) presented triggered the concept of risk perception, when he suggested that researchers need to compare between different risks. For instance, the risk of smoking and driving is bigger and more dangerous than the risk of being near a nuclear power plant. This showed people that accepting technology risk should be easier than accepting other much greater risks. In 1969, Starr (1969) examined social benefits and technological risks in some detail. He observed that people would more likely accept the risk if there were benefits related to the risk. As per Sjöberg et al. (2004), Starr research opened researchers' eyes and brought their interest to answer the question of how individuals perceive, tolerate and accept different risks. In addition, for logical decision-making, risk perception was difficult to process, as experts believed that individuals are likely to see risk even if no risk was obvious. According to Sjöberg et al. (2004, p.8), "The conflict between expert and public risk perception is at the basis of the social dilemmas of risk management."

A big input to the area of risk perception is brought from the study of subjective probability by Kahneman and Tversky. By the 1970s, researchers began to draw interest in subjective probability. Kahneman and Tversky are well known for their experiment, which examined the way individuals react in simplified circumstances (Borovcnik 2015). According to Sjöberg et al. (2004, p. 14), “They found great differences between probability according to calculated probability calculus and the intuitions people had about probabilities.” Sjöberg et al. (2004) also add that the work of Kahneman and Tversky can explain much about how individuals perceive and react once faced with risks. In 1979, Daniel Kahnman and Amos Tversky came up with a theory to define how people actually behave under risk comparing to other theoretical models. They referred to their theory as “The Prospect Theory”, and published their famous research “Prospect Theory: An Analysis of Decision under Risk.” According to Barberis (2013), their research was able to do two things. First, they gathered in one paper simple but convincing illustrations, which showed that individuals do not go by the assumption of the “Expected Utility Theory” while making decisions involving risk. Second, they offered a new model to risk referred to as the Prospect Theory (Barberis 2013). Later in 2002, Kahneman received a Nobel Prize for his input to the study of decision-making and its factors in psychology, and Prospect Theory is an important part of his work (Borovcnik 2015). In section 2.5, The Prospect Theory is examined in more details.

Sjöberg (2000) describe the Psychometric Model which was launched in 1978 by Fischhoff and his colleagues, as a leading model in the area of risk perception. Other studies and research followed this to extensively examine this model and it's effectiveness in explaining risk perception. The idea behind this model is using a number of explanatory scales to rate various hazards. The numbers are then used to analyzed individual's risk perception, perceived risk or risk acceptance (Sjöberg 2000). The recent risk perception surveys and questionnaires apply items regarding risk's magnitude, probability, and characteristics derived from the Psychometric Model (Visschers et al. 2007). According to Rundmo & Nordfjærn (2017), the study of risk perception in the past decades has been influenced by psychometric approach. The focus has been on the subjective and distinctive characteristics of risk perception. In this approach, it is believed that risk perception is multidimensional where different

factors are involved. Thus, risk perception can be measured by applying different measures that reflect the different features (Rundmo & Nordfjærn 2017).

In addition to Prospect Theory and the Psychometric Model that examine risk perception, other theories also emerged in the literature explaining individual's risk perception. One important theory that links cultural influence, individual's risk perception and decision-making is The Cultural Theory of Risk (CTR). The Cultural Theory was developed by Mary Douglas in 1978 and Douglas and Wildavsky (1983). It has been essential in the study of risk perception and examining different aspects of risk. By early 1980s, both Douglas and Wildavsky examined the effect of principles and culture on individual's risk perception. From their point of view, people's perception of the surrounding risks is socially and culturally determined. As per Rippl (2002, p. 148), "This means that the values and worldviews of certain social or cultural contexts shape the individual's perception and evaluation of risks." While some researchers believe that Cultural Theory is a very useful tool to explain cultural variances that shape individual's risk perception, others have been questioning this theory through theoretical and empirical studies. Nevertheless, the criticism has been also challenged by other researchers with evidence of a combination of empirical, theoretical and methodological data and tools (Sjöberg 2003). Cultural Theory of Risk is reviewed in more detail in section 2.5 below.

## **2.5 Risk Perception Important Theories**

### **2.5.1 Prospect Theory**

Understanding the Prospect Theory is a key for any researcher who is aiming at evaluating the way risks are framed and examined (Ojiako et al. 2014). As per Yaldiz et al. (2014), the Prospect Theory, a behavioral economic concept, is one of the mostly used theories in the literature by many researchers to explain risk behavior. Prospect Theory was established by Daniel Kahneman and Amos Tversky in 1979, and they later introduced a developed version in 1991 (Wakker 2010).

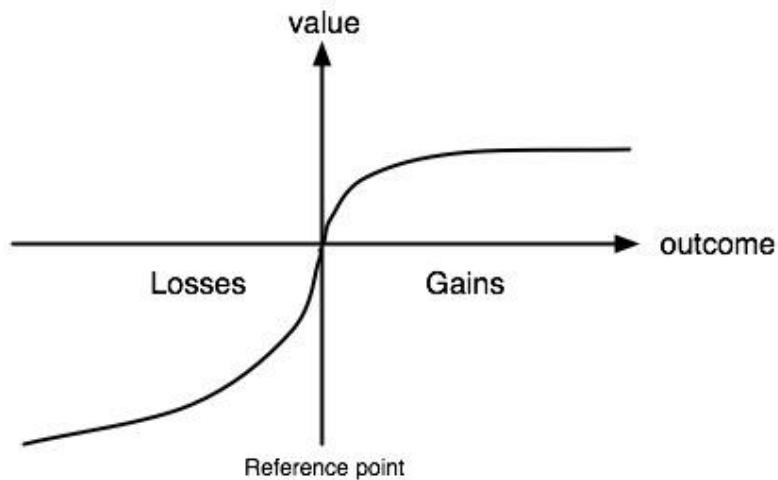
The Prospect Theory is a model explaining people's decision-making process when facing risks. It is believed that Prospect Theory can explain several human behaviors under risk that other theories couldn't explain such as the Expected Utility Theory (Castro et al. 2016). The Prospect Theory uses psychology research and findings into other fields such as economics, which resulted in distinguished addition for the study of human judgment and decision-making under risk. As per Zhang & He (2014), with Prospect Theory, a new field is opened which is studying decision-making under risk. "Prospect theory holds that people's behaviors, revealing non-rational psychological factors, are predictable (Zhang & He, 2010 p.160)." Kahneman and Tversky's paper "Prospect theory: an analysis of decision under risk", published in 1979, explains some classes of choice problem and suggests a new explanation for individual's decisions under risk (Kahnman & Tversky 1979).

According to Zhang & He (2014, p. 160), the conclusions of the Prospect Theory are:

- "Most people show risk aversion when they are faced with gain (fixed effect)
- Most people show risk preferences (reflection effect)
- Most people usually judge gain and loss according to reference point (reference dependent)
- Most people are more sensitive to loss than gain (loss effect.)"

The mentioned assumptions can be observed in people's daily life while making choices. As per the Prospect Theory, people evaluate the impact of the choice relatively to a reference point, where gains are considered exceeding reference point while losses are considered less than the reference point (Zhang & He 2014). In addition, according to addock et al. (2015, p. 168), "as outcomes move further away from the reference point, the perceived value associated with each increment declines. Thus, the value function is concave above the reference point in the domain of gains and convex below the reference point in the domain of losses." So, when a person believes to be in the domain of gain he will be risk averse, while when a person believes to be in a domain of loss, he will be risk seeking. As a result, people base their decisions on perceived gains instead of perceived losses (Acar & Goc 2011). Prospect Theory identifies two stages in the process of decision-making; framing and valuation. In framing, the person builds an image of the acts, contingencies and

consequences which are related to the choice. In the second phase, valuation, the individual examines the impact of every prospect and decides based on the assessment (Tversky & Kahneman 1992). In the figure below (Kahneman & Tversky 1979, p. 279), the value function is S-shaped where it is steeper for loss than gain. This reveals that loss outweighs gain.



**Figure 1**

**Figure 2. 1 A Hypothetical Value Function (Kahneman & Tversky 1979, p. 279)**

In Kahneman and Tversky point of view, people's risk attitude is influenced by different situations. Therefore, under positive circumstances, individuals will be leaning toward risk-aversion. While under negative circumstances, individuals will be leaning toward risk-seeking. This is referred to as the "Reflection Effect". For example, when presented with opportunities, a leader will show risk-averse attitude and when presented with threats, a leader will be risk-seeking (Tsai & Luan 2016).

As per Tsai & Luan (2016), Kahneman and Tversky provided theoretical explanation for the prospect theory for individuals and following that many researchers have provided empirical evidence to the Prospect theory by examining behavior of managers and organizations.

### **2.5.2 The Cultural Theory of Risk**

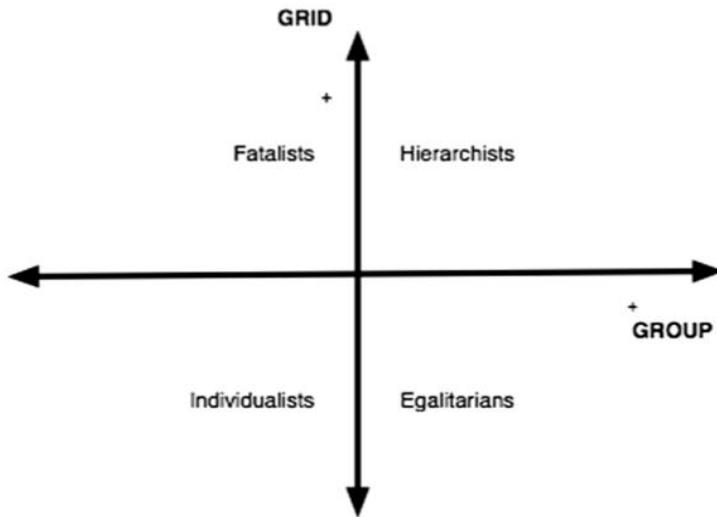
As per Rippl (2002), the study of risk is widely ruled by two concepts; the psychometric paradigm and the cultural theory. Douglas and Wildavsky, by the 1980s, suspected the significance of culture and beliefs and their impact on people's risk perception. They believed that people's risk perception and their perception of social issues are shaped by their social and cultural backgrounds (Rippl 2002). The concept of the Cultural Theory is based on the thought that an individual's risk perception is established on cultural biases, which are a reflection of the individual's social relations (Ng & Rayner 2010). According to Douglas & Wildavsky (1983), each human is rooted in a unique social structure and that social and cultural backgrounds shape how individuals examine and evaluate the surrounding risks. The Cultural Theory suggests that individual's risk perceptions reveal and highlight one's preferences for different kinds of social organization or cultural lifestyle. The mentioned preferences are regarded as "cultural worldviews" (Xue et al. 2014). According to Douglas & Wildavsky's theory (1983), worldviews are categorized as either "group" or "grid" based on their place inside a dimensional space.

As per Xue et al. (2014):

- The "group" facet represents the degree to which people are dedicated to their community organization, that (Xue et al. 2014, p. 249) "foster strong social bonds, collective identity and cooperation (high group) as opposed to emphasizing individual differences, self-reliance, and competition (low group)."
- The "grid" facet represents a strong obligation (Xue et al. 2014, p. 249) "to role- or class-based social stratification (high grid) versus the belief that all individuals in society should not be excluded from social roles on the basis of their sex, age, or colour (low grid)."

Furthermore, when the two categories- Group and Grid- are joined together, a 2x2 matrix is created showing four different cultural worldviews (Xue et al. 2014):

- Egalitarianism
- Individualism
- Hierarchism
- Fatalism



**Figure 2. 2 The Cultural Theory of Risk Model (Xue et al. 2014, p. 250)**

As per Wildavsky & Dake (1990), egalitarians are distinguished by their high worry about social prejudice, doubting authority, acceptance of social nonconformity as well as strongly supporting democracy. On the other hand, individualists like deregulation, free market options and giving others chances to maximize personal gain, while they hate restraints on their independence. “Individualists claim that nature is “cornucopian”, so that if people are released from artificial constraints there will be no limits to the abundance for all, thereby more than compensating for any damage they do (Wildavsky & Dake 1990, p. 45).” Similarly, hierarchists support technological items and processes. Hierarchists are dedicated to preserving the existing power structure which shields their interest. Fatalists are known by their extreme disengagement and they think that most of what is going around them in the community is not under their control (Xue et al. 2014). According to the Cultural Theory, there are hypotheses suggesting each of the different type’s attitudes toward risk. For instance, hierarchists are most likely to take the risk if the decision regarding the risk has been justified by the government or experts. Egalitarians will most likely resist risks that significantly impact on future generation (Rippl 2002).

As per Kahan et al. (2007), the Cultural Theory of risk states that a person’s risk perception reveal and support their commitments to how they think society should be controlled. Based on the theory, people view matters as risky if they impact their cultural norms (Douglas & Wildavsky 1983). In the cultural theory, it is believed that risks are defined and seen based on the values and attitudes that control various

variants of the social organization. As per Ng & Rayner (2010 p. 89), “individuals will be selective about risks to be concerned about, especially those that reinforce the cultural solidarity of their institutions.” Furthermore, this theory can justify why opposing cultural biases are able to occur together at the organizational level (Ng & Rayner 2010). As per Yang (2015), studies using empirical data mostly support the model and propositions of the Cultural Theory. Nevertheless, Cultural Theory has been challenged by the lack of empirical support and some recommended the application of a mixture of approaches such as the psychometric approach with cultural theory for stronger explanatory power.

## **2.6 Factors of Risk Perception**

As per Sjöberg (2003), there is an apparent need to recognize the different factors affecting risk perception. According to Wang et al. (2016), although past studies have highlighted a number of factors influencing risk perception, they have seldom presented an extensive knowledge on how individuals describe and perceive risk.

In construction projects, for instance, it has been found that individual's risk perception and managers decision-making are influenced by personal characteristics, which include both psychological and demographic features (Acar & Goc, 2011). In psychology, most researchers suggest that people's risk perceptions is influenced by past experiences, cultures, and common sense (Veland & Aven 2013).

It has been documented that risk perception is linked with individual's beliefs, thoughts, judgments and feelings. One essential factor influencing risk perception is individual characteristics, which involve gender, age, educational history, salary, self-esteem, locus of control and the traditional personality determinants (wang et al. 2016, Källmén 2000, Sjöberg 2003). Wang et al. (2016) also highlight that in sociology, the factors affecting risk perception are within two categories; one is risk-related and the other is perceiver-related. Perceiver-related factors are demographic factors such as age, sex, and specific personal behavior such as anxiety and beliefs. In this section, factors from the literature are gathered, analyzed and grouped into two categories in order to highlight the most common factors described in the literature.

## **2.6.1 Demographic Factors (Gender, Age, Educational Background, Culture)**

### **➤ Gender:**

Gender is an important factor that has been widely examined. Abotsi et al. (2014) argue that men tend to take higher risk than women and supported this point by a number of researches' findings. As per Cheung et al. (2013), evolutionary theory proposes that men tend to take higher risks than women. Many offered different explanation to gender differences in risk perception. One is the economic salience hypothesis where it is believed that men are more involved and affected by economical matters than women and are less concerned with other issues such as the environment. As a result, female perceive environmental risks as more important than males, while men perceive economic risk as more significant than women. Another explanation suggests that men and women interpret similar risks differently and look at them from a different perspective. In addition, males view risky behavior or choices more tolerable than females do (Cheung et al. 2013). Figner & Weber (2011) argue that females tend to show much lower risk attitude in some domains such as finance, recreational activities and ethics but have more risk attitude in other domains such as social risks. As per Rundmo & Nordfjærn (2017), males and females are concerned with different types of risks. Therefore, they not only might recognize similar risks in a different way, but also worry about different risks. Similar risks have different meaning to them.

### **➤ Age:**

As per Abotsi et al. (2014), age is a factor of risk perception as they explain that older people have lower risk taking behavior than younger ones. Older people view danger in a greater level than younger ones and thus younger people take more risk. In addition, younger people overestimate their capabilities and chances, which makes them take higher risk. Also, younger people have a positive attitude and are optimistic about the outcome (Rundmo & Nordfjærn 2017). Ojiako et al. (2014) also highlighted in their study of risk perception among small and medium enterprise owner-managers the importance of general individual traits including age, genders and culture in

responding to different risks. In addition, they argued that this has been supported by considerable amount of research conducted by Weber and her colleagues.

➤ **Educational background/Organizational level:**

Risk perception differs from a person to another based on organizational level and educational background. Since individuals have different opinions and understanding of the circumstances based on their level in the organization, this influence their perception of the surrounding risks (Wang et al. 2016). In an experimental study examining stakeholder risk perception in construction projects where 60 participants from different backgrounds and organizational levels including architects, engineers, and contractors were examined, it was found that although all the stakeholders were well aware of Occupational Safety and Health (OSH) hazards in construction procedures, risk probability estimation among them varied. Architects estimated the lowest probability of risk while engineers estimated higher likelihood (Zhao et al. 2016). Zhao et al. (2016) concluded that it is must be accepted that it is essential for decision makers to acknowledge the differences in risk judgment in different personal in the project environment.

➤ **Culture/ Race:**

Individual's culture is also a main factor influencing perception of risk. In Douglas & Wildvasky book (1983, p. 8), they argue that "each form of social life has its own typical risk portfolio." Therefore, people's risk perception is significantly affected by cultural bias that is fundamental to social organization. Examining the relationship between culture and risk perception is one of the main aims of this research paper.

As per Liu et al. (2015), culture influences how risk is seen and operationalized within organizations. According to Cheung et al. (2013), studies examining risk behaviors demonstrate that culture from which people come from influence risk as people from Eastern culture react to risk differently than people from Western cultures. In a study by Weber & Hsee (1998) to examine the cross-cultural differences in risk perception, participants from US, China, Poland and Germany were given identical mathematical probabilities related to risky financial choices. It was found that risk perception and perceived risk varied among different nationalities. For

instance, Chinese participants had significantly less risk-taking behaviors, while Americans had the most risk-taking attitude. In the study, Weber & Hsee associated the differences mainly to cultural differences affecting risk perception. According to Hofstede's (2001) cultural dimensions perspective, in China, the culture is considered socially collective unlike the American culture, which it is more individualist. As a result, in Chinese culture, the decisions and choices are taken by the whole family or the involved group. Many used this fact to explain risk perception differences among different cultures. In another study by Blais & Weber (2006) comparing between English and French people in five domains, it was observed that risk perception results for the French people were considerably higher than English people in all different areas. On the other hand, risk attitude for English people in four areas were higher than French people. It was then explained that since French have higher risk perception, they tend to have lower risk attitude. Similarly, since English group have less risk perception, they tend to have higher risk acceptance.

According to Camprieu et al. (2007), there is a good amount of evidence in the literature suggesting that managers from different cultures respond in a different manner to various issues related to project management and this include issues related to risk and uncertainty. In Camprieu et al. (2007) study to examine cultural differences in project risk perception, they examined four sets of independent variables, which are cultural factors, individual factors, social-economic factors and situational factors. They looked at how people from distinct geographical and cultural settings (Canada and China) are different in the kinds of risk they consider, their perceived likelihood of occurrence and relative importance. This was evaluated through empirical study. The study concluded that the findings support the idea that there is a great variance in how individuals coming from diverse cultures perceive and examine risks in any complex project.

### **2.6.2 Personal Characteristics (Emotions, Past Experience, Personality)**

It has been documented that risk perception is linked with individual's beliefs, thoughts, judgments and feelings (Wang et al. 2016). As per Roszkowski & Davey (2010), personality, emotions and previous experiences are important in risk

interpretation. Thus, different individuals presented with same risks might evaluate the information provided and risk in a different way.

➤ **Emotions:**

According to Roszkowski & Davey (2010), emotions play a vital role on how risk is viewed by involved individuals. A person's emotions directly influence how he or she might perceive risks and react to them. In addition, Damm et al (2013) also mention emotion and emotional experiences as an important factor for risk perception. The importance of emotions' impact on perception has also been documented by Weller & Tikir (2011). In their study, emotions were found to be positively linked with the perception of various risks including health, social and ethical risks. Huurne & Gutteling (2008) mention that traditionally, risk was about the likelihood and probability of an unwanted event (analytical approach); but modern approaches to risk also look at how people feel about unwanted risks. People not only evaluate risk based on what they know (probability), but also based on their judgment. Huurne & Gutteling (2008) refer to this as affective responses. "These affective responses refer to emotional reactions to risks, such as worry, anxiety, and fear (Huurne & Gutteling, 2008 p. 849)".

➤ **Past/personal experience:**

Damm et al. (2013) say that there is a sufficient proof that individual's risk perception differ greatly and is independent of evaluated levels of risk. They add, "risk is all about thoughts, beliefs, and constructs (2013, p. 166)." They argue that heuristics are widely used by people while assessing risk and specifically the availability of heuristic. They further explain that by this, individuals evaluate the severity of risk by whether they can remember similar risk and events in their previous experience. Therefore, memories that are still well present in one's memory are the ones that increase the likelihood of occurrence again which can be referred to as recall of memory. This all go under the factor of past experience, which clearly influences risk perception. As per Damm et al. (2013, p. 167), "Direct involvement and personal experience with particular outcome increase people's perception of risk." This is explained by the fact that once similar kind of risk is already cognitively present, one

can understand it easier. In a study by Weber (2006), he observed that individuals who have personal past experience with certain risks assign those risks with bigger probabilities than risk they have not experienced before and only learned about through verbal explanation. According to Patt et al. (2006), a good reason to this is trust where people usually tend to trust their personal experience more than they trust others experiences even some experts knowledge. Another explanation to the importance of past experience is the vividness of the risk since personal and direct experience leave stronger memories and impression of this risk. As a result, drawing examples and recalling the importance of the risk becomes easier (Keller et al. 2006).

### ➤ **Personality:**

According to Cheung et al. (2013), people who are used to taking high risk in particular domain will also do so in other domains, which show that personality is important in shaping risk perception. As per Chauvin et al. (2007), examining individual's variance and personality in risk perception is very complex and more difficult than examining the differences in different types of risks and hazards. In their study on risk perception and personality facets using the Big Five Model, they found that personality facets predict risk perception more than other factors such as age and gender. According to Bouyer et al. (2001), the link between worldviews (hierarchic, egalitarian, individualist, and fatalist) and risk evaluation has been established by several studies. For instance, individuals who are fatalists and egalitarians, view health related risks as riskier than individuals who are from different view. In Bouyer et al. (2001) study, they found that worldview greatly influenced the prediction of three risk factors among the ten studied risks. In a study by Wang et al. (2016) to investigate the impact of personality and risk propensity on risk perception of construction project managers in China using the Big Five personality model, a relationship was established. Both the quantitative and qualitative data of the study showed a relationship between personality characteristics (Extraversion, Agreeableness and Conscientiousness) on risk perception of construction project managers. The results showed that managers who have Extraversion traits have lower risk perceptions. According to one participant in the study who had high levels of extraversion, "Compared with my colleagues, for the same risk I usually think it is not that risky (Wang et al. 2016, p. 1302)."

## **2.7 Summary**

Risk perception is an important concept in project management since risk is present in every aspect of the project. With project team members coming from various cultures, backgrounds and experiences, understanding the influence of risk perception is important. Many factors influencing risk perception have been identified in the literature. The factors are related to individuals' demographics and personal characteristics. This research is interested in examining demographics factors in general and culture in specific. Also, previous studies have linked personality and risk perception and provided measures for testing personality. Previous researches examining the relationship between culture and risk perception tried to explore the variance in cross-cultural context in which they looked at participants working in different countries. Not much has been found about individuals from different cultures working together in projects teams, which this study aims to investigate. In addition, the majority of the comparisons were done among western countries and very little studies examined the relationship between western and eastern countries (Yang 2015).

## **CHAPTER THREE: Literature Review Part 2**

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### **3.1 Introduction**

*“Most decisions are unprogrammed and have at least some degree of uncertainty, ambiguity and complexity.”*

(Socea 2012, p. 49)

According to Sitken and Pablo (1992, pp.12), risk perception is “a decision maker's assessment of the risk inherent in a situation.” Hence, risk perception influences decision maker's decisions. Therefore, understanding decision-making in project context is very important for this study. As per Stingle & Geraldi (2016), decision-making is one of the most essential aspects of projects management. Thus, the study of decision-making in project context has received great attention in the last 15 years where project decisions have been looked at closely (Stingle & Geraldi 2016). One of the project manager's important tasks is understanding his clients' risk appetite and weighing the options to make decisions involving risk. With new technologies, competitive environments, globalization and frequent new inventions, project management is faced with complicated and dynamic decision-making process involving risks (Koleczko 2012).

Decision-making is essential in projects. Many studies have concluded that the root causes behind unsuccessful projects are human errors and unsuccessful judgment, which usually are brought by poor decisions. Thus, decision-making is a crucial task for any personnel working in project management (Ewege et al 2012). Decision-making involving risk is regarded as one of the most significant matter and has received great attention (Dong et al. 2016). Accordingly, understanding the facts behind the process of decision-making is very important in projects and organizations.

In this section, decision-making will be explored from different angles including definitions, background history, theories/studies and factors influencing the process of decision-making.

## **3.2 Definitions (Decision-Making, Group Decision-Making)**

### **3.2.1 Decision-Making**

A decision can be defined as a position, view or conclusion after some thought. It is the result of a complicated procedure of deliberation representing a mental phenomenon. A decision involves an evaluation of the possible outcomes and uncertainties (Eweje et al. 2012). According to Soerjoatmodjo & Kaihatu (2016, p. 541), “decision is defined as a goal-directed, problem-solving motivated act of choosing amongst two or more alternatives.” The concept of decision-making is studied in various sciences including economics, politics, psychology, and mathematics (Khahneman & Tversky 1983). Generally, decision-making is perceived as a complicated interaction of high-level activities, which are related to option generation, examining possible risks and outcomes and choosing an action that is preferred by the individual (Del Missier et al. 2010). “Decision-making is defined as the process of choosing out of alternative courses of action that is dealt with (Dede 2013, p. 691)”. In psychology, decision-making and problem solving often come together although both are defined differently. Accordingly, another definition for decision-making is the procedure of selecting the best act between the several other options in order to solve a difficulty or overcome an obstacle (Dede 2013). Formerly, decision-making studies focused mostly on making choices where a choice is selected among the best available set of options (Beach 1993). According to Radomski et al. (2015), the process of decision-making is complicated which is related to individual’s daily life. Furthermore, it needs the selection of options while utilizing feedback from the past selections to establish and sustain an ideal choice approach. The definition of decision-making usually involves choices and choosing. According to Schall (2005, p. 10) “we can refer to a decision as a process that results in the overt act of choosing”.

As per Mihaela (2015), reaching a decision is defined as choosing from a group of options or different actions depending on specific standards and factors that will provide the most successful opportunities that fulfill the aims of the individual or group.

The subject of decision-making is very broad. As per Doya & Shadlen (2012), most fascinating cognitive functions can be regarded as a form of decision since cognitive tasks or functions involve flexibility and/or planning. Moreover, other functions and actions that we do not recognize as cognitive actually depend on decision processes (Doya & Shadlen 2012). Studies on decision-making, previously, have mainly focused on examining the process of decisions with only two choices or alternatives. Nevertheless, in real situations, individuals are faced with multiple alternatives to decide (Chrchland & Ditterich 2012). This can be applied to projects and organizations where decisions are made involving several choices and alternatives, which makes decisions more complex.

### **3.2.2 Group Decision-Making**

In project context and organizations, multiple team members go through the process of decision-making together where a single decision-maker is less practical. This is known as group decision-making. Group decision-making is a process in which several decision-makers cooperatively evaluate and choose the best available action or solution among many (Liang et al. 2017). As per Chao et al. (2017, p. 26), “group decision making (GDM) aims to obtain a solution alternative(s) to a given question based on the opinions provided by a set of experts.” In current organizations, decision-making highly depends on team members and groups. Ideally, team members share and integrate their information and experiences resulting in superior logical decisions. Nevertheless, in real life project teams, individuals can experience many decision biases, which has been documented through empirical studies. Both individuals and team decision-makers do not follow the norms or the expected rationality when making their choices (Curseu et al. 2016).

### **3.3 Background Information and Theories of Decision-Making**

The field of behavioral decision-making has been examined for many years. The research on decision-making became known in the academic field when the statistical decision theory was established in 1950s. When a group of researchers developed this theory, others applied it to the practical life. In 1966, the “Decision Analysis” was presented at the 4<sup>th</sup> International Operations Conference, which became important in decision-making research. With the increasing interest in the complex activities of the brain and how individuals think and make decisions, many theories and explanations were provided by different researchers (Zhu 2012). Nevertheless, in 1979, when Daniel Kahneman and Amos Tversky, psychologists known for their work on decision-making and judgment, released their radical paper, “Prospect theory: An analysis of decision under risk”, they, as per Read (2000, p. 496) “gave us the grand synthesis and development of ideas that defined that field and gave us a common research agenda”. Read (2000) compares the influence of this article on decision research and studies as the influence Darwin’s “On the origin of species” had on biology. In Kahneman and Tversky’s article, they criticize the expected utility theory that was used to explain decision-making as a descriptive model of decision with the presence of risks. Furthermore, they presented an alternative theory, Prospect Theory, where they describe choices made with risky situations. According to the Prospect Theory, individuals base their decisions according to the possible value of loss and gain instead of the end result applying heuristics (Kahneman & Tversky 1979). As per Khahneman & Tversky (1983, p. 341)- “the study of decisions addresses both normative and descriptive questions”. To distinguish between the two, they further explained that the normative evaluation is related to the logic behind the decision and its rationality. On the other hand, the descriptive analysis is related to individual’s beliefs and choices as they are created by each individual not as they must be. Most of the studies on human judgment and choices are illustrated by the tension the normative and descriptive sides create (Khahneman & Tversky 1983). More details related to The Prospect Theory can be found in chapter two- section 2.5.

According to Furman et al. (2010), heuristics can be described as a kind of decision-making approach usually known as “rules of thumb”. Heuristics make the process of decision-making easier by minimizing the need to analyze many cues and lessening the cognitive load on decision makers. Thus, making decisions easier and more efficient (Furman et al. 2010). Tversky & Kahneman (1974) introduced three heuristics usually applied in explaining decision-making, which are availability, representativeness and anchoring/adjustment. The availability heuristic refers to how an individual can easily remember a similar example or experience in his mind. The representativeness heuristic is known as the degree in which a circumstance is like an existing event in the mind where an individual makes a generalization not looking at other important or relevant information to the decision. Anchoring and adjustment heuristic proposes that people start their view with an anchor and as more knowledge is available, they adjust their view or decision (Tversky & Kahneman 1974).

Before establishing the Prospect Theory, normative theories explaining decision-making mainly suggested that individual's make decisions on a rational basis with the aim to increase effectiveness or used their logical evaluation built on the best method to achieve maximum benefits (Einhorn & Hogarth 1981). The Expected Utility Theory has been widely applied to explain people's behavior and decision-making process under risk or uncertainty. Researchers have used this theory to evaluate people's behavior when facing wanted, unwanted and symmetrical risks (Alghalith 2010). According to the Expected Utility Theory, choices or decisions are made depending on the maximization of the predicted outcome, which has uncertainty to it. The theory suggests that a person makes a decision regarding uncertain or risky events once the projected utility of the result has been examined. As a result, in case of uncertain circumstances, the decision maker is believed to pick the choice that has the most expected value, which is most probabilistic. Hence, it is suggested that the logical person will choose the choice where utility is at its maximum level (Mongin 1997). However, as per Kahnman & Tversky (1979), the expected value is unpredictable and cannot be agreed on universally. Nevertheless, it is more subjective and unique to each individual where people are not logical thinkers all the time and their choices do not always follow the Expected Utility Theory.

### **3.4 The Process/ Styles of Decision-Making**

According to Stingl & Gerald (2017), decision-making is an essential part of project management and organizations. It is true that many normative guidance and supporting systems are provided to support the rational process of decision-making. However, the process of decision-making and the behavior of decision maker deviates from the rational ideal which has been supported by many research and studies on behavioral decision-making (Stingl & Gerald 2017). According to Brown et al. (2016), in economics, it is well known that people do not make decisions in similar approaches.

As per Fitzgerald et al. (2017 p. 339), “decision making styles are defined as the individual’s characteristic mode of perceiving and responding to decision making tasks.” The General Decision-Making Styles Inventory recognizes five decision-making styles, which are rational, intuitive, spontaneous, avoidant, and dependent (Dewberry et al. 2013, Delaney et al. 2015). The styles can be summarized as following:

Style	Characteristics
Rational	Logical deliberation
Intuitive	Rely on feelings
Dependent	Consult other people
Avoidant	Delay decisions whenever possible
Spontaneous	Make decisions fast

**Table 3. 1 Decision-making Styles**

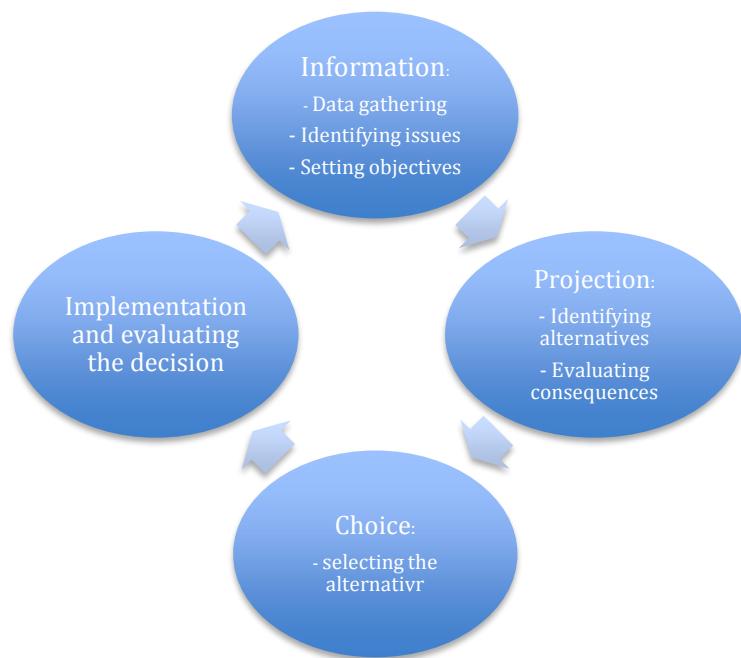
Generally, decision theories are divided into three branches. The first branch is the traditional normative theories, which believe that decision processes are a reflection of only rational cognitive aspects. The second branch includes theories that concentrate on the logical processes of decision-making like the influence of

heuristics and instincts where emotions influence decisions. The third model is the one that uses the combinations of the first and the second models, referred to as the dual-process models (Furman et al. 2010). A lot of the work on decision-making classifies decision-making processes into two modes, affective/experiential mode and rational mode. In the affective mode, the individual is quick and follows his instincts and past experiences. In the rational mode, the individual is slower and applies reasoning and consideration. This is referred to as the dual-process (Strough et al. 2011). Researchers argue that concentrating only on those two modes- Dual-process- does not allow for fully understanding the complexity of the process of decision-making that involves many complicated processes and is influenced by other factors such as social context (Delaney et al. 2015). Fitzgerald et al. (2017) also present similar decision-making modes and refer to them as styles, which are rational and spontaneous styles. Similar to the rational mode, the rational style depends on thorough information investigation and logical examination of the choices, which take longer time. In contrast, the spontaneous style is fast and quick decision-making.

Memory has been found to be an important aspect of decision-making process. Whenever a person is presented with alternatives, the process of recognition becomes important in making decisions. As per Fechner et al. (2016), methods in decision-making, which only use recognition and memory, are referred to as recognition-based strategies. On the other hand, when the information regarding the choices is kept in long-term memory, the process of looking for the knowledge past recognition is referred to as knowledge-based strategies. The process of decision-making can be complicated as individuals could depend on both recognition and knowledge-based strategies. At the beginning, they use cognition and once it is not enough, they rely on knowledge stored in the memory (Fechner et al. 2016). One of the thoroughly studied cases of recognition-based strategies is the recognition heuristic. As per Gigerenzer & Goldstein (2011, p. 101), “The recognition heuristic makes inferences about criteria that are not directly accessible to the decision maker.” For instance, when presented with two options, if the individual recognizes one of them, then the known choice has a higher chance to the criterion (Gigerenzer & Goldstein 2011). Once the alternatives are identified, knowledge-based strategies use extra knowledge to come up with a decision. In this process, the brain relies on saved knowledge and integrating available and related data (Fechner et al. 2016).

In organizations, the process of decision-making and the outcome are both significantly important. Based on the nature and level of the decision in the organization, there are numerous decision structures. For instance, according to Socea (2012, p.48), “routine, scheduled, repetitive decisions are taken in accordance with classical reasoning systems based on rationality and optimization”. While short-term decisions are taken according to the organizational foundations. This includes particular operating of the organization, habits and past knowledge and skills. High-level decisions (strategic) are made according to the political grounds (Socea 2012).

As per Socea (2012), the process of decision-making within organizations generally goes through stages, which are recognized and widely approved in the literature. However, it is not necessary to go through all phases since in some cases, managers can go back to a stage if the choices are not certain. The model can be summarized as the following: information gathering, projection, choice and implementation (Socea 2012). This can be graphically presented as the following:



**Figure 3. 1 Process of Decision-Making Within Organizations**

In projects, decisions are difficult and have risk to them making them complicated. These complicated decisions need information, past knowledge, experience and the collaboration of several people (Socea 2012).

### **3.5 Factors Influencing Decision-Making**

It is well recognized in the literature that the process of decision-making is influenced by various factors, and most importantly three sets of factors. The factors include, decision features, situational factors and **individual differences**. The decision features factor involves unique features of each decision itself, which is the most understood factor in the literature. Several researches have been established to understand the impact of decision features. In addition, the literature agrees on many situational factors that influence decisions such as time, cognitive load and social circumstances. For example, time factor is important as stressed by many researchers. In situations where time is limited, people might speed up the process of decisions and information gathering in order to reach a decision within the time given. This may result in errors and negative impact (Brown et al. 2016, Furman et al. 2010).

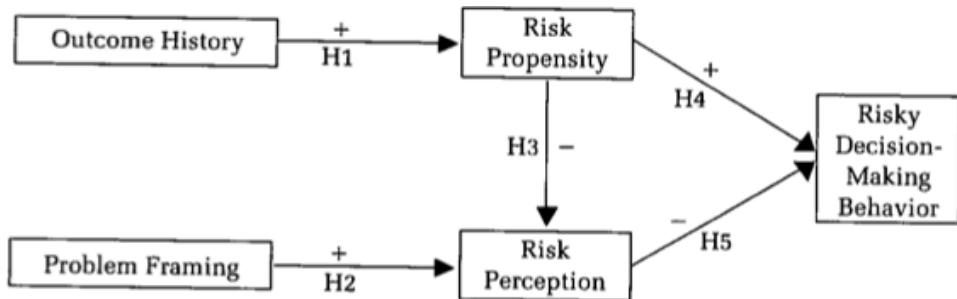
In contrast, although there are a good number of researches on the influence of individual differences in regard to decisions, there is still not much evidence on the influence of some essential aspects such as individuals, group and cultural differences (Appelt et al. 2011). Since both decision features and situational factors are well understood and documented in the literature, this research paper focuses on the third set of factors that is individual differences. As per Dewberry et al. (2013), understanding individual difference factor is important to reach better decision-making results. Some of the most common and agreed on factors related to individual differences, which are important to this research, are discussed in this section. Also, some essential and widely agreed on factors are mentioned as well.

#### **3.5.1 Risk Perception and Risk Propensity**

An important individual difference when making decisions and dealing with uncertainty is **risk perception and risk propensity**. A decision-makers personal evaluation of the surrounding risks is important in influencing decision-making. However, as per Riaz & Hunjra (2015), the exact influence of risk perception and risk propensity on decision-making and the relationship between the three is not yet well documented. They further argue that despite the fact that studies usually agree that there is a link between risk perception and decision making, there are a degree of inconsistency about the exact relationship.

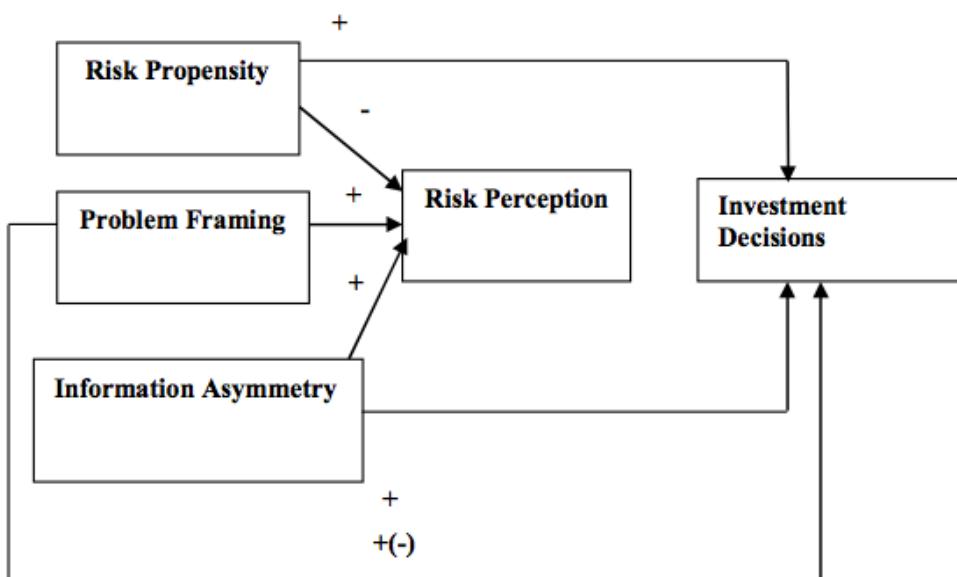
Risk propensity is described as every person's tendency to take actions that involve risk (Bakker et al. 2007). Risk propensity is an individual difference, which is concerned with personal differences. It is not related to the situation or circumstance and can be described as innate (Huff & Prybutok 2008). Many decisions, especially in project context, involve risk and uncertain outcomes. Hence, decisions involving risk are not completely made on rational basis and are influenced by personal attitude toward taking risky actions. Simply, some people are more willing to take risky decisions than others depending on their risk propensity (Bakker et al. 2007). Some researchers identify risk propensity as personality trait that influences decision-making process (Hung 2010, Furman et al. 2010). In Furman et al. (2010) study exploring the influence of heuristics and risk propensity in the decision-making of skiers, it was found that there is a positive relationship between risk propensity and decision-making to ski a slope. As per Furman et al. (2010), the study's findings show that risk propensity is important in decision-making and that people need to be aware of how that can affect group decision-making practices.

Some researchers propose that the role of risk perception on decision-making is a mediating role, meaning that the impact of risk perception is not direct but, with other factors, is mediating (Sitkin & Pablo 1992, Sitkin & Weingart 1995). Sitkin & Weingart (1995), included both risk perception and risk propensity as determinants of decision involving risk in their proposed model. In their model (as shown in the figure below), it is suggested that risk propensity affects risk perception and risky decision-making behavior.



**Figure 3.2 Mediated Model of the Determinants of Risky Decision-Making Behavior**  
 (Sitkin & Weingart 1995, p. 1574)

According to Riaz & Hunjra (2015, p. 971), based on the available literature, “it can be said that there will be a positive relationship between risk propensity and the risk perception of decision makers.” In their study to evaluate the impact of risk perception and risk propensity on decision making of investors, they developed a model describing the influence of risk propensity and other factors on decision-making through mediating impact of risk perception. The model is shown in the figure below. The study found that risk propensity is positively and significantly linked to decision making when there is a facilitating variable of risk perception.



**Figure 3.3 Mediating Role of Risk Perception** (Riaz & Hunjra 2015, p. 973).

Based on the definition of perception and from a psychological aspect, human's perception directly affects decision-making and the impact of their choices. In

addition to that, many researchers have found that decisions in organizations are highly influenced by managers' perceptions and personal cognitive analysis. Nevertheless, there is a gap in the literature on the influence and role of managers' personal perceptions in management field and how that influences decisions (Özleblebicia & Şahin 2015).

### **3.5.2 Personality**

One of the individual differences that impact decision-making is personality. Personality is linked with individual's performance in many aspects of life and work including decision-making (Dewberry et al. 2013). There is evidence in the literature that personality affect people's performance. Different elements of decision-making process are also influenced by personality. For instance, dispositional anxiety is linked with risk-avoidant choices. Moreover, personality can have an impact on the performance of decision-making (Gudonavicius & Fayomi 2014). According to Halama & Gurnakova (2014), personality is confirmed to be an essential factor influencing decision-making in various fields including career context, organizations and healthcare systems. Studies found that a person's personality has an impact on cognitive and emotional modes of decision-making (Halama & Gurnakova 2014). In group decision-making, individual's personality influence choice selection. Each individual's preferences that represent the unique personality are essential in the process of decision-making. Individuals, based on their own knowledge, way of analyzing information and facing uncertainty, directly influence group decision-making process (Zhu 2012). Mihaela (2015) argues that managers within the same or different organizations tend to show differences in their decision-making processes and styles, although they might have similar responsibilities and aims. As per Mihaela (2015, p. 659), "the differences can be explained by personality traits, professional experience and by the managerial style (leadership) which confer the managers a certain decisional style."

Personality has been linked with risky decisions in different contexts such as social, ethical and leisure choices. This impact has been measured using Iowa Gambling Task. Many studies use the Big Five personality traits to examine decision-making

styles and processes among people with different personalities and link it with the results from Iowa Gambling Task. The Big Five Personality Traits are extraversion, agreeableness, openness, conscientiousness and neuroticism. (Dewberry et al. 2013, Halama & Gurnakova 2014). In Dewberry et al. (2013) study, where three hundred and fifty-five participants were enrolled from the working population through online survey, they examined cognitive styles, decision-making styles and personality. One of the findings of the study reveals that personality differences explain a good amount of differences in decision-making abilities which is more significant than the other examined variables.

### **3.5.3 Age**

Another personal difference between individuals is **age**. As per the dual-process of decision-making, older people depend more on their emotions and past knowledge than depending on reasoning, while younger people depend more on reason. When people get older, their cognitive ability and memory decline with time, while their emotions that help intuition stay more stable and could get better with time (Delaney 2015). As per Hess et al. (2015), understanding the effect of age on decision-making is complex since other factors may interact and the influence of age might change with time. For instance, older generations in the future will have more knowledge and access to information regarding different aspects such as health than the previous generations had. This will influence the process of decision-making. As a result, multiple factors influence decision-making along with aging (Hess et al. 2015). In a study by Ojiako et al. (2014a) surveying 1313 project management practitioners within seven different countries to test the impact of project role, age and gender on project decision judgments, it was found that project role and age of participants had an impact on decision judgment at the different stages of project lifecycle. It was observed that older participants do not make initial project decision judgments before the handover stage. This shows that older project participants do not make decisions until more knowledge and information is available which happens in project later stages. According to Ojiako et al. (2014a, p. 563), “ this leads to a more stable longer term view of a project based on business outcomes rather than a view subject to more immediate project performance metrics.”

### **3.5.4 Information and Communication**

Theoretically, taking a decision becomes better and easier process when more information is presented. Nowadays with the advances in information and communication technologies, information is available to a great extent (García-Peña & Conde 2014). As per Ewege et al. (2012), information is a fundamental element in the process of decision-making where a positive relationship is well recognized. A correlation has been noted between the quality and amount of information and the quality of decisions made in organizations. Decision-makers who have access to more information are more contented when facing decisions involving uncertainty (Ewege et al. 2012).

In group decision-making, exchange of information and knowledge sharing are very essential. The quality of the decision taken by a group is greatly linked with the amount and the type of information exchanged among team members (Silver 2013). One of the benefits of working in teams is bringing more information from the different members and creating a pool of information that aids the group in the process of decision-making. However, to achieve this advantage, individuals working in groups must successfully share and apply their knowledge. Information sharing and team communication is regarded as one of the main contributors to successful team decision-making. Nevertheless, many studies have found that this alone is not enough within certain circumstances as many other factors influence group decision-making (Xiao et al. 2016)

As per Furman et al. (2010), the complex process of decision-making depends on the level of information overload as well as time pressure. Many researches reveal that whenever people are in the process of making complex decisions, they rely on information. In some cases, the information individuals rely on might not be very relevant to the options. (Brown et al. 2016). In addition to information sharing in group decision-making, **communication** is very significant between group members. By exchanging information and knowledge through effective communication means, judgment abilities, specifically in complicated situations with uncertainty, are enhanced (Zhu 2012).

Past experience is also important in decision-making as it is considered as a source of information. With experience, individuals increase their knowledge and information. When the decision maker has previous knowledge in similar situations, he can address any gaps in the available information and can make correlation and connection with his past experience. The more experiences and past knowledge the individual has, the better capacity he has to effectively make decisions and act in similar circumstances (Huff & Prybutok 2008).

### **3.6 Summary**

Decision-making is an important concept in project management. It is defined as a complicated interaction of high-level activities, which are related to option generation, examining possible risks and outcomes and choosing best action (Del Missier et al. 2010). As per Ewege et al (2012), decision-making is a crucial task for any personnel working in projects. The literature identifies many factors that influence decision-making. The factors include decision features, situational factors and individual differences. This research is interested in individual differences. Understanding individual difference factor is important to reach better decision-making results (Dewberry et al. 2013). These factors include risk perception and risk propensity, personality, and age. In addition, the literature stresses on the importance of information and communication in the process of decision-making.

## **CHAPTER FOUR: Literature Review Part 3**

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### **4.1 Introduction**

The main aim of this study is to study risk perception in multicultural project teams. Culture has been found to be one of the important factors influencing individual's risk perception. Therefore, understanding the concept of culture is essential for this dissertation. In this section, culture, diversity, cultural diversity, national culture and multicultural teams will be defined. In addition, the context of this study is project teams in the UAE. Hence, UAE's cultural diversity will be explored.

### **4.2 Culture**

*"As we swiftly move forward with cultural and knowledge empowerment, we recognize that the UAE has become the cultural capital of the Arab world that is open to all cultures."*

Sheikh Mohammed Bin Rashid statement on the 38th UAE National Day, December 1, 2009

Many definitions of culture exist in the literature (Jetu et al. 2011). Taylor (1871) has provided the literature with a very early definition of culture. According to Taylor (1871, p.21), "culture is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society." Easier and simpler definitions came after Taylor's definition of culture. One simple definition is by Triandis (1972), as cited by Shahin & Wright (2004). Triandis (1972) explained culture as "cultural group characteristics and considered it as a way of perceiving man-made parts of the environment" (Shahin & Wright 2004, p. 501). Hofstede (1991, p. 5) defined culture as "the collective

programming of the mind which distinguishes the members of one group from another". Another definition of culture is (Fox 2007, p. 84) "the behavioural norms that a group of people, at certain time and place, have agreed upon to survive and co-exist." More recent definitions can be also found in the literature. One definition is by Javidan &, House (2001, p. 292) who define culture as "a set of beliefs and values about what is desirable and undesirable in a community of people, and a set of formal or informal practices to support values." According to DiStefano & Maznevski definition (2003, p. 1), "culture is a system of values, beliefs, assumptions and norms, shared among a group of people. The group could be a country, region, religion, profession, organisation, even a generation or a social of sporting club". The final recent and useful definition of culture is by Hodgetts et al. (2006). They view culture as "the acquired knowledge that people use to interpret experience and generate social behavior. This knowledge forms values, creates attitudes, and influences behavior (Hodgetts et al. 2006, p. 583)." This definition gives us a clearer understanding of culture and its influence in this thesis's context. As per their definition, the variance in people's attitudes, behavior and values can be justified based on the morals they believe in and from where it has originated. Generally, all of the attempts to define culture include elements from human society or group that influence and shape individual's beliefs and attitude in that group he or she belongs to.

In a summary, a culture is combination of knowledge, belief, religion, art, politics, language and conventions, that unites a specific group of individuals in a society and differentiates them from other groups. It is a routine, habits, rituals, behaviors, what we considered right or wrong and original lifestyle. A crowd of individuals who belongs to the same cultural group shares similar perceptions and attitudes toward many situations in the world around them (Seymen, 2006).

### **4.3 Diversity**

Diversity is a very wide concept referring to "the collective (all-inclusive) mixture of human differences and similarities along a given dimension (Wise & Tschirhart 2000, p. 387)." As per Wise & Tschirhart (2000), diversity scopes within workforce

members involve different aspect including race, culture, religion, gender, personality organizational tenure, education and other demographical and psychographic features. Cox & Blake (1991) suggests that diversity is the differences of both social and cultural uniqueness between individuals who exist together in a distinct organization or market setting. While Boje (2011, p. 48) argues that “diversity is typically defined as the degree of heterogeneity among team members on specified demographic dimensions.” The literature has many ways of classifying diversity, but this research is interested in the diversity related to cultural dimension in the workplace. This is recognized according to the person’s geographic background.

#### **4.4 Cultural Diversity**

Cultural diversity has many valid definitions since researchers attempted to define the concept from different angles. Understanding the concept of cultural diversity is very important for the study of business because cultural diversity impacts how individuals act in organizations and teams. Group members who share the same culture act similarly whereas group members from various cultures act in a different manner (Francesco & Gold 2005). Hence, the notion of cultural diversity within organizations is essential. In simple words, cultural diversity means that a group of individuals from various cultures coming from different countries exist together in one country or in one organization (Meares 2008). As per Cox (1993, p. 5), culturally diverse groups “collectively share certain norms, values or traditions that are different from those of other groups.” The number of researches trying to understand the similarities and differences between organizations with people coming from various countries are rapidly increasing. Since the majority of countries have multicultural composition in terms of different nationalities and with the influence of globalization, the area of cultural diversity is very important and interesting for research (Seymen 2006). According to Seymen (2006), one of the most important trends influencing organizations is the rapid change in the composition of the groups working there which is known as diversity.

## **4.5 National Culture**

One term that describes cultural diversity is National Culture. National culture is part of cultural diversity, which is essential for the context of this dissertation. As per Hofstede (1991, p. 262), national culture is “the collective programming of the mind acquired by growing up in a particular country.” In simple words, national culture is about the strong set of values shared by the members of the same nation. Sirmon & Lane (2004, p. 309) argue that national culture “is a system of shared norms, values, and priorities that, taken together, constitute a ‘design for living’ for a people”. In a specific country, the national culture defines how things must be done and how things should be for those individuals belonging to this country. These shared values and beliefs are learned in an individual’s early life by socializing and communicating with families and communities around them. Thus, the influence national culture has on people is strong and lasts for a long time (Sirmon & Lane 2004). According to Hofstede (1991), in organizations, national culture can explain half of the variances in managers’ approaches, principles, and attitudes. Moreover, even though many managers of multicultural organizations have worked in diversified places; they tend to retain their own cultural values (Sirmon & Lane 2004).

## **4.6 Multicultural Teams**

All around the globe, organizations are increasingly becoming more culturally diverse in terms of cultural origin. Since organizations are depending more on teams and teamwork as their functioning structure, a lot of attention has been drawn to the impact of cultural diversity on teamwork (Pieterse et al. 2013). As per Pieterse et al. (2013, p. 783), “team diversity offers a complex challenge because it has the potential to both benefit and disrupt team performance.” Multicultural teams are described as a group of task-oriented individuals coming from various cultural backgrounds and nationalities (Matveev & Milter 2004). A multicultural team is also defined as (Halverson & Tirmizi 2008, p. 5) “a collection of individuals with different cultural backgrounds, who are interdependent in their tasks, who share responsibility for

outcomes, who see themselves and are seen by others as an intact social entity embedded in one or more larger social systems.”

#### **4.7 UAE’s Cultural Diversity**

The United Arab Emirates (UAE) comprises a federation of seven Emirates, which are Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al-Quwain, Ras Al-Khaimah and Fujairah. The UAE is located on the North East coast of the Arabian Peninsula sharing borders with Sultanate of Oman from the east and Saudi Arabia from the south. It has an area of 83,600 square Kilometers (Hurreiz 2013). According to Albadri (2012), The UAE is one of the 10 most diverse nations worldwide, and specifically, one of the most culturally diverse countries worldwide. The rapid development of the country, supported by oil, led to a huge economic growth, infrastructure development and increase in goods supply. As a result, to sustain the rapid growth along with shortage in native workers, foreign labors were brought to fill the gap. In addition to labor workforce, the rapid growth in the country required diversifying the economy which resulted in an influx of expatriate working in different sectors such as services, construction and technology (Randeree 2009).

According to the UN estimation, the total population of the UAE in mid 2016 was 9,267,000. The population consists of 85% of immigrants. As a result, the UAE is very diverse in ethnics, religions and languages. The population consists of 19% of Emirati, 23% of other Arabs and Iranian, 50% of South Asians, 8% of Westerners and East Asians. The population is dominant by males because of the huge numbers of short-term immigrants. The languages include Arabic (official), English, Persian, Hindi and Urdu. The country is very diverse in religion and ethnicities. 76% of the country are Muslims, 9% are Christian and 5% have other religions (CIA 2017).

As per a report published by Gulf News in 2008, 99% of positions in the private sector are taken by expatriates, while 91% of positions in the government sector are taken by expatriates (Ahmed 2008). According to Jasem Ahmad Al Ali, a human resource specialist at the Human Resources Department of Dubai Municipality

(Ahmed 2008, p. 1), "Going by the trend, by 2009 UAE nationals will account for less than eight per cent of the workforce and by 2020 UAE nationals will account for less than four per cent." As per Al-Ali (2008), there is a population and workforce imbalance among Emiratis and non-nationals in both private and government sectors, which is a weakness for the country.

An evaluation of the demographics of Dubai by itself gives many indications of the cultural diversity and population composition. According to Randeree (2009 p. 73) "the city ranks highest in the world for male to female ratio (2.62 male to 1 female), workforce to population ratio (68.33 per cent); expats as a percentage of the total population (82 per cent); population growth per annum (seven per cent), and population under 65 years of age (99.35 per cent)." As of 2004, Dubai had a population of 1.1 million, which is one third of the total population of the country while it only has an area of 4.9% of the country. Moreover, the female population was 27% due to the large number of male expatriate. Population growth in Dubai is exceptionally high. The UAE is a leading example of a country with cultural diversity, at country level as well as organizational level (Randeree 2009).

## **4.8 Summary**

This research is examining risk perception in multicultural teams. Hence, understanding the concept of culture and cultural diversity is essential. As per Hodgetts et al. (2006) definition of culture, the variance in people's attitudes, behavior and values can be justified based on the values they believe in and from where it has originated. There are different forms of cultural diversity. National culture is part of cultural diversity, which is what this research is looking at. Culture and cultural diversity is an important topic in the UAE because this country is considered as one of the most culturally diverse countries worldwide (Albadri 2012).

## **CHAPTER FIVE: Research Design and Methodology**

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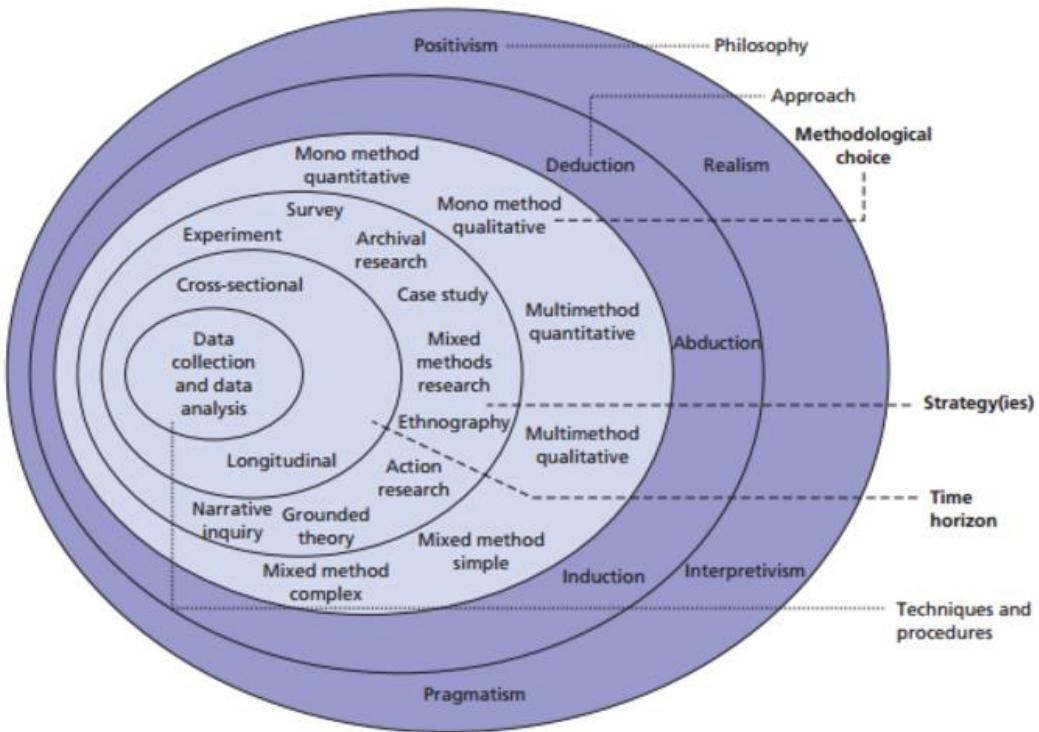
### **5.1 Introduction**

Research methodology has a broad scope. It includes, research methods, logic and framework behind the project which can explain why specific methods/procedures are undertaken. This chapter will examine the research methods available in the literature in order to choose the best research approach and methods for this thesis. Research methods, strategy and design will be specified that best fulfill the aims and objectives of this dissertation mentioned earlier in chapter one, and to test the study's proposed hypotheses.

### **5.2 Research Methodology**

As per Fellows & Liu (2003, p.31) “research methodology refers to the principles and procedures of logical thought processes which are applied to a specific investigation; a system of methods.” Kothari (2004) distinguishes between research methods and research methodology where he views research methods as the techniques and tactics utilized by researchers for carrying out a research. Hence, all the methods taken by the researcher during his time doing the research and examining research problems are referred to as “research methods”. On the contrary, research methodology has a wider scope. It includes not only research methods but also the logic and framework behind the project that explain why certain methods are used. This can help the researcher and others to examine and evaluate the findings of the study (Kothari 2004). Saunders, Lewis and Thornhill (2012) propose a comprehensive and well-detailed view of research process in a figure referred to as “The Research Onion” as

can be seen in the figure below. The Research Onion will guide this study's design and methodology as it provides every researcher with full guidance on how to select research methods.



**Figure 5. 1 The Research Onion (Saunders Lewis & Thornhill 2012, p. 128)**

### 5.3 Research Philosophy

Saunders Lewis and Thornhill (2012) suggest that research philosophy can be described as the way in which a person's view the world and develop his assumptions. As per Saunders Lewis and Thornhill (2012), different research philosophies such as positivism, realism, interpretivism and pragmatism are applied to achieve different outcomes. There is no philosophy better than the other. It all depends on the research objectives and questions. Nevertheless, according to Mkansi & Acheampong (2012), there is a confusing categorization of research philosophies where different studies have suggested different descriptions and classifications. To avoid confusion, this study will follow Saunders, Lewis and Thornhill sixth edition book, "Research

Methods for Business Students” for choosing research philosophy. In their model, they present different philosophies, but suggest that a research philosophy is a multidimensional set. This research study follows the positivism philosophy. In positivism, data is collected about a reality and a relationship is investigated within the collected data. Existing theories are utilized to develop the research hypotheses. Later, the hypotheses are examined to be either confirmed or disproved which may take the researcher to develop more theories and can be tested again by additional studies (Saunders Lewis & Thornhill 2012). This research philosophy has been chosen for this study since, for the short time available, it allows reviewing a good amount of literature and data and then developing hypotheses. The hypotheses are tested through empirical data collection. If more time is available in the future for further examination, more than one philosophy can be adopted.

## **5.4 Research Approach**

The amount of information a researcher has regarding the theory that relates to the study he is investigating determines the research approach. Two research approaches can be adopted which are, deductive or inductive. In deduction approach, a theory is used to establish research proposal/hypotheses and then a framework is designed to examine the proposed hypotheses. Through data collection and analysis, the hypotheses are confirmed or rejected. Whereas, in the inductive approach, a new theory is developed through data collection and analysis (Collins 2010). Based on the objectives and aims of the research discussed in chapter one, deductive approach is the best suitable approach for this study.

## **5.5 Methodological Choice**

As per Saunders Lewis and Thornhill (2012), the first step in methodological choice is determining either to follow a mono-method or multiple methods. The mono-

method can be either a single quantitative or a single qualitative method. Quantitative research methods explain facts and findings through empirical and analytical models, which were first developed in natural sciences. In contrast, quantitative research methods evolved in social sciences to observe and examine social and cultural aspects of human life. The mixed methods of both qualitative and quantitative consist of collecting both qualitative and quantitative data and then incorporating the two sets of data while utilizing unique designs (Creswell 2014). For this study, considering time limitation, a mono-method is used which is single quantitative research method. This will help to test the research proposed hypotheses to further understand the relationship between the study's variables. As per Saunders Lewis and Thornhill (2012 p. 162), "quantitative research examines relationships between variables, which are measured numerically." In addition, according to Althaus (2005), quantitative understanding usually rules the history of risk.

## **5.6 Research Strategy**

Several research strategies are available for both qualitative and quantitative research methods such as experiment, survey, case study and action research as can be seen in "The Research Onion." Quantitative research utilizes survey research strategies. Moreover, the survey strategy is the most suitable and common strategy for deductive approach. Survey strategy is usually practiced by the use of questionnaires. (Saunders Lewis & Thornhill. 2012). Thus, the research strategy chosen for this study is a questionnaire.

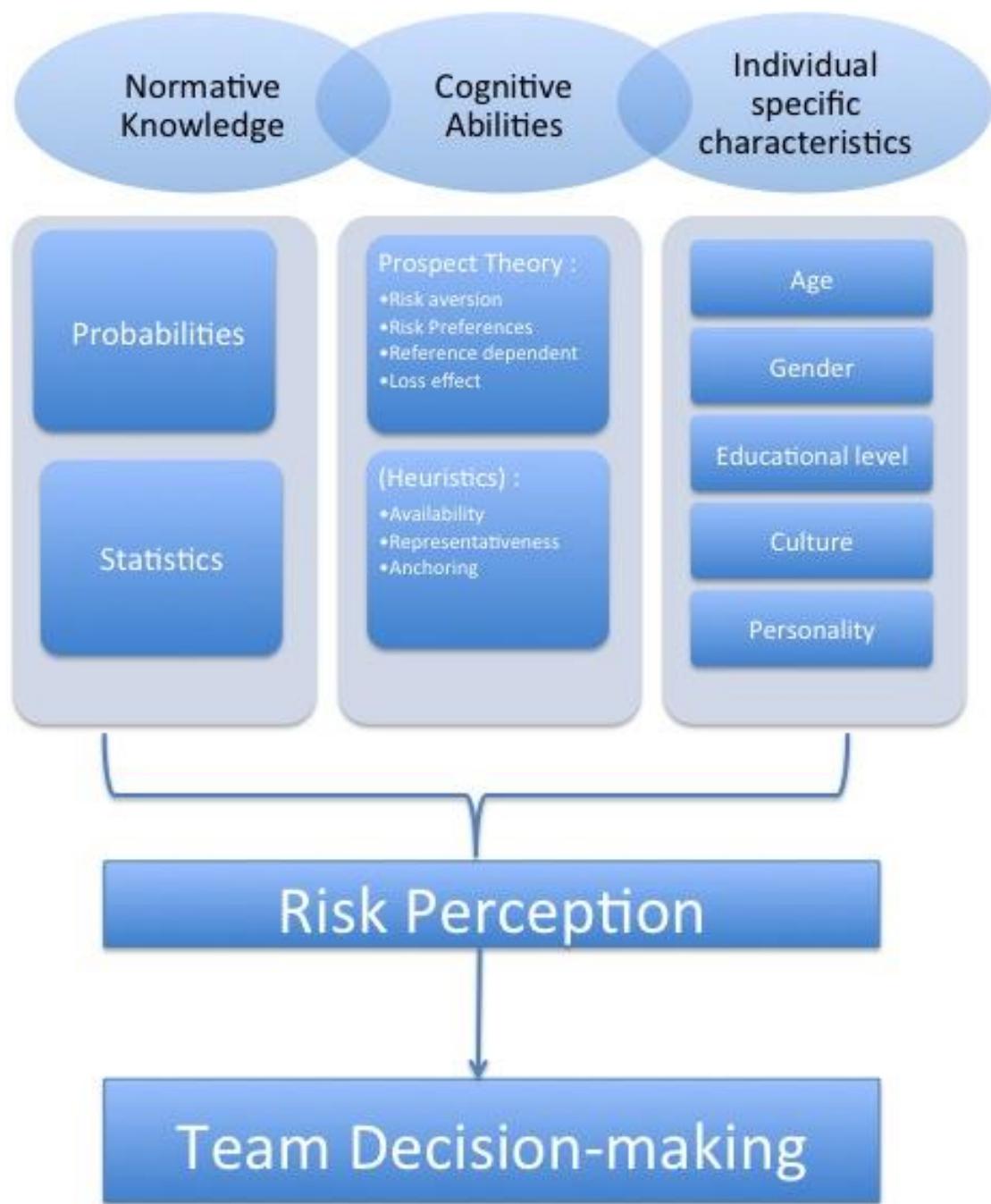
## **5.7 Time Horizon**

Based on the time limitation given to complete this research, the time horizon chosen for this study is to be a cross-sectional study. In cross-sectional studies, the research presents a "snapshot" of the situation taken at a specific time, while in longitudinal

studies, the research examines change and development where several “snapshots” are presented during a longer time (Saunders Lewis & Thornhill 2012). The chosen time horizon goes with research strategy of survey as mentioned by Saunders Lewis and Thornhill (2012 p. 190), “cross-sectional studies often employ the survey strategy.”

## **5.8 Conceptual Framework**

The presented hypotheses and arguments by this study have been developed after the thorough examination of the available literature that has been stated in the literature review in chapter 2,3 and 4. Important details about risk perception, decision-making, culture and the factors influencing risk perception have been revealed in the past chapters. As aforementioned, the aim of this study is to examine the concept of risk perception in multi-cultural project teams. Different factors influencing risk perception are evaluated which are demographic characteristics of individuals working in teams. To examine the study’s proposed hypotheses with the information presented in the literature review, the following framework has been created.



**Figure 5. 2 Conceptual Framework for Risk Perception**

This study identifies risk perception as a multidimensional concept. Three elements interact and shape individual's risk perception. This includes Individual's normative knowledge based on probability and statistics, individual's cognitive abilities as presented by the prospect theory and individual's specific characteristics. The concept

of risk perception is very complex and difficult to measure since many elements interact to shape a person's perception. This fact must be acknowledged.

The framework proposes that age, gender, educational background, culture and personality are factors influencing individual's risk perception where a relationship will be investigated. There are other factors identified in the literature review such as emotions and past experience, but have not been included in the framework. Considering time and resource limitation, the study is mainly looking at demographic variables (age, gender, culture) as well as personality and is greatly concentrating on the effect of culture on risk perception. Personality variable is not a demographic characteristic, but is included in the framework because it has been noted in the literature review that personality is a factor influencing both risk perception and decision-making. In addition, personality is an individual characteristic.

The previous researches examining the relationship between culture and risk perception tried to explore the variance in cross-cultural context where participants were working in different countries. Not much has been found about individuals from different countries/cultures working together in project teams, which this study aims to investigate. As a result, the findings of this study could be a valuable addition and input to Project Management literature and the study of multicultural teams.

## **5.9 Study Instrument**

The instrument of this study is a **questionnaire** developed after a thorough examination of related literature, which can be found in the Appendix. The items used in the questionnaire related to risk perception are derived from the literature looking at similar issues.

The questionnaire is divided into three sections, which are:

➤ **Part One- Demographic Items:**

In the first part, data regarding the demographic characteristics of the participants is collected. This includes age, gender, marital status, educational level, organizational

level, organizational sector and nationality. Then, five questions were adapted from Ojiako et al. (2016) questionnaire. These questions look at participants' initial cultural disposition. The questions ask where they were born, how long they lived in this country, if they have worked in other countries, the languages they speak and whether they socialize with other cultures or not. These questions were added as a reference if there was a need to explain the findings. The available options for participants to choose from in this part ranged between two options to six options.

➤ **Part Two- The Big Five Personality Model:**

Personality has been found through the literature review to be an important factor of both risk perception and decision-making. This thesis uses the Big Five Model that has five wide factors, which are extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience. As per Wang et al. (2016, p. 1295), "The Big Five personality model enjoys considerable support and is regarded as the most widely and extensively used model of personality." Thus, this thesis examined the participants personality characteristics based on The Big Five Personality Model. A five-point Likert scale was used (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) that measured 28 items. The original model has 44 items which were reduced to 28 items in order to make it easier to use and measure (the reverse-scored items were deleted).

➤ **Part Three- Project Risk Perception:**

The last part of the questionnaire was adapted from Camprieu et al. (2007) survey that examined cultural differences in project risk perception. The participants were required to compare between two project proposals featuring different risks. This mimics a selection process of projects in real-life. Participants were given the following statement adapted from Camprieu et al. (2007, p. 687):

"There is a requirement for a new electricity generation facility in a region that is expected to experience population and economic growth in the next twenty years. Different industrial groups submitted several proposals, featuring different technologies and technical solutions. For each proposal, a risk profile was developed by experts."

Participants were asked about how they feel comparing each two proposals with different risk factors. The statement was:

“I feel that proposal A is riskier than proposal B”

A five-point Likert scale was used (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). In the original questionnaire, participants were asked to do pairwise comparisons of the projects depending on the profiles created by experts having different risk factors and different probabilities and impact. The number of comparisons was 21 comparisons. This was shortened to 6 comparisons in order to reduce the time needed to complete the questionnaire. The total number of questions in this part is 6 questions. The first three questions compared project proposals with different risk factors. The last three questions compared proposals with different possibility and impact. It was found in the literature review that individuals react differently to different risk factors. Also, it was noted that people are influenced by the two components of risk (probability and impact) in a different manner. Therefore, these questions were found very useful to test the study’s hypotheses.

## **5.10 Pilot Questionnaire**

Initially, the questionnaire was piloted on 5 acquaintances from the three different nationalities (UAE, Western and Asian). 2 of the acquaintances were professors with experience in quantitative research methods and 3 were people working in projects. This step was taken to make sure that the guidelines and questions are clear and well understood. This step was important and assisted in gaining more experience in research administration, analysis and scoring. In addition, the total required time to perform the questionnaire was noted. The average time needed was 20-25 minutes. The questionnaire was first tested with University experts to see whether it was worded and arranged accurately. At this stage, some changes were administered which are explained below:

- It was suggested that in the Big Five Personality Model, removing the items with reverse-scoring is easier for measuring. Hence, 18 items with reverse-scoring were deleted.
- It was suggested that the layout of “Part Two” to be changed to make it easier for participants. Instead of the participants writing the number next to each

statement, the numbers were provided and the participant only need to tick the box.

- One participant noted that, in Part Three, it is better to make the scale a five-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) instead of a yes and no scale which is better in data analysis and scoring. Therefore, the question was changed from “Do you think that proposal A is riskier?” to “I feel that proposal A is riskier than proposal B.”
- The comparisons between proposals, in Part Three, were shortened and only two factors were included instead of three to make it easier for the reader and to reduce the time needed.

Once these changes were administered, the questionnaire was piloted again on participants working in project teams. The reviews were taken and participants felt that the questionnaire was clear and easy to follow, but for some it might take more than 25 minutes.

## **5.11 Research Sample**

As the context of this research is to examine the variables in projects, the inclusion criterion for the sample was working in project-based organizations. Due to time limitation, specific project type was not considered and participants from different projects and organizations were enrolled. The questionnaire was divided among participants from different nationalities, which included Emiratis, Westerners (participants from European countries such as UK, Germany and France) and Asians (participants from Asian countries such as India, Philippines and China). The total sample was 180 participants from which 62 were Emiratis, 58 were Europeans and 60 were Asians. Participants working in three Emirates were selected which are Dubai, Abu Dhabi and Sharjah. The biggest sample was from Dubai. Participants are working in different organizational sectors, government, private and semi-government. All the participants speak English and the UAE sample speaks Arabic as their first language.

## **5.12 Procedure**

Most of the questionnaires were distributed as hard copies directly (70%), while 30% were sent through emails. Participants were asked if they had interest to complete a questionnaire on project risk perception. In the first page of the questionnaire, standard instructions were provided that explain the aim of the questionnaire. Once each questionnaire was completed, it was then returned personally or sent through email. The total period required for completing 180 questionnaires was 6 weeks. Some questionnaires were returned within few days, while others took over a week with occasional reminders. Once the questionnaires were returned, the results were computed in SPSS. Relationships between variables (demographics, personality, risk perception) were tested. Statistical analysis was then performed to check for significant difference among the different nationalities and gender in the sample

## **5.13 Ethical Consideration**

To fulfill the ethical guidelines, a copy of the research proposal was given to the university supervisor for approval and guidance. Once the approval was received, the study was then continued. The total time required to finish the questionnaire was measured in the pilot questionnaire and participants were informed about it before proceeding (20-25 minutes). In addition, in the consent part of the questionnaire in the instruction page, the participants were assured that no one will be recognized from the answers and there were no request for confidential information in the questionnaire. Participants were ensured that the results of the questionnaire will be only used for the dissertation purpose.

## **5.14 Summary**

This paper's methodology and design are guided by "The Research Onion" proposed by Saunders Lewis and Thornhill (2012). The research follows the positivism philosophy. Based on the objectives and aims, deductive approach has been chosen. Considering time limitation, a single quantitative research method is used. The time horizon chosen for this study is to be a cross-sectional study. A conceptual framework for risk perception based on the literature review has been created. The conceptual model identifies risk perception as a multidimensional concept where different elements interact and shape individual's risk perception. In order to test the hypotheses and the conceptual model, a questionnaire has been developed. A research sample was chosen and a pilot questionnaire was carried out before the actual administration of the questionnaire.

## **CHAPTER SIX: Data Analysis and Results**

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### **6.1 Introduction**

In this chapter, the results and main findings of the study instrument (questionnaire) will be mentioned. The main aim of the questionnaire was to examine risk perception in multicultural project teams in the UAE. In addition, the relationship between risk perception and culture, gender and personality needs to be established. This chapter aims to understand the relationship statistically. The statistical tests were done through SPSS. The results of the tests are provided in this chapter. First, the demographics of the sample are described and later the statistical tests (one-way ANOVA, independent sample t-test and Correlation) are described.

### **6.2 Descriptive Statistics**

The total number of participants who answered the whole questionnaire was 180. All participants work in project teams in various types of projects. Data was collected from government, private and semi-government sectors. The questionnaire was distributed in 10 different organizations in project-based teams. 96 Questionnaires were from Dubai organizations, 72 questionnaires were from Abu Dhabi organizations, and 16 questionnaires were from Sharjah.

### **6.3 Sample Demographics**

- 31% of the sample is female and 69% of the sample is male.
- Most of the respondents fall within the age range of 25-35 and 36-45 ( 44% and 31% respectively). 20% of the sample is above 45 years old, and approximately 5% of the sample is younger than 25.
- Only 1.7% of the participants have a lower degree than bachelor. The majority (60%) has an educational level of bachelor degree. Around 37% of the participants have masters and only 2.2% have a Doctorate.
- 21% of the participants are executives, 61% are from middle management and 17.8% are from high management.
- The percentage of the organizational sector was almost similar with 32% government, 37% private and 31% semi-government. This was expected since equal numbers of surveys were distributed in each sector.

## **6.4 Nationality**

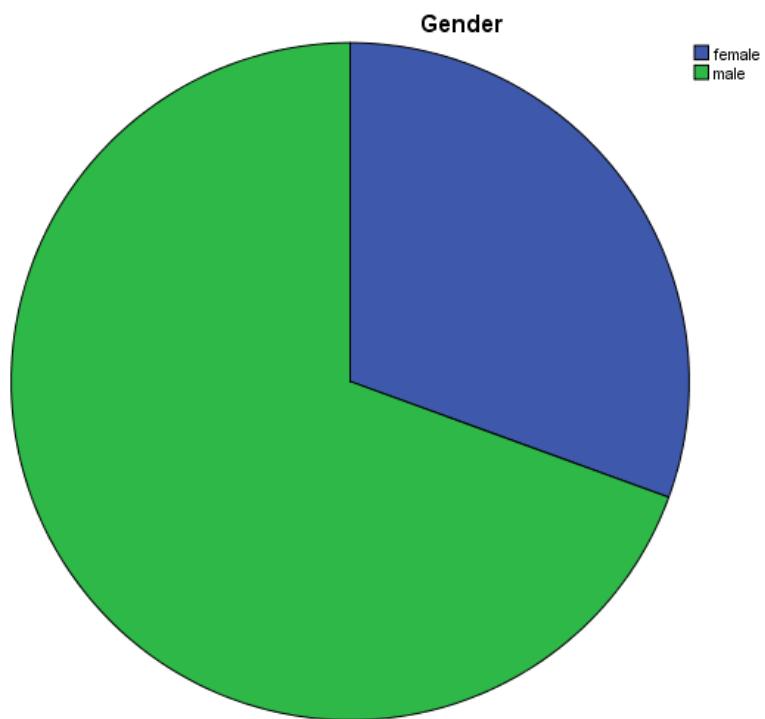
- 36% of the participants are UAE nationals (Emiratis)
- 32% of the participants are Westerns (This includes participants from Western Europe such as UK, Germany and France). Those are also all born in Western countries.
- 32% of the participants are Asians (This includes participants from Southeast Asia mostly from three countries which are India, Philippines and China). The majority are Indians.
- Among the non-UAE nationals, the majority, 51%, has spent 2-5 years in the country, while 7.8% have been in the country for less than 1 year, 24% have been in the country for 1-2 years, 3.8% have been in the country for 5-10 years and 3.4% have been in the country for over 10 years.

These results are highlighted in tables below

## 6.5 Frequency Tables and Charts

1. Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	55	30.6	30.6	30.6
	male	125	69.4	69.4	100.0
	Total	180	100.0	100.0	

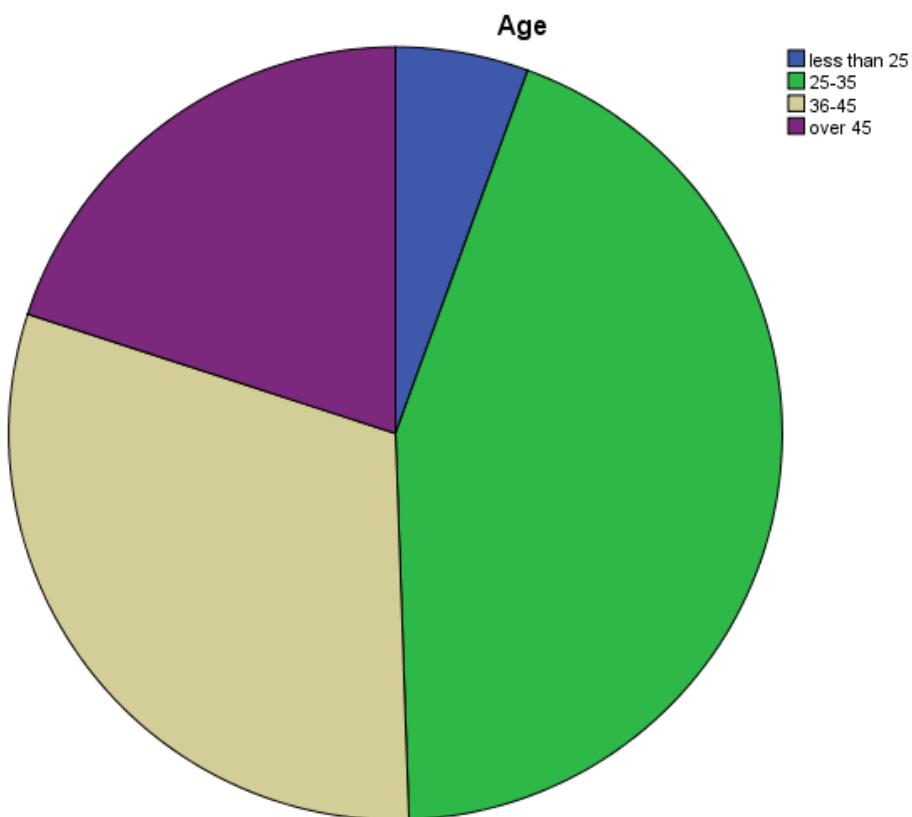
**Table 6. 1: Gender**



**Figure 6. 1: Gender**

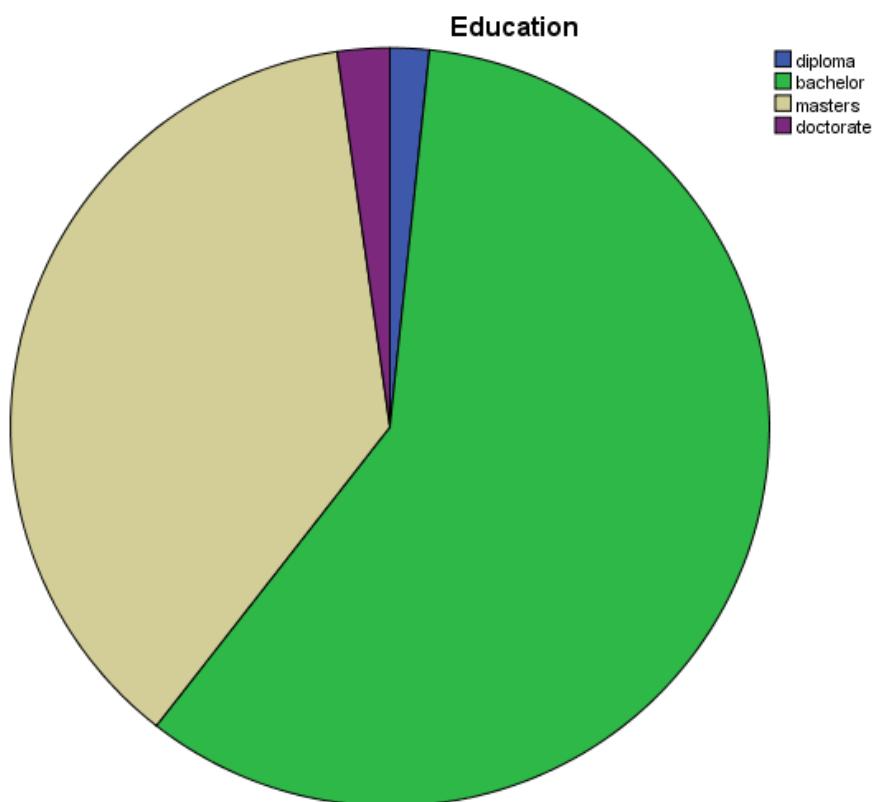
**2. Age**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 25	10	5.6	5.6	5.6
	25-35	79	43.9	43.9	49.4
	36-45	55	30.6	30.6	80.0
	over 45	36	20.0	20.0	100.0
	Total	180	100.0	100.0	

**Table 6. 2: Age****Figure 6. 2: Age**

<b>3. Education</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	diploma	3	1.7	1.7	1.7
	bachelor	106	58.9	58.9	60.6
	masters	67	37.2	37.2	97.8
	doctorate	4	2.2	2.2	100.0
	Total	180	100.0	100.0	

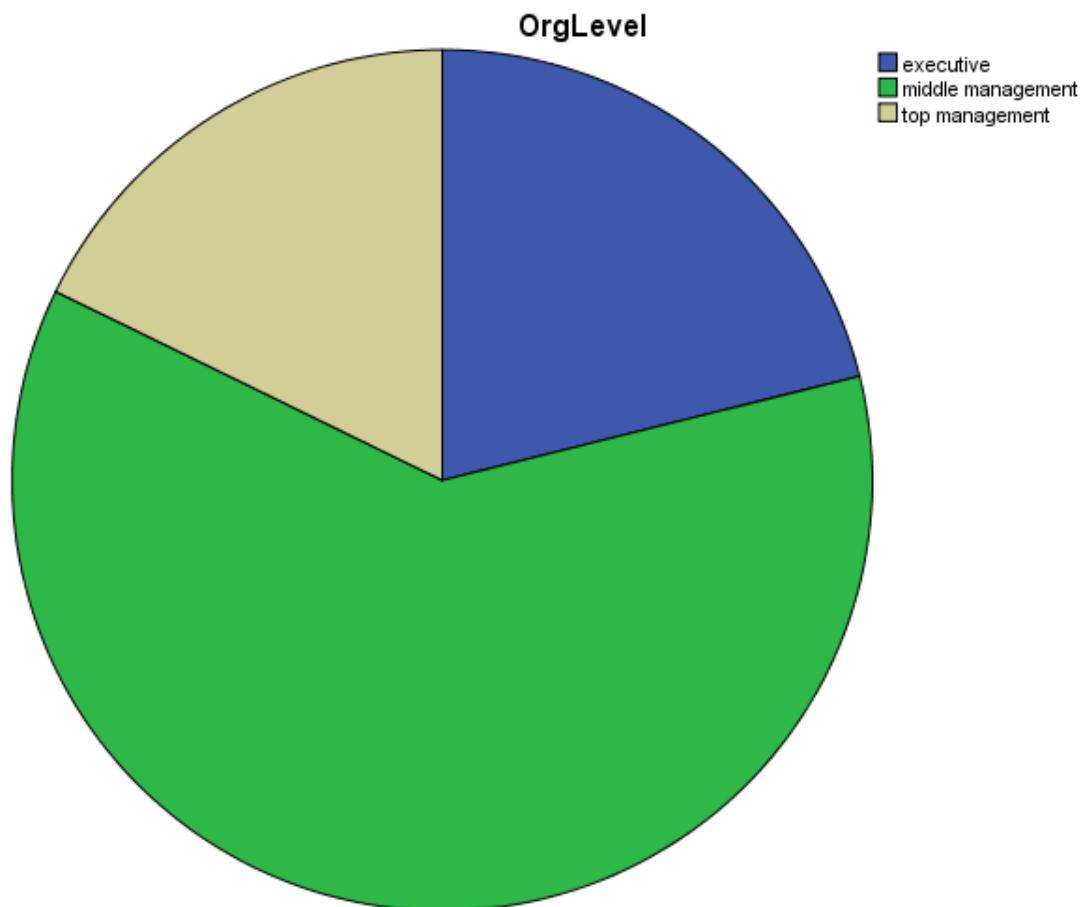
**Table 6. 3: Educational Level**



**Figure 6. 3 Educational Level**

<b>4. Organizational Level</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	executive	38	21.1	21.1	21.1
	middle management	110	61.1	61.1	82.2
	top management	32	17.8	17.8	100.0
	Total	180	100.0	100.0	

**Table 6. 4: Organizational Level**

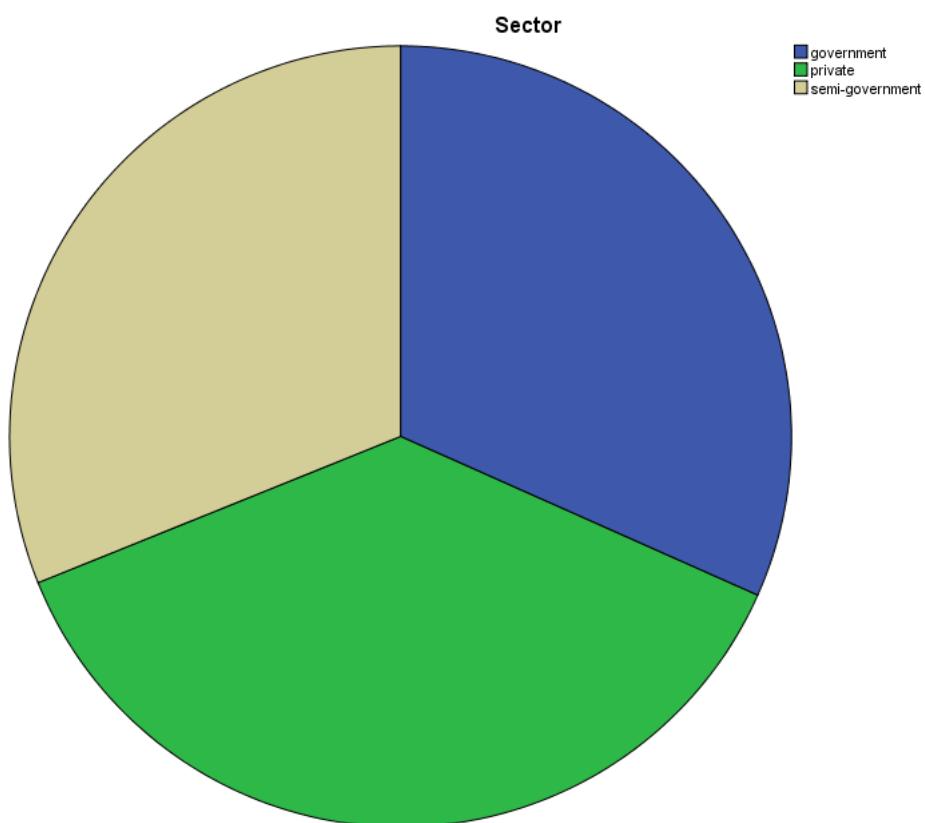


**Figure 6. 4: Organizational Level**

### **5. Organizational Sector**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	government	57	31.7	31.7	31.7
	private	67	37.2	37.2	68.9
	semi-government	56	31.1	31.1	100.0
	Total	180	100.0	100.0	

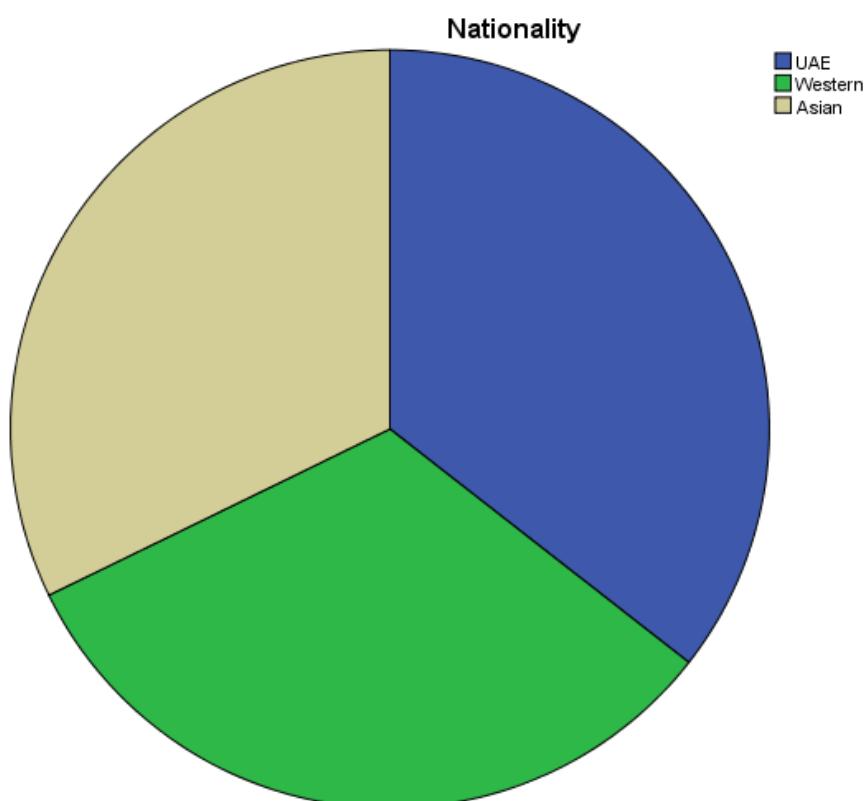
**Table 6. 5: Organizational Sector**



**Figure 6. 5: Organizational Sector**

<b>6. Nationality</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UAE	64	35.6	35.6	35.6
	Western	58	32.2	32.2	67.8
	Asian	58	32.2	32.2	100.0
	Total	180	100.0	100.0	

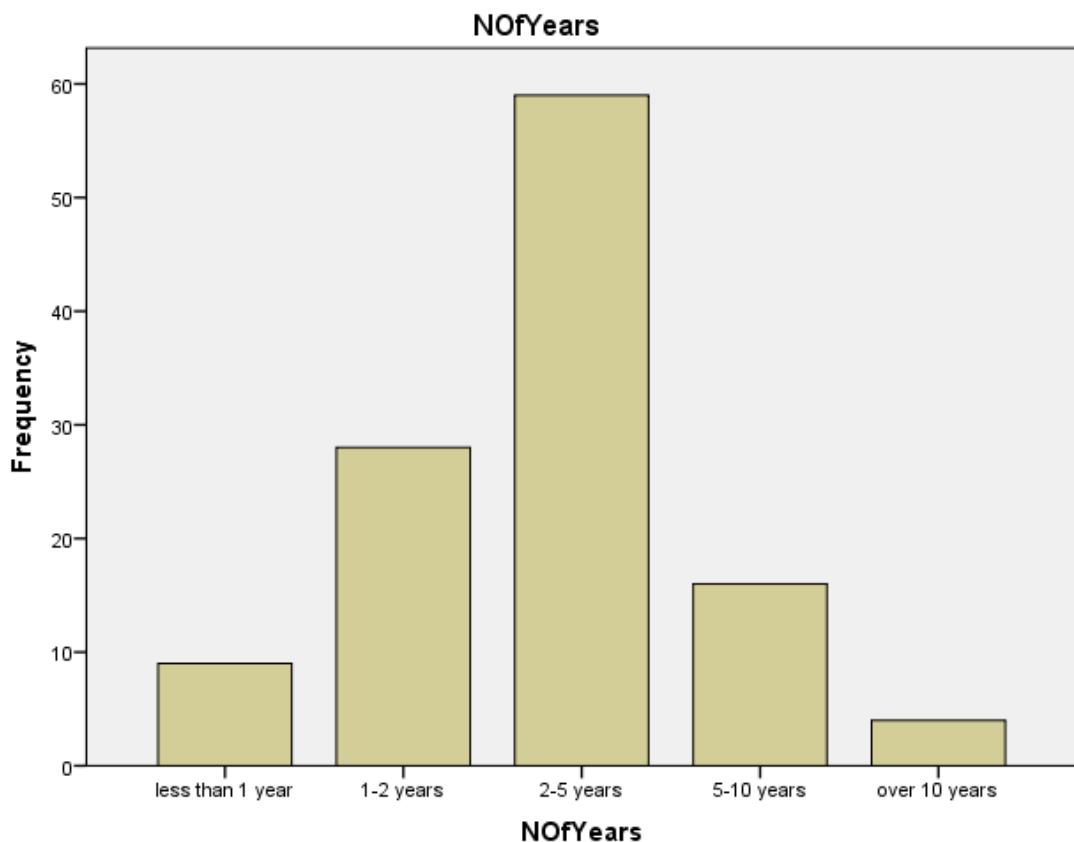
**Table 6. 6: Nationality**



**Figure 6. 6: Nationality**

<b>NO of Years</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 year	9	7.8	7.8	7.8
	1-2 years	28	24.1	24.1	31.9
	2-5 years	59	50.9	50.9	82.8
	5-10 years	16	13.8	13.8	96.6
	over 10 years	4	3.4	3.4	100.0
	Total	116	100.0	100.0	

**Table 6. 7: Number of Years in the Country**



**Figure 6. 7 Number of Years in the Country**

## 6.6 Variables Description

- Independent Variables:
  1. Nationality
  2. Gender
  3. Personality: Multi-dimensional variable, which includes the following factors: Extraversion (E), Agreeableness (A), Conscientiousness (C), Neuroticism (N), and Openness (O).
- Dependent Variables:
  1. Market Risk Factor (Market)
  2. Environmental Risk Factor (Environment)
  3. Technical Risk Factor (Technical)
  4. Probability and Impact Factor (ProbabilityImpact1, ProbabilityImpact2, ProbabilityImpact3).

## 6.7 One-Way ANOVA

One-way ANOVA is a statistical test used to look for any differences between more than two groups. The test looks at the differences that exist in group means. It is called “one way” because the test considers only one type of grouping for each question like age or nationality (Chalmer 1986). Analysis of variance (ANOVA), allows for testing the significance of the differences within sample means. This is done through breaking down the variance of the two or more groups into components. Later, the components are utilized to build the sample statistic (Lee et al. 2000). As per Lee et al. (2000, p. 486), “ANOVA can be used to analyze certain decisions.” When there is a significant ANOVA result, pairwise comparisons are made. Tukey’s and Scheffe’s tests are the most used post hoc tests (Thompson 2008).

In this study, we are trying to compare the differences people from different countries have in the way they interpret risk and their decision based on their own risk perception. To do so, One-way ANOVA is a good test to examine whether there is variance or not in the sample. When testing the hypotheses, we aim to look at how

individuals from different countries evaluate different risk factors and how they respond to the probability and impact components of risk. Below are the tables for One-way ANOVA test.

<b>Descriptives</b>									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean			
						Lower Bound	Upper Bound	Minimum	Maximum
Market	UAE	64	2.23	.938	.117	2.00	2.47	1	5
	Western	58	3.90	1.003	.132	3.63	4.16	1	5
	Asian	58	2.02	.908	.119	1.78	2.26	1	4
	Total	180	2.70	1.259	.094	2.51	2.89	1	5
Environment	UAE	64	3.19	1.283	.160	2.87	3.51	1	5
	Western	58	2.28	.970	.127	2.02	2.53	1	5
	Asian	58	3.83	.861	.113	3.60	4.05	2	5
	Total	180	3.10	1.229	.092	2.92	3.28	1	5
Technical	UAE	64	3.52	.816	.102	3.31	3.72	2	5
	Western	58	2.38	.988	.130	2.12	2.64	1	5
	Asian	58	2.22	.918	.121	1.98	2.47	1	5
	Total	180	2.73	1.076	.080	2.58	2.89	1	5
ProbabilityImpact1	UAE	64	2.22	1.061	.133	1.95	2.48	1	5
	Western	58	2.17	1.028	.135	1.90	2.44	1	5
	Asian	58	3.24	1.329	.174	2.89	3.59	1	5
	Total	180	2.53	1.239	.092	2.35	2.72	1	5
ProbabilityImpact2	UAE	64	2.41	.971	.121	2.16	2.65	1	5
	Western	58	2.33	.944	.124	2.08	2.58	1	5
	Asian	58	3.59	1.214	.159	3.27	3.91	1	5
	Total	180	2.76	1.188	.089	2.59	2.94	1	5
ProbabilityImpact3	UAE	64	2.48	.734	.092	2.30	2.67	1	4
	Western	58	2.45	.680	.089	2.27	2.63	1	4
	Asian	58	3.59	1.200	.158	3.27	3.90	1	5
	Total	180	2.83	1.035	.077	2.68	2.98	1	5

**Table 6. 8: Descriptives**

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Market	Between Groups	123.954	2	61.977	68.628	.000
	Within Groups	159.846	177	.903		
	Total	283.800	179			
Environment	Between Groups	70.588	2	35.294	31.296	.000
	Within Groups	199.612	177	1.128		
	Total	270.200	179			
Technical	Between Groups	61.474	2	30.737	37.334	.000
	Within Groups	145.726	177	.823		
	Total	207.200	179			
ProbabilityImpact1	Between Groups	42.966	2	21.483	16.402	.000
	Within Groups	231.834	177	1.310		
	Total	274.800	179			
ProbabilityImpact2	Between Groups	58.445	2	29.223	26.623	.000
	Within Groups	194.282	177	1.098		
	Total	252.728	179			
ProbabilityImpact3	Between Groups	49.263	2	24.631	30.617	.000
	Within Groups	142.398	177	.805		
	Total	191.661	179			

**Table 6. 9: One-Way ANOVA**

The results, as per the above table, show that there is a statistically significant difference between the groups as a whole in all the dependent variables (Market risk, Environmental risk, Technical risk, Probability and Impact). Therefore, multiple comparisons must be examined to find out which groups have differences and where. To do so, the Tukey post hoc test is done. The table below illustrates the findings.

Multiple Comparisons								
Tukey HSD								
Depend ent Variable	(I) Nationality	(J) Nationality	Mean	Std. Error	Sig.	95% Confidence Interval		
			Difference (I-J)			Lower Bound	Upper Bound	
Market	UAE	Western	-1.662*	.172	.000	-2.07	-1.25	
		Asian	.217	.172	.420	-.19	.62	
		Western	1.662*	.172	.000	1.25	2.07	
			1.879*	.176	.000	1.46	2.30	
		Asian	-.217	.172	.420	-.62	.19	
	Environment		-1.879*	.176	.000	-2.30	-1.46	
	Western	UAE	.912*	.193	.000	.46	1.37	
	Asian	-.640*	.193	.003	-1.10	-.19		
	Western	-.912*	.193	.000	-1.37	-.46		
		-1.552*	.197	.000	-2.02	-1.09		
Technic al	UAE	Asian	.640*	.193	.003	.19	1.10	
			1.552*	.197	.000	1.09	2.02	
		Western	Western	1.136*	.164	.001	.75	1.53
			Asian	1.291*	.164	.000	.90	1.68
		Asian	Western	-1.136*	.164	.000	-1.53	-.75
			Asian	.155	.168	.628	-.24	.55
	Probabil ityImpac t1	Western	Asian	-1.291*	.164	.000	-1.68	-.90
			Western	-.155	.168	.628	-.55	.24
		Asian	UAE	.046	.207	.973	-.44	.54
			Western	-1.023*	.207	.000	-1.51	-.53
Probabil ityImpac t2	Western	UAE	UAE	-.046	.207	.973	-.54	.44
			Asian	-1.069*	.213	.000	-1.57	-.57
		Asian	UAE	1.023*	.207	.000	.53	1.51
			Western	1.069*	.213	.000	.57	1.57
		Western	Western	.079	.190	.910	-.37	.53
			Asian	-1.180*	.190	.000	-1.63	-.73
	Asian	UAE	UAE	-.079	.190	.910	-.53	.37
			Asian	-1.259*	.195	.000	-1.72	-.80
		Western	UAE	1.180*	.190	.000	.73	1.63
			Western	1.259*	.195	.000	.80	1.72
Probabil ityImpac t3	Western	UAE	Western	.036	.163	.973	-.35	.42
			Asian	-1.102*	.163	.000	-1.49	-.72
		Asian	UAE	-.036	.163	.973	-.42	.35
			Asian	-1.138*	.167	.000	-1.53	-.74
		Asian	UAE	1.102*	.163	.000	.72	1.49
			Western	1.138*	.167	.000	.74	1.53

\*. The mean difference is significant at the 0.05 level.

Table 6. 10: Tukey Post Hoc Table

From the table above, it can be seen that there are differences among certain groups in some components and there are no differences among others. Below, each dependent variable result is explained.

### **1. Market Risk:**

In this question, participants were asked if they feel a proposal with high market risk is riskier than a proposal with high environmental risk. From this question, the aim is to evaluate how different groups attach importance to different risk factors (mainly how they feel about a proposal with high market risk; whether it is risky or not).

The mean for market risk in UAE participants was 2.3, for Westerns 3.9 and for Asians 2. Looking at the Significance level:

- There is a statistically significant difference between Emiratis and Westerns (Sig .000). This indicates that there is a difference between these two groups.
- There is no statistically significant difference between UAE and Asians ( Sig. .420). This means that there is no statistical difference in the way Emiratis and Asians evaluate market risk based on the answers of participants.
- There is a statistically significant difference between Western and Asian (Sig. 0.000). These two groups have differences in the way they evaluate the importance of market risk.

### **2. Environmental Risk:**

In this question, participants were asked if they feel a proposal with high Environmental risk is riskier than a proposal with high technical risk. From this question, the aim is to evaluate how different groups attach importance to different risk factors (mainly how they feel about a proposal with high environmental risk; whether it is risky or not). The mean for environmental risk for UAE was 3.1, for Westerns 2.2 and Asians 3.8. Looking at the Significance level:

- There was a statistically significant difference between Emiratis and Westerns (Sig 0.000). These two groups have differences in the way they evaluate the importance of environmental risk
- There was a statistically significant difference between Emiratis and Asians (Sig .003). These two groups have differences in the way they evaluate the importance of environmental risk.

- There was a statistically significant difference western and Asians (Sig .000). These two groups have differences in the way they evaluate the importance of environmental risk.

### **3. Technical Risk:**

In this question, participants were asked if they feel a proposal with high technical risk is riskier than a proposal with high market risk. From this question, the aim is to evaluate how different groups attach importance to different risk factors (mainly how they feel about a proposal with high technical risk; whether it is risky or not). The mean for technical risk for UAE is 3.5, for Western 2.3 and for Asians 2.2. Looking at the Significance level:

- There was a statistically significant difference between Emiratis and Westerns (Sig .001). These two groups have differences in the way they evaluate the importance of technical risk
- There was a statistically significant difference between Emiratis and Asians (Sig .000). These two groups have differences in the way they evaluate the importance of Technical risk
- There was no statistically significant difference between Western and Asian (Sig .628)

From One-Way ANOVA results, it can be said that Hypothesis 1 (H1) is proven since there was a difference noted between the different groups in response to certain risk factors.

### **4. Probability and Impact:**

In the last three questions, participants were asked if they feel a proposal with high probability/low impact risk is riskier than a proposal with low probability/high impact risk. From this question, the aim is to evaluate how different groups attach importance to probability and impact components of risk (testing hypothesis 4). Looking at the Significance level in all three questions, it was found that:

- There was no statistical significant difference between Emiratis and Western (Sig 0.973). This means that Emiratis and Western have no difference in the importance they attach to probability and impact.

- There was a statistically significant difference between Asians and Emiratis (Sig .000). Asians and Emiratis have differences in the importance they attach to probability and impact.
- There was a statistically significant difference between Asians and Westerns (Sig .000). Asians and Westerns have differences in the importance they attach to probability and impact.

From this, it can be said that hypothesis 4 (H4) is proven since there is a variance noted between Emiratis and Asians and between Asians and Westerns.

## 6.8 Independent Sample T-Test

Looking at the variance between the means of two crowds on the same variable can be done using T-test. This test looks at the variance in the means of the two groups by using a measure of the spread of the scores (Saunders Lewis & Thornhill 2012). An independent sample t-test was performed to compare risk perception for risk factors and probability/impact scores between females and males. Independent Sample T-test table is presented below.

<b>Group Statistics</b>					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
Market	female	55	2.51	1.034	.139
	male	125	2.78	1.342	.120
Environment	female	55	3.27	1.162	.157
	male	125	3.02	1.254	.112
Technical	female	55	3.02	.892	.120
	male	125	2.61	1.128	.101
ProbabilityImpact1	female	55	2.67	1.218	.164
	male	125	2.47	1.248	.112
ProbabilityImpact2	female	55	3.00	1.155	.156
	male	125	2.66	1.192	.107
ProbabilityImpact3	female	55	3.04	1.088	.147
	male	125	2.74	1.001	.090

**Table 6. 11: Group Statistics**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval Lower	95% Confidence Interval Upper
Market	Equal variances assumed	9.057	.003	-1.352	178	.178	-.275	.203	-.676	.126
	Equal variances not assumed			-1.494	132.0 53	.137	-.275	.184	-.639	.089
Environment	Equal variances assumed	.758	.385	1.253	178	.212	.249	.198	-.143	.640
	Equal variances not assumed			1.291	110.8 32	.199	.249	.193	-.133	.631
Technical	Equal variances assumed	8.387	.004	2.387	178	.018	.410	.172	.071	.749
	Equal variances not assumed			2.612	128.9 13	.010	.410	.157	.100	.721
ProbabilityIm pact1	Equal variances assumed	.186	.667	1.001	178	.318	.201	.200	-.195	.596
	Equal variances not assumed			1.011	105.6 06	.314	.201	.199	-.193	.594
ProbabilityIm pact2	Equal variances assumed	1.056	.306	1.800	178	.073	.344	.191	-.033	.721
	Equal variances not assumed			1.823	106.3 37	.071	.344	.189	-.030	.718
ProbabilityIm pact3	Equal variances assumed	.024	.878	1.805	178	.073	.300	.166	-.028	.629
	Equal variances not assumed			1.748	95.93 0	.084	.300	.172	-.041	.642

**Table 6. 12: Independent T-Test Tables**

It was found that:

- There was a significant difference in the score between female and male in technical risk factors. There was a significant difference for the two groups,  $t(2.387) = 178$ ,  $p < .05.$ , two-tailed with females ( $M= 3.02$ ,  $SD= .892$ ) and males ( $M= 2.61$ ,  $SD= 1.128$ ). The magnitude of the difference in the means (mean difference  $3.02 - 2.61 = 0.41$ , 95% CI:  $.071$  to  $.749$ ) was small ( $\eta^2 = .018$ ). These results suggest that there was a significant difference in

the way females and males attach importance to technical risk factors. From this result, it can be said that hypothesis 2 (H2) is proven.

- There was no significant difference in score between females and males in Market risk factor Sig. (2-tailed)= .178
- There was no significant difference in score between females and males in environmental risk factor Sig. (2-tailed)= .212
- There was no significant difference in score between females and males in probability and impact Sig. (2-tailed)=.318 and Sig. (2-tailed)= .073

## 6.9 Correlation

The correlation coefficient is used to assess the strength of a relationship between two variables; one dependent and one independent. The coefficient indicates both the strength and direction of the linear relationship if it exists. The absolute size of the correlation coefficient indicates the degree of the relationship. The type of the relationship is indicated by the sign whether it is negative (-) or positive (+) (Saunders Lewis & Thornhill 2012). To examine whether there is a relationship between personality and risk perception of participants, a correlation test was done between the five traits of personality (Independent), risk factors (dependent) and probability and impact (dependent). The correlation table is presented below.

		Correlations											
		Enew	Cnew	Nnew	Onew	Anew	Market	Enviro	H	Techn	Problm	Problm	Problm
Enew	Pearson Correlation	1	.213**	.044	.316**	.021	-.015	-.080	.107	-.096	-.072	-.031	
	Sig. (2-tailed)		.002	.538	.000	.767	.828	.260	.132	.175	.310	.659	
Cnew	N	200	200	200	200	200	200	200	200	200	200	200	
	Pearson Correlation	.213**	1	-.170*	.206**	.184**	-.031	-.123	.126	.062	.069	.051	
Nnew	Sig. (2-tailed)	.002		.016	.003	.009	.667	.082	.077	.384	.334	.472	
	N	200	200	200	200	200	200	200	200	200	200	200	
Nnew	Pearson Correlation	.044	-.170*	1	-.037	-.454**	-.035	-.014	.017	.125	.022	.019	
	Sig. (2-tailed)	.538	.016		.607	.000	.620	.843	.809	.078	.756	.788	
	N	200	200	200	200	200	200	200	200	200	200	200	

Onew	Pearson Correlation	.316**	.206**	-.037	1	-.003	-.005	-.006	-.020	.099	.136	-.071
	Sig. (2-tailed)	.000	.003	.607		.972	.939	.936	.782	.165	.054	.320
	N	200	200	200	200	200	200	200	200	200	200	200
Anew	Pearson Correlation	.021	.184**	-.454**	-.003	1	-.068	-.019	.046	-.058	.025	.035
	Sig. (2-tailed)	.767	.009	.000	.972		.341	.793	.517	.418	.724	.621
	N	200	200	200	200	200	200	200	200	200	200	200
Market	Pearson Correlation	-.015	-.031	-.035	-.005	-.068	1	-.488**	-.174*	-.218**	-.238**	-.218**
	Sig. (2-tailed)	.828	.667	.620	.939	.341		.000	.014	.002	.001	.002
	N	200	200	200	200	200	200	200	200	200	200	200
Environ	Pearson Correlation	-.080	-.123	-.014	-.006	-.019	-.488**	1	-.017	.297**	.284**	.289**
	Sig. (2-tailed)	.260	.082	.843	.936	.793	.000		.809	.000	.000	.000
	N	200	200	200	200	200	200	200	200	200	200	200
Tech	Pearson Correlation	.107	.126	.017	-.020	.046	-.174*	-.017	1	-.247**	-.260**	-.271**
	Sig. (2-tailed)	.132	.077	.809	.782	.517	.014	.809		.000	.000	.000
	N	200	200	200	200	200	200	200	200	200	200	200
Problm p1	Pearson Correlation	-.096	.062	.125	.099	-.058	-.218**	.297**	-.247**	1	.698**	.665**
	Sig. (2-tailed)	.175	.384	.078	.165	.418	.002	.000	.000		.000	.000
	N	200	200	200	200	200	200	200	200	200	200	200
Problm p2	Pearson Correlation	-.072	.069	.022	.136	.025	-.238**	.284**	-.260**	.698**	1	.652**
	Sig. (2-tailed)	.310	.334	.756	.054	.724	.001	.000	.000	.000		.000
	N	200	200	200	200	200	200	200	200	200	200	200
Problm p3	Pearson Correlation	-.031	.051	.019	-.071	.035	-.218**	.289**	-.271**	.665**	.652**	1
	Sig. (2-tailed)	.659	.472	.788	.320	.621	.002	.000	.000	.000		.000
	N	200	200	200	200	200	200	200	200	200	200	200

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

**Table 6. 13 Correlation**

No significant correlation was found between personality traits and risk factors. No significant correlation was found between personality traits and probability and impact components. In this case, hypothesis (3) is rejected.

## **6.10 Summary**

In a summary, first, the descriptive statistics were used to describe the sample in terms of gender, age, organizational level, organizational sector, nationality and number of years in the country. Second, important statistical tests were conducted to test the study proposed hypotheses. One-Way ANOVA was done to examine the variance between different cultures in response to different risk factors and probability and impact. Independent Sample T-Test was done to examine the variance between females and males. Finally, correlation was done to examine the relationship between risk perception and personality. Based on the results of the tests, (H1), (H2) and (H4) has been proven, while (H3) has been rejected.

## **CHAPTER SEVEN: Discussion and Limitations**

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### **7.1 Introduction**

This study has examined and discussed risk perception in multicultural teams and how can that influence project decision-making. The study then attempted to examine the relationship in a new context. The relationship was examined in multicultural project teams in the UAE. The statistical results discussed in the previous chapter revealed a relationship between risk perception and the two examined demographical variables (culture and gender) and there was no relationship found between risk perception and personality. This will be discussed in this chapter in details. First, research's major findings will be highlighted, then an elaboration and a discussion will follow. Finally, the limitations will be listed.

### **7.2 Major findings**

Through data analysis and statistical tests of the questionnaires, the important findings will be mentioned and discussed in this section. The first analytical step was to investigate if the groups from different cultures varied in how they utilized the information given to them to evaluate the level of risk in different proposals. The importance Emiratis, Westerns and Asians attach to three risk factors (market, environmental, technical) was measured. In addition to risk factors, the importance participants attached to the two elements of risk (likelihood and magnitude) was also evaluated. The statistical tests of variance revealed that there is a significant difference between the three groups in the importance they attach to the three risk

factors as well as to the probability and impact components of risk. This finding, variance in different groups, is similar to what Camprieu et al. (2007) have found in the original study that examined the similar questionnaire. In addition, the difference various cultural groups have toward different risk factors noted in this study has also been documented by other studies in the literature examining this topic in cross-cultural context (Weber & Hsee 1998, Blais & Weber 2006, Camprieu et al. 2007, Liu et al. 2015, Yang 2015). Therefore, the findings of this study can be supported by the related literature.

The major findings of the statistical tests (One-Way ANOVA, Independent Sample T-Test, Correlation) are listed below:

➤ **Market Risk:**

There was a significant difference between Emiratis and Western and between Emiratis and Asians in the importance they attached to a proposal with high market risk. In contrast, there was no significant difference noted between Westerns and Asians. Emiratis participants viewed a project proposal with high market risk as a very risky project. Western and Asians disagreed with this and viewed a project with high market risk less risky.

➤ **Environmental Risk:**

In the environmental risk factor, there was a significant difference between Emiratis, Westerns and Asians. Westerns viewed a proposal with high environmental risk as a very risky project. On the other hand, Asians viewed a project with high environmental risk less risky than Westerns. The difference between Emiratis and Asians was less significant than the difference between Emiratis and Westerns. As per Camprieu et al. (2007), some cultures live with harmony with the environment while others aim to control it. As a result, it is expected to note differences in regard to the environment between different cultures.

➤ **Technical Risk:**

In the technical risk factor, there was no difference noted between Westerns and Asians, but there was a significant difference between Emiratis and the other groups.

Both Westerns and Asians viewed a project with high technical risk as a risky project. Whereas, Emiratis viewed it as less risky to a significantly lesser extent. This could be explained by the fact that Emiratis usually don't occupy technical jobs, so they might not be very familiar with technical risk factors. On the other hand, Asians usually occupy technical job within the organization in the UAE, so they are well aware of technical risks' impact and importance.

#### ➤ **Probability and Impact:**

In terms of the two elements of risk, probability and impact, there was no significant difference between Emiratis and Westerns, but there was a significant difference between Emiratis and Asians, and between Westerns and Asians. For Emiratis and Western participants, they attached more significance to the information related to the probability than the information related to the impact. In contrast, the influence of impact information was stronger than the influence of probability information for Asians. To elaborate more, Emiratis and Westerns, when presented with two proposals, one with high probability/low impact and one with low probability/high impact, they viewed the first one as a riskier proposal. On the other hand, Asians viewed the proposals with high probability/low impact as less risky than a proposal with low probability/high impact. The probability is more important for Emiratis and Westerns when making a decision, while the impact is more important for Asians when making a decision. Camprieu et al. (2007) also found that Westerns attach more importance to the probability component than Asians. Adler & Gundersen (2007, p. 180) explain the difference between Westerns and Asian by saying that "Chinese executives believe that there is an element of 'joss' or luck involved in all transaction (external attribution). By contrast most American managers believe that effective problem solving and hard work will get the job done (internal attribution)." Thus, Asian will most likely take a high probability/low impact risk, while Westerns will most likely take low probability/high impact risk.

#### ➤ **Personality**

Although the above tested variables show similarities to what has been found in the literature, the personality variable showed a different result than what was projected.

There was no relationship found between personality traits (The Big Five Model) and participants' risk perception (risk factors and probability and impact). As a result, no further statistical test was performed. In this case, hypothesis 3 (H3) is rejected. However, it cannot be generalized that there is no relationship between personality traits and risk perception because of several limitations. The reason no correlation was found could be due to self-evaluation by respondents, which can be inaccurate sometimes. In addition, as aforementioned, 18 items with reverse-scoring were deleted which might have influenced the results. As per Chauvin et al. (2007), examining personality in risk perception is very complex.

➤ **Gender:**

When Independent Sample T-Test was performed to look for any significant variance between females and males, the only significant difference was found to be in the technical risk factor. The female respondents reacted differently than the male respondents in response to a project proposal involving technical risk factor.

### **7.3 Discussion**

Based on the literature reviewed and the results of this study, it can be said that national culture has a significant influence on individual's risk perception leading to different choices and different decisions. This difference might impact the performance of multicultural teams working in project-based environments. As a result, this could influence the overall performance, decisions, and relationships in projects and organizations in general. Therefore, it is suggested that a special focus and attention to be given to multicultural teams, especially in decision-making involving risks and uncertainty. It should also be mentioned that this research has found that there are no significant differences between certain groups in responding to some risk factors and probability and impact. For instance, Emiratis and Westerns have similar reaction to probability and impact components of risk.

As per Ng & Rayner (2010 p. 89), “individuals will be selective about risks to be concerned about, especially those that reinforce the cultural solidarity of their institutions.” This can be observed in the results of data analysis. Individuals coming from different cultural background were concerned with different risks and reacted differently to what they believe to be riskier. Some can argue that this difference could be due to other factors such as age or organizational level. Nevertheless, it must be mentioned that the majority of the participants are from similar age group and share similar educational and organizational level. Therefore, it is assumed that the difference is most likely related to their national culture. In addition, most of the non-UAE nationals who participated in the survey (75% of the participants) have only spent less than 5 years in the country. So, they are still not much affected by the country’s or their organizational culture. The differences noted between Westerns and Asians has also been identified in the literature with cross-sectional empirical studies. According to Cheung et al. (2013), studies examining risk behaviors show that culture influence risk as people from Eastern culture react to risk differently than people from Western cultures. As per Wang et al. (2015), Northern Europeans and East Asians are different in how they observe and respond to risk. They explain that (2015, p.170) “northern Europeans are highly convinced that they can control events, while East Asian cultural groups tend to hold the view that events are complex, which are affected by various factors and are inevitably less controllable.”

The differences in risk perception among the participants from different cultures has been identified long ago by many researchers. As per Kahnman & Tversky (1979), the expected value is unpredictable and cannot be agreed on universally. Nevertheless, it is more subjective and unique to each individual where people are not logical thinkers all the time. In addition, Gigerenzer & Goldstein (2011, p. 101) argue that “the recognition heuristic makes inferences about criteria that are not directly accessible to the decision maker.” As a result, when individuals are presented with new information related to risk, they use heuristics to make decisions. Many of the information, values, and experience they apply are derived from their culture and origin and what they are familiar with. For instance, an English project manager working in the UAE, when faced with risk and uncertainty, will apply the knowledge he has and experience he shared in his country to the new environment he is working

in. Therefore, what might feel very risky to an Emirati project member might feel less risky to an English project member. It is not surprising that people from different cultures have different perception of the different risk factors, and people coming from similar cultural backgrounds respond somehow similarly to different risk factors. As a matter of fact, a person's risk perception is influenced by his national culture. As per Karimi et al. (2016, p. 115), "environmental and technology policies tend to be aligned with national characteristics." This influences how individuals react to technical and environmental risk factors.

As has been stated earlier in the literature review, a culture is defined as (Javidan & House 2001, p. 292) "a set of beliefs and values about what is desirable and undesirable in a community of people." Technical and environmental risk perception and tolerance is an important topic in cultural differences among project personal as how people perceive the risk and react to it is different from one country to another (Karimi et al. 2016). Karimi et al. (2016) argue that when large projects are part of a larger cultural contexts or countries with multicultural social decomposition, understanding the relationship between risk perception of technological risk and different cultures is needed.

Liu et al. (2015) argue that cultural influence in projects is inevitable and is essential for successful risk management. Liu et al. (2014) empirical study has found that project risks are perceived and controlled in a different manner depending on the national cultures. Project team members from diversified culture can pose conflict and impact on project success. Different cultures have different attitude and reactions to the problems in life in general which are deeply influenced by cultural roots. This has major impact on project risk management (Lie et al. 2015). Therefore, the topic of risk perception in multicultural organizations is very essential. Risk perception influences individual's decision-making and in projects, decision-making is vital.

As per Essinger & Rosen (1991), a risk is defined as a degree of the anticipated variance between expectations and realizations. Therefore, culture influences how risk is perceived and operationalized in project-based environments. Nevertheless, although it has been found that culture influence project risk perception, exact cultural

consequences on project performance is not fully understood (Fellows & Liu 2013, Liu et al. 2015). It is not surprising that the exact relationship has not been fully described and understood since this relationship is very complex and complicated. However, acknowledging the existence of such influence between culture and risk perception in project environment is a key element in achieving a better understanding.

In addition to cultural variance among participants, the research also identified a variance between female and male participants in responding to technical risk factor. This finding can also be supported by the literature review. As per Cheung et al. (2013), men and women interpret similar risks differently and look at them from a different perspective. Rundmo & Nordfjærn (2017) argue that males and females are concerned with different kinds of risks. Therefore, they not only tend to perceive similar risks differently, but also worry about different risks. Male participants might relate to technical risk factors more than female. Also, males tend to understand technical details of projects more than females. It is the nature of males to be more interested in the technical details than females. This finding was somewhat expected among participants. These findings could be significant for certain types of projects or organizations that involve high technical risks such as IT projects, construction projects and software projects. Recognizing the fact that females and males perceive some risk factors differently is essential for project management.

The significant difference noted in this research is very essential. Large projects that involve different risk factors most of the times demand the review and approval of many individuals who act as representatives to the certain organization (Camprieu et al. 2007). Douglas & Wildavsky (1983) provided several studies that have found that different decision-makers worry about different risk factors. The importance of differences in risk perception is very essential for multicultural teams who make important decisions. As per Camprieu et al. (2007, p. 643), “in the global economy of the 21st century, these projects increasingly require joint ventures – or some other forms of partnership – between organizations originating from different geographical and cultural horizons.” As per Adler & Gundersen (2007, p.86), “even more than perception and interpretation, cultural conditioning strongly affects evaluation.”

Therefore, it is essential for high management and certain stakeholders to understand the variance different individuals from different countries have. They need to understand that when evaluating project proposals that have different risk factors, individuals from different countries and cultures involved in the evaluation process will assess risks differently.

## **7.4 Limitations**

It is recognized that there are some limitations involved in this study that could have affected the results and findings. While carrying out this research, the limitations were identified which are explained below.

➤ **Sample Size:**

The sample size of each national culture is not equal. The UAE sample included 64 participants and the both Western and Asian sample included 58 participants.

➤ **Selection Method:**

The only selection criterion for conducting the questionnaires was individuals working in project teams. Neither specific industry was selected nor specific organizational sector. If specific industry or sector was chosen, the results of the study could have been more reliable. According to Zwikael and Globerson (2006, p. 688), “Different industries face different challenges.” In addition, since the selection criterion was broad, other factors could have influenced participants’ risk perception-other than their nationality.

➤ **Time:**

Time was a big constrain in this study. The topics of risk perception, decision-making and multicultural teams are very broad and huge that each one of them requires long time to investigate. Moreover, this research field is new in the context of UAE as no similar data has been found. With time limitation, it was difficult to cover every aspect.

➤ **Gender:**

The number of female participants was not equal to the number of male participants. There was a great difference especially in non-UAE nationals participants. This could have influenced the result of the analysis.

➤ **Questionnaire:**

The questionnaire was adapted from previous empirical studies. However, it was altered to suit this study. For instance, 18 items with reverse scoring were deleted from the personality test. This could be the reason why no correlation was found between personality traits and risk perception although the literature identifies a strong relationship. In addition, part three of the questionnaire that is related to project risk perception was altered as well. The original questionnaire alone requires 35 minutes to complete and this was not practical for this research. The number of questions was greatly reduced. Also, the format of the questions was changed to reduce the time required and to simplify it for the participants.

➤ **Self-report Nature of the Questionnaire:**

There is always uncertainty about the participants' accuracy when responding the questionnaires, especially with the personality part. It cannot be known whether participants were accurate about describing their personalities or not.

➤ **Language:**

The language of the questionnaire was English. All participants speak English. However, for many of them, English is not their first language. Therefore, this could have limited the respondents' understanding of the questions.

## 7.5 Summary

In a summary, based on the literature review and the findings of this study, it can be said that national culture has a significant influence on individual's risk perception leading to different choices and different decisions. The results of this study showed that individuals coming from different cultural background were first, concerned with different risk factors and second, reacted differently to the two components of risk-probability and impact. Therefore, their decisions varied. This variance among people

from different culture has been long identified in the literature. As per Liu et al. (2015), cultural influence in projects is inevitable and is essential for successful risk management. The study also noted a difference between females and males in response to technical risk factors. These finding are essential for project management. It is vital for high management to recognize and understand the variance different individuals from different countries have. The study also recognizes several limitations. The limitations include sample size, selection method, time, questionnaire, nature of the questionnaire and language barrier.

## **CHAPTER EIGHT: Conclusions and Recommendations**

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### **8.1 Introduction**

In this final chapter, the conclusions of the study are firstly discussed. Then, recommendations are provided for both project management and future research. Finally, contributions of this research are mentioned for both academics and practitioners.

### **8.2 Conclusions**

The aim of this thesis was to examine the concept of risk perception in multicultural project teams in the United Arab Emirates. The thesis's aim was achieved by exploring the concept of risk perception in the UAE when the questionnaire was administered in the country and then the findings were analyzed and linked with the literature review. The objectives were also achieved. This was done through first, critically and extensively reviewing the existing literature on risk perception and the related topics such as risk, risk management, project teams, decision-making, culture, multicultural teams and diversity. Second, a comprehensive framework was created that incorporate all elements that influence risk perception identified in the literature including the study's variables. Third, the relationship between individuals' specific characteristics (culture, gender and personality) and risk perception was examined in real life project teams. This was investigated through quantitative research approach. The aim was to measure how different people in project teams react to different risk factors and to the two components of risk- probability and impact. This was done

through a questionnaire. Through those four steps, the mentioned objectives in chapter one were achieved.

All research questions were answered. This was achieved through the literature review and the questionnaire analysis. The major research questions of this dissertation, “Does risk perception varies according to different cultures and groups?,” “Does risk perception influence the process of decision-making in projects?” and “Can the findings of the literature review be generalized to project teams in the UAE?” have been answered. The results demonstrated that risk perception varies among different cultures. In addition, when presented with similar information, participants perceived risks differently which resulted in different decisions regarding risky projects. Therefore, the findings of the literature review that suggest that culture is an important factor in risk perception can be generalized to multicultural project teams in the UAE.

A questionnaire was utilized to test the hypotheses. The findings revealed that there is a significant variance in risk perception of project team members of different cultural backgrounds. Individuals from different cultures perceived different risk factors differently. In addition, they reacted differently to probability and impact of risk. It was also noted that there was a gender difference in response to some risk factors. However, no relationship was noted between personality and risk perception. Therefore, it can be said that Hypothesis (1), Hypothesis (2) and Hypothesis (4) were proven, while Hypothesis (3) was rejected.

Although there are extensive researches on the topic of risk perception, only some of them were based on empirical studies in project management context. Most of the studies were carried in other fields such as health and safety, environment and psychology. Therefore, there was an apparent need for a study that examines the topic of risk perception in project context. With the influence of globalization and the UAE’s wide cultural diversity, looking at this topic particularly from cultural perspective was important. The research aims to use the empirical evidence to find conclusions that might help organizations with multicultural team to understand the variance in risk perception and how that might influence risk decisions.

The most significant conclusion is that examining the topic of risk perception and its relationship with culture and other variables is a very complex one, which cannot be fully understood and evaluated in the context of this research because of limitations of time and scope. A more comprehensive and extensive model is required that takes into consideration the many factors that influence risk perception and also influence individual's culture, specially in a global country such as the UAE. Nevertheless, the variance noted in data analysis is still very essential.

As per Adler & Gunderson (2002, p. 101), “cultural blindness – choosing not to see cultural differences – limits our ability to benefit from diversity; that is, it precludes our ability to minimize the problems caused by cultural diversity and to maximize the potential advantages it offers.” It is certainly important to recognize that such variance among project team members of different cultures exists. Even when working with one another in the same group for the same organization, individuals tend to perceive risk factors, probability and impact differently. In the context of this study, this variance is believed to be due to cultural background. This variance is very important for project decision-making process that involves risk. As a result, the findings of this research urge for more studies that looks deeply into risk perception of multicultural project team and the process of decision-making.

As the UAE continues to be an attractive country for business and work, the concept of multicultural teams becomes more and more significant. Risk perception and its influence on project decision-making in multicultural teams in the UAE is a new area for research and investigation that needs attention.

### **8.3 Recommendations**

It is acknowledged that the results of this dissertation does not suggest a framework or thorough procedures in which multicultural teams can use to ensure satisfying decisions are taken when there is risk involved. However, the findings can provide

tactics and general roadmap to be considered by top management in project-based organizations with multicultural teams in the UAE in specific and any culturally diverse country in general. Since the topic of risk perception and multicultural teams is complex and the influence is difficult to measure, the recommendations of this study will focus on how to achieve better decision-making and minimize the unwanted influence of individual's risk perception.

The results of the study showed that there is a significant variance in how people from different cultures evaluate and perceive the risk of projects. This could have a major influence in project selection process for big organizations. In this case, a decision is made to which a project ends up to be selected among many proposals. Therefore, this thesis suggests the following for project management practitioners and organization's top management involved in complex project selection with multicultural teams:

### **1. Clear and Precise Selection Criteria:**

Top management to establish clear and precise criteria of project selection involving different risk factors. This step is very important to be done by higher management and the important stakeholders involved. It helps project managers and the multicultural team involved in the selection process to make a good decision and minimize the influence of personal risk perception. By clearly defining the criteria that include risk profile analysis, risk ratings and defining which level of risk is acceptable and what is not, decision-makers make the decisions that best suit the organization. In this step, the involved management needs to establish documents and analysis method that incorporate the different risks. This could be different from one organization to another based on the industry, sector and projects involved.

### **2. Effective Communication**

By exchanging information and knowledge through effective communication means, judgment abilities, specifically in complicated situations with uncertainty, are enhanced (Zhu 2012). Therefore, effective communication of risk information and the developed criteria is very essential and helpful. If the criteria is established but not

effectively communicated with the managers, the risk is still present. In addition, it was revealed in the literature review that communication is an important factor that influences decision-making process.

### **3. Information Sharing**

As per Ewege et al. (2012), information is an important factor in the process of decision-making where a positive relationship is well recognized. Therefore, the more information available for project managers and project team members, the better the decisions are. Decision-makers who have access to more information are more contented when facing decisions involving uncertainty (Ewege et al. 2012). The more information the top management provide for project managers and the multicultural teams, the better their understanding of the involved risks is; thus, better decisions are achieved.

### **4. Regularly Evaluating Decisions**

The exact influence of risk perception of multicultural teams on decision-making cannot be measured. Therefore, it is suggested that organization's top management regularly evaluate the decisions taken by project managers and the team responsible for project selection. By doing this, poor decisions can be detected and avoided in the future.

The figure below illustrates the steps for effective decisions involving risk for project selection.



**Figure 8. 1 Tactics for Project Selection Decision-Making**

## 8.4 Future Research

Although the findings of this research provide empirical evidence to cultural and gender variance in project teams, the findings are challenged by the research limitations discussed in chapter seven. It is risky to say that the findings can be generalized to any multicultural team in different sectors. In order to validate the results and further examine this topic, this study suggests the following for future research:

- Carrying out a similar study in project teams of specific industry where only choosing project teams working in similar project types. For instance, examining cultural variance in multicultural teams in construction or IT or healthcare projects. By doing this, the exact relationship in each sector can be determined and following that, specific recommendations can be provided.

When choosing a specific industry such as construction, the risk factors examined can reflect construction risk factors where participants understand them better. Participants will share similar knowledge, background, experience and interest. In this case, any variance noted can be traced to cultural variance. Industry specific evaluation of cultural variance will be beneficial for practitioners.

- In an area like risk perception, many factors can interact making it a complex phenomenon to study. Therefore, using multiple methods that combine quantitative and qualitative methods is highly recommended. The mixed methods consist of collecting both qualitative and quantitative data and then incorporating the two sets of data (Creswell 2014). The multi-method is highly recommended since this study involves examining variable from social and human behavior where qualitative research methods such as case studies and interviews can be extremely beneficial for the research purposes. The results obtained from a case study or interview will greatly support and explain the findings of the empirical study.
- One of the research limitations was the selection criterion for participants. Therefore, it is recommended for future research in a similar area to have well defined criteria in order to minimize the influence of any other variables. Since the literature identifies many factors influencing risk perception, having narrow criteria for selection is important. For instance, examining this within project management master students is a good option since they all have same qualification for entering the program, they share similar age, educational level, experience and interest.

## **8.5 Contribution of this Research**

The findings of this research can contribute to both academics and project management practitioners worldwide. Below the contributions/implications are mentioned

### ➤ Academic Perspective

In general, the study of multicultural team behavior in project management has many gaps. As per Jetu et al. (2011, p. 57), “Significant gaps still exist in our understanding of how cultural patterns influence project team behavior in project team settings.” They further argue that despite the development of theoretical understanding of this concept, empirical researches are not well developed yet. “Only a limited number of empirical studies exist, and these studies provide useful insight into the impact that culture has on projects (Jetu et al. 2011, p. 57).” Therefore, this thesis contributes to the study of culture and project teams by presenting an empirical evidence of the relationship between culture and risk perception of multicultural teams. This research gives strong empirical evidence to the variance in risk perception in multicultural teams. These findings are new in project management context. It opens the door for more future research in the area of risk perception in multicultural teams and culturally diverse organizations.

### ➤ Practitioners Perspective

The findings of this study proves for project management practitioners in general and project managers in specific that cultural variance in project team’s risk perception exist and influences project decision-making. Recognizing and understanding such variance is essential in complex projects since many important decisions are influenced by individual’s risk perception. The study urge practitioners for more focus and attention to be given for multicultural teams involved in decision-making within the organization.

## 8.6 Summary

The study was able to achieve the aim and objectives mentioned in chapter one. It was also able to answer the research questions and the proposed hypotheses were all tested through quantitative research approach. The study concludes that examining the topic of risk perception in multicultural teams is complex, but the noted variance among different cultures is essential. Based on the findings, the study bases its recommendations on the decision-making process in multicultural organizations.

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## Appendix

### Questionnaire

Dear Sir, Madam,

This questionnaire will be used to collect the primary data needed for a research study related to project risk perception. Therefore, we seek your assistance to be as open, fair and honest as possible in your responses. Please note that there is no right or wrong answer.

The researcher assures you that no individuals will be identified from their responses and there is no request for confidential information included in the questionnaire. The results of the analysis will be strictly used by the researcher for study purpose only.

Total time required to complete the questionnaire is 20-25 minutes

The questionnaire comprises three parts:

1. General Information
2. Personality
3. Risk Perception

Thank you

### Part One: General Information

Question	Tick appropriate choice
Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male
Age group	<input type="checkbox"/> less than 25 <input type="checkbox"/> 25-35 <input type="checkbox"/> 36-45 <input type="checkbox"/> over 45
Marital Status	<input type="checkbox"/> Single <input type="checkbox"/> Married
Educational level	<input type="checkbox"/> High school <input type="checkbox"/> Diploma <input type="checkbox"/> Bachelor <input type="checkbox"/> Masters <input type="checkbox"/> Doctorate
Organizational level	<input type="checkbox"/> Executive <input type="checkbox"/> Middle management <input type="checkbox"/> Top management
Organization sector	<input type="checkbox"/> Government <input type="checkbox"/> private <input type="checkbox"/> semi-government
I am	<input type="checkbox"/> UAE national <input type="checkbox"/> Non-UAE national/ Nationality:-----
I was born in ....(country)	<input type="checkbox"/>
If you are not UAE national, how many years have you lived in the UAE?	<input type="checkbox"/> less than 1 year <input type="checkbox"/> 1-2 years <input type="checkbox"/> 2-5 years years <input type="checkbox"/> 5-10 years <input type="checkbox"/> over 10 years
I have worked in other countries other than the one I was born	<input type="checkbox"/> Yes ..... <input type="checkbox"/> No
I speak other languages other than my native language?	<input type="checkbox"/> Yes ..... <input type="checkbox"/> No
I socialize with other cultures other than my native culture?	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Part Two: Personality

Here are a number of characteristics that may or may not apply to you. Please tick one box for each statement to indicate the extent to which you agree or disagree.

	<b>Statement</b>	<b>Disagree Strongly 1</b>	<b>Disagree a little 2</b>	<b>Neither 3</b>	<b>Agree a little 4</b>	<b>Agree strongly 5</b>
1	I see myself as someone who is talkative					
2	I see myself as someone who does a thorough job					
3	I see myself as someone who Is depressed, blue					
4	I see myself as someone who is original, comes up with new ideas					
5	I see myself as someone who Is helpful and unselfish with others					
6	I see myself as someone who Is curious about many different things					
7	I see myself as someone who is full of energy					
8	I see myself as someone who Is a reliable worker					
9	I see myself as someone who Can be tense					
10	I see myself as someone who Is ingenious, a deep thinker					
11	I see myself as someone who Generates a lot of enthusiasm					
12	I see myself as someone who Has a forgiving nature					
13	I see myself as someone who Worries a lot					
14	I see myself as someone who Has an active imagination					
15	I see myself as someone who Is generally trusting					
16	I see myself as someone who Is inventive					

	<b>Statement</b>	<b>Disagree Strongly 1</b>	<b>Disagree a little 2</b>	<b>Neither 3</b>	<b>Agree a little 4</b>	<b>Agree strongly 5</b>
17	I see myself as someone who Has an assertive personality					
18	I see myself as someone who Perseveres until the task is finished					
19	I see myself as someone who Can be moody					
20	I see myself as someone who Values artistic, aesthetic experiences					
21	I see myself as someone who Is considerate and kind to almost everyone					
22	I see myself as someone who Does things efficiently					
23	I see myself as someone who Is outgoing, sociable					
24	I see myself as someone who Makes plans and follows through with them					
25	I see myself as someone who Gets nervous easily					
26	I see myself as someone who Likes to reflect, play with ideas					
27	I see myself as someone who Likes to cooperate with others					
28	I see myself as someone who Is sophisticated in art, music, or literature					

### **Part Three: Project Risk Perception**

There is a requirement for a new electricity generation facility in a region that is expected to experience population and economic growth in the next twenty years. Different industrial groups submitted several proposals, featuring different technologies and technical solutions. For each proposal, a risk profile was developed by experts.

**Below, every two proposals are grouped for comparison. For each question, please indicate how do you agree with each statement.**

#### **Question 1:**

Risk factor	Proposal A	Proposal B
Market Risk	<b>20%</b> Chance that market demand will be <b>20%</b> below the break-even level	<b>5%</b> Chance that market demand will be <b>5%</b> below the break-even level
Environmental risk	<b>5%</b> Chance that new environmental protection standards will be applied in a <b>5 to 10</b> years. The project would not meet them	<b>20%</b> Chance that, once in operation, the proposed project <b>will not</b> meet the current environmental protection standards

**I feel that proposal A is riskier than proposal B**

Strongly agree	Agree	Neither	Disagree	Strongly disagree

#### **Question 2:**

Risk factor	Proposal A	Proposal B
Technical Risk	<b>5%</b> Chance that the proposed technology will be <b>5%</b> less cost-effective than projected	<b>20%</b> Chance that the proposed technology will be <b>20%</b> less cost-effective than projected
Environmental Risk	<b>20%</b> Chance that, once in operation, the proposed project <b>will not</b> meet the current environmental protection standards	<b>5%</b> Chance that new environmental protection standards will be applied in a <b>5 to 10</b> year time frame. The project would not meet them

**I feel that proposal A is riskier than proposal B**

Strongly agree	Agree	Neither	Disagree	Strongly disagree

**Question 3:**

Risk factor	Proposal A	Proposal B
Technical Risk	<b>20%</b> Chance that the proposed technology will be <b>20%</b> less cost-effective than projected	<b>5%</b> Chance that the proposed technology will be <b>5%</b> less cost-effective than projected
Market risk	<b>5%</b> Chance that market demand will be <b>5%</b> below the break-even level	<b>20%</b> Chance that market demand will be <b>20%</b> below the break-even level

**I feel that proposal A is riskier than proposal B**

Strongly agree	Agree	Neither	Disagree	Strongly disagree

**Question 4:**

Risk factor	Proposal A	Proposal B
Technical Risk	<b>20%</b> Chance that the proposed technology will be <b>5%</b> less cost-effective than projected	<b>5%</b> Chance that the proposed technology will be <b>20%</b> less cost effective than projected
Environmental risk	<b>20%</b> Chance that new environmental protection standards will be applied in a <b>5–10</b> year time frame. The project would not meet them	<b>5%</b> Chance that, once in operation, the proposed project <b>will not</b> meet the current environmental protection standards

**I feel that proposal A is riskier than proposal B**

Strongly agree	Agree	Neither	Disagree	Strongly disagree

**Question 5:**

Risk factor	Proposal A	Proposal B
Technical Risk	<b>20%</b> Chance that the proposed technology will be <b>5%</b> less cost-effective than projected	<b>5%</b> Chance that the proposed technology will be <b>20%</b> less cost-effective than projected
Market risk	<b>20%</b> Chance that market demand will be <b>5%</b> below the break-even level	<b>5%</b> Chance that the market demand will be <b>20%</b> below the break-even level

**I feel that proposal A is riskier than proposal B**

Strongly agree	Agree	Neither	Disagree	Strongly disagree

**Question 6:**

Risk factor	Proposal A	Proposal B
Market Risk	<b>20%</b> Chance that market demand will be <b>5%</b> below the break-even level	<b>5%</b> Chance that the market demand will be <b>20%</b> below the break-even level
Environmental risk	<b>20%</b> Chance that new environmental protection standards will be applied in a <b>5–10</b> year time frame. The project would not meet them.	<b>5%</b> Chance that, once in operation, the proposed project <b>will not</b> meet the current environmental protection standards

I feel that proposal A is riskier than proposal B

Strongly agree	Agree	Neither	Disagree	Strongly disagree