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HUMAN FACTORS AND CULTURAL INFLUENCES IN IMPLEMENTING AGILE PHILOSOPHY AND AGILITY IN GLOBAL SOFTWARE DEVELOPMENT

Anuradha Sutharshan
BSc Computer Science, MSc Computer Science, MSc Software Engineering

This thesis is presented in fulfilment of the requirements for the degree of Doctor of Philosophy

Faculty of Computing, Health and Sciences
School of Computer and Security Services
Edith Cowan University

July 2013

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

As software becomes increasingly important to all aspects of industry, developers should be encouraged to adopt best practice and hence improve the quality of the processes used, and achieve targets relating to time, budget and quality. In the software industry, several software methodologies have been used to address software development problems; however some of these processes may be too bureaucratic. The Agile Alliance formed in 2001, sought to address this problem; accordingly, they developed a manifesto and twelve principles, to which all agile software methods adhere. The purpose of the manifesto and its principles is to uncover better ways of developing software.

Agile software development methods seem to address the software development industry's need for more agile processes that are responsive to changes during software development. Agile values and principles require a major cultural change for software managers, e.g. collective team responsibility and self-organisation, especially in large organisations with a strong culture of planning and centralised power. In large global organisations, this issue is likely to be exacerbated by cultural diversity. The objective of this thesis is to analyse the possibility, of using agile methods or practices in different cultures, and study what changes are required, to adapt agile approaches to different global application development issues. The study found that certain agile practices can be useful in different cultures and some practices required major cultural adaptation. A study of suitable practices for different cultures such as Australia, India and the United Kingdom and the associated suggested changes required are the main areas of study.

Human factors have been identified by researchers and practitioners to impact on software development projects. Similarly, cultural differences may also be influential in a global market. The principles of agile software development focus on iterative adaptation and improvement of the activities of individual software development teams to increase effectiveness. This research programme focused specifically on national culture based on Hofstede's cultural dimensions, Hall's cultural dimensions and the relationships between different aspects of national culture and the implementation of agile methods. To investigate this aspect of software development, a set of cultural

dimensions and consolidated cultural agile attributes were developed, that are considered necessary for implementing agile methods. Based on relevancy, cultural dimensions such as Individualism/Collectivism, Power distance index, Uncertainty avoidance index, Time and Context were selected and studied. Some of cultural agile attributes studied include Transparency, Dedicated team, Decision making, Tolerance for change, Time keeping and Authoritative. This set was identified from a literature review on culture for agile methods, a detailed analysis of relevant commonly used agile methods and from feedback from agile experts. This thesis involves qualitative interviews conducted in Australia, India, and the UK using an interpretive paradigm and aims to identify cultural dimensions to implement agile methods in the software engineering community.

The results of this research programme provide an analytical comparative framework for implementing agile methods in different cultures, and insight into how cultural differences may affect a software project and how these challenges can be addressed through agile principles.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education.

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

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ACKNOWLEDGEMENTS

This research journey has been challenging, rewarding and enjoyable. Though only my name appears on the cover of this thesis, many have helped me in different ways and I would like to acknowledge all who assisted me to complete this PhD thesis.

I offer my sincere and heartfelt thanks to both my supervisors Dr. Mike Johnstone and Dr. Trish Williams. I appreciate their timely advice and interest in my work, and was always available to discuss with me. They both challenged me to achieve my full potential. They always provided words of encouragement during times when I was down. They both not just guided my thoughts through the academic process of developing this thesis, but also took care of me as a person on this journey. My deep appreciation and special thanks goes to both Mike and Trish.

I would also like to thank my previous supervisors Dr Paul Maj and Dr Donald McDermid without who I will not be able to come to this extend. I benefited greatly from their advice and support through my studies. Their guidance and encouragement created a momentous learning experience for me. I would also like to say a special 'thank you' to Donald, for providing all the support and for reviewing my chapters even after he had left the university.

My personal thanks also go to all the anonymous reviewers of my published papers for their valuable comments. I would further like to express my sincere thanks to Murrie Jupp for proof reading my thesis, and for providing valuable suggestions. I would also like to thank my workplace both Department of Transport and Landgate for giving me the support and opportunity to study.

This study would not have been possible without the participants who gave their time, cooperation and input to discuss research questions. I appreciate their willingness and openness to provide their experience and insights. Without these valuable inputs I would not have been able to complete my thesis.

During this process, I went through many life events and throughout the ups and downs, my parents Shivanes and Raja, husband Sudha and daughters Suhasini and Gurupriya have been giving strength and encouragement. I am highly indebted to my family for being there whenever I needed and was always supportive of my career. My family members have sacrificed many of their personal wishes and I would like to take this opportunity to tell them ‘I love you’. My sincere thanks to my mentor and my guiding light late Swami Shantanand Saraswathi who has guided every step of my life and is still guiding through.

Finally, I would like to thank all my family and friends who throughout my academic experience have provided me with support and encouragement.

Thank you to all

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CHAPTER 1
INTRODUCTION

1.1 Purpose of the Chapter

Chapter one provides the background of the thesis and its purpose. This includes the motivation of the researcher to investigate the major areas of concerns that impact software project failure. Based on the significance of this area of investigation, the research problems are defined. The research questions are discussed leading from the research problem. The structure of the thesis is then outlined and the key terms used are defined, so that the reader can understand the context in which they are used in the thesis.

1.2 Research Interest and Motivation

The researcher's experience in the software industry has provided many examples, where software projects have had difficulties in successfully being implemented. Several factors can contribute to the failure of software projects. Reflection on reasons for such failures led the researcher to consider this a suitable area for investigation. Firstly, the researcher believed that understanding and managing human factors within a culture would help IT professionals and businesses to improve software development projects. Indeed, after working in India for many years, the researcher migrated to Australia and it was interesting to see that human factors were influencing project success in not just in India, but in Australia as well, albeit with different factors. The researcher experienced several significant cultural differences that she believed could lead to project failure. For example, managing time and delay in making quick decisions due to hierarchy were some criteria that affect software projects in India. In turn, a relaxed mentality and avoiding responsibilities were seen as concerns in Australian culture. Thus the researcher found some interesting relationships between the way people work in different cultures and project success or failure. Second, the methodology used for projects needs to reflect current IT and business needs. It was obvious that the change in business processes leading to complex situations, needed to be aligned with a better fit of methodology. After working in the software industry for many years, understanding agile methods and exploring ways to implement agile

methods in different cultures became a focus of interest. Agile method researchers strongly agree and accept that societal culture (defined in section 1.7) has an influence on the way agile methods are used and implemented (Cho, 2009; Ingalls & Frever, 2009; Strode, Huff, & Tretiakov, 2009). On account of personal interest and due to the popularity of agile methods, a study to analyse concepts and links to culture was considered an important area for the research focus.

These reflections led the researcher to start thinking along the lines of human factors and agile methodology, as two major areas of study for this thesis and thus a simple list of key interest areas were identified to understand the background of this research programme.

- Software project failure has been constantly experienced for many years. The history of failure of software development projects in the past is well documented (Abe, Sakamura, & Aiso, 1979; Ellis & Losch, 1999; Imamoglu & Gozlu, 2008; Morien, 2005; Standish Group, 2004).
- The problem domain for a project failure has changed considerably in the past few years. During the 1980s, the major factors for software project failure were related to execution and operational problems. During the 1990s, the problem domain had significantly widened to include human factors such as: the lack of top management involvement; failure to gain user commitment; misunderstanding the requirements; lack of adequate user involvement; failure to manage end user expectations; insufficient/inappropriate staffing; and, conflict between user departments (Keil, Cule, Lyytinen, & Schmidt, 1998).
- A global market and multicultural society has increased software project complexity. Software project implementation, based on organisations across nations, using resources across national borders, has become common place allowing organisations to select qualified resource pools from different geographical locations. This is seen as an added layer of complexity in addition to the human factors. Current market trends and global business environments create more challenges in dealing with the differing cultures (Lee et al., 2006).
- Business and IT needs have become complex. Organisations are expected to cope with fast changing requirements and in some cases the requirements

become obsolete before the project is completed. Time to market, stakeholder expectations and, competitive threats have severely challenged the development of the systems based on pre-specified requirements. Agility has become important and the need to study agile methods has become critical, based on the fact that agile software development methods provide successful ways of adapting and implementing the software development process rapidly and effectively (Salo, 2005). Many organisations have considered adopting agile methods to take advantage of the numerous benefits that they offer to an organisation (Sidky & Arthur, 2007).

- A need for studies of cultural alignment with agile method implementation has become critical to the software engineering community, to assist with software project success.

The researcher's flow of thought regarding these trains of thoughts is shown in figure 1-1.

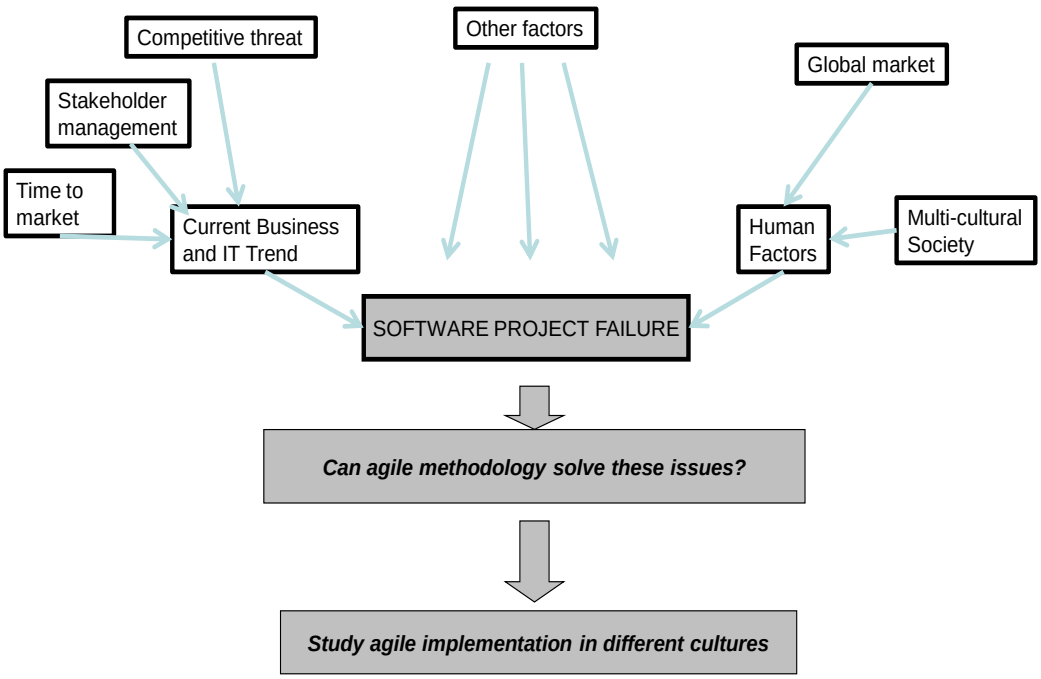


Figure 1-1: Mind map of research interest.

1.3 Contributions to Theory and Practice

The findings of this research aim contribute in the areas of agile adoption and societal cultural research. In addition, this research contributes to and extends theoretical knowledge and its impact on the agile adoption process. This study is the first to research agile method implementation in different cultures. This study makes further contributions by providing a detailed analysis of software systems development and societal culture within Australia, India and the UK.

Table 1-1: Previous research in similar fields.

Previous Methodology related studies [but not cross-cultural]	**Previous Cross-cultural related studies [but not methodology]**
Use of methodologies and CASE tools in Norway (Krogstie, 1995). Key Issues in Information Systems Management Surveys: Methodological Issues and Choices in a Norwegian Context(Gottschalk, Christensen, & Watson, 1997). A Comparison of Five Alternative Approaches to Information Systems development(Hirschheim, Iivari, & Klein, 1997). The use, limitations and customisation of structured systems development methods in the United Kingdom (Hardy, Thompson, & Edwards, 1995).	Culture and International Usability Testing: The effects of Culture in Interviews(Vatrapu & Perez-Quinones, 2006). The Effects of Culture on Performance Achieved through the use of Human Computer Interaction (Ford & Gelberblom, 2003). Exploring the Relationships between Individualism and Collectivism and Attitudes towards Counselling among Ethnic Chinese, Australian and American University students(Snider, 2003). The Reflexivity between ICTs and Business Culture: Applying Hofstede's theory to compare Norway and the united States(Sornes, Stephens, Saetre, & Browning, 2004).
Previous Methodology and Cross-culture related studies 1. A Review of Culture in Information Systems- (Leidner & Kayworth, 2006)*who studied and analysed studies of culture in information systems research at national and organisational levels.* 2. The relationship between Organisational Culture and the Deployment of Systems Development Methodologies - (Livari & Huisman, 2007). *They omitted agile methodology in their study and identified that this was an area of future interest (Strode, et al., 2009).*	

Table 1-1 lists previous research in similar fields. This study is a combination of culture and methodology and specifically, agile methodology and benefits both for the software engineering community and consultants, who are working in a global software environment with multicultural influences.

1.4 Significance of the Study

The critical nature of software project failure and success has been studied and discussed for many years. Despite many improvements in software engineering, project failure has been a critical challenge for the software development community. There have been concerns for successful implementation of software projects (Rivard, Raymond, Bergeron, & Aubin, 1998, p. 144). Complexity of software systems has increased due to the nature of the business environment. Information technology has become more fragmented and managing projects has become overly difficult because business environments and expectations are changing.

Though many successful projects have been seen, there are many issues that software engineers are still struggling with, to ensure success in software project implementation. For a software project to be successful, it has been demonstrated that the focus should be placed on the processes, technology and people in order to achieve better performances, and the people-focus is by far the component that gets the least attention (Leonard, 2002). The need for the participation and involvement of users and business in IT development was recognised even in the 1970s (Lucas, 1971). The importance of people skills became important based on the high user involvement in software development projects (Cheney, 1988).

This research focused on the implementation of agile software development methodologies and the study of different cultures, as they relate to software development in Australia, India and the United Kingdom. This was undertaken to understand different aspects of software development methods and implementation. Thus, this research studies the impact and influence of people and methods on software project success. These research findings will benefit software engineering professionals working on software projects and academics in the field of software development methodologies.

1.5 Research Problem Leading to Research Questions

This section covers the main problem domain discussed in this thesis, leading to the research goal, then breaking it into definitive objectives and then presenting the research questions.

1.5.1 Research Problem

The literature points to numerous research and case studies that indicate a high rate of failure among many software projects (Abe, et al., 1979; Ellis & Losch, 1999; Imamoglu & Gozlu, 2008; Morien, 2005).Software project failures have affected industry heavily due to the critical nature of IT in organizations over recent years. Delivering successful projects has not been easy with recent trends and advancements in business. The software industry has reached a stage where another change to the way business is done has become critical, because of the emphasis on agility and time-to-market, so many software development organisations are moving to agile methods. Organisations increasingly recognise the need for agility in almost every project they execute and the need for iterative development, frequent consultation with customers, and, small and frequent releases have become critical to project success (Cao, Mohan, Xu, & Ramesh, 2009).The literature strongly indicates that there is a relationship between culture and the successful adoption of a software development method (Iivari & Huisman, 2007; Sidky & Arthur, 2007; Strode, 2005).Studies have shown that software project failures are rarely faults in technology; rather human factors have increasingly been seen as major causes for failure (Imamoglu & Gozlu, 2008). Therefore, with regards to software project failure, it is not just the human factors that need attention, but also the approach taken to developing software.

The research problem is to identify what specific cultural change is required, to implement agile methods in that specific culture, to help achieve software project success. This outcome will also help in the global market to work among different cultures, with better understanding of cultural work habits. Within the context of software development and successful delivery, the specific problem focus of this thesis is on providing a solution for implementing agile methods in different cultures, to bring about software project success and in the process enhance knowledge of different cultures as it relates to software development processes.

1.5.2 Research Goal

The goal of this thesis is to determine the extent to which agile methodology can be adopted in different cultures such as Australia, India and UK and the changes required in values and principles to successfully implement agile in these cultures. The goal is to understand different cultures and the current issues in software development practices in use, and to evaluate the effectiveness and changes required to implement agile methodology. The need to work among cultures to develop software is seen as a common model in practice in many organisations and this thesis provides some guidance to intercultural study.

Although significant research has been conducted in the areas of software project success and software development methodology in the past, little attention has been paid to agile methodology in relation to managing cultural factors, to fundamentally alter the attributes of IT projects and therefore influence the success factors.

The goal is broken down into discrete objectives.

1.5.3 Research Objectives

The following are the objectives of this research:

Objective 1: To understand, compare and contrast different agile techniques in commonly used agile methods [Literature Study].

- For the purpose of this research programme, commonly used agile methods such as Extreme Programming, Scrum, DSDM, FDD, Crystal and Lean were considered and studied.
- Based on studying the practices and processes of each agile method, a list of agile techniques was created and compared among the different agile methods.
- The list of agile techniques was condensed based on those techniques that were culture related.

Objective 2: To identify the culturally related agile factors that can be used to describe, analyse and understand culture, which in turn could help to implement agile methods successfully [Literature Study and Analysis].

- Hofstede's and Hall's cultural dimensions along with other scholars were studied and relevant cultural dimensions were chosen, that had direct relationship with agile implementation.
- As these cultural dimensions were at a high level, they had to be broken down into cultural agile attributes (as defined at end of the chapter). These culture related agile attributes were collated based on agile techniques (Objective 1), agile principles (as defined by the Agile Manifesto) and chosen cultural dimensions (based on Literature Study).
- This culture related agile attributes were used as a foundation to study different cultures. The data collection was based on questions defined on the culture related agile attributes.

Objective 3: To synthesise a theoretical framework for implementing agile approaches in different cultures [Data Collection].

- Data were collected from the software engineering community in Australia, India and the United Kingdom to study and understand different cultures in relation to implementing agile methods.
- The reason why Australia, India and the UK were chosen is that they represent considerable cultural diversity.
- Study data was used to create a theoretical framework to reflect cultural changes required in different cultures to implement agile methods in relation to cultural agile attributes (as identified in Objective 2).

Objective 4: To provide an understanding of cross-cultural challenges seen when implementing agile methods in different cultures [Analysis].

- Based on the framework, an analysis was conducted to provide an understanding of cross-cultural studies in a global market.

Figure 1-2 represents these objectives as a high level flowchart of this research.

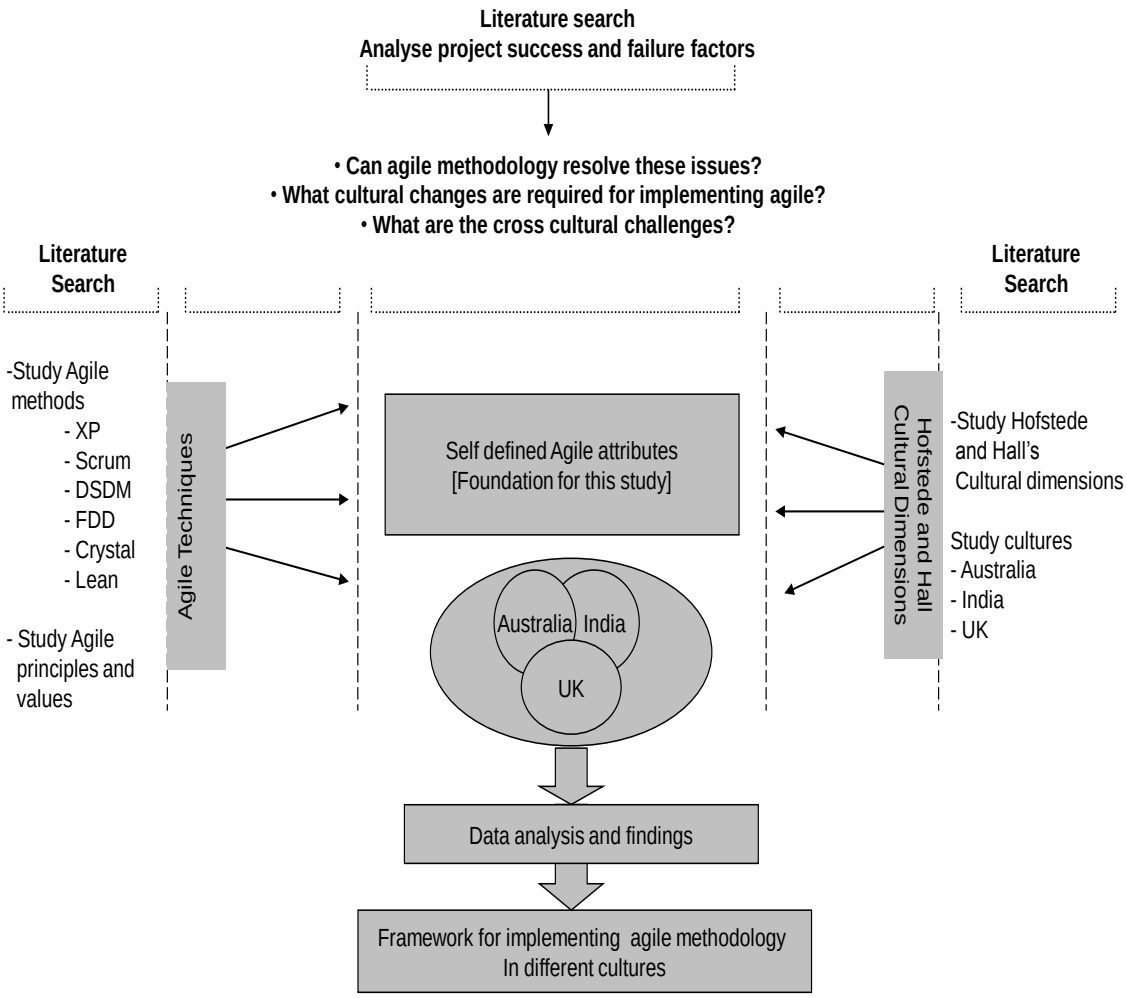


Figure 1-2: Background to the research.

1.5.4 Research Questions

Based on the objectives, the research questions were formulated to address each of the research goals. This thesis aims to answer the following research questions:

> Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?

The Foundation Research Question is to identify the factors that can culturally influence agile method implementation. Commonly used agile methods are studied and specific agile techniques listed. From these techniques, culture related techniques are considered as a foundation for this research.

Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?

Culturally oriented agile techniques are studied in relation to implementing agile methods. First, the cultural challenges are studied and intercultural issues are analysed. Cultures studied in this research programme are Australia, India and the United Kingdom.

Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

Based on the intercultural challenges studied (in Research Question 1), changes needed in relation to agile methods implementation in specific cultures are identified and analysed.

A figurative representation of the research questions are shown in figure 1-3.

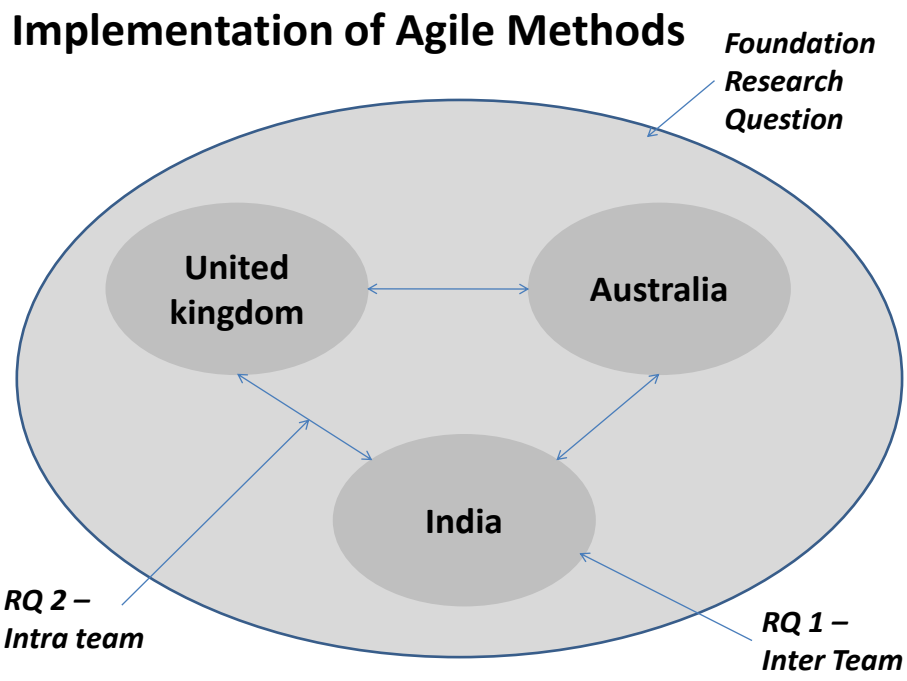


Figure 1-3: Figure reflecting research questions.

In order to address the above, the researcher developed a research design, based on the cultural and agile methodologies literature. Previous studies by culture

researchers such as Kluckhohn & Strodtbeck, Hofstede, Hall and Trompenaars & Hampden-Turner were studied to identify a list of cultural dimensions suitable for this research (Hall, 1976; Hofstede, 1980a; Kluckhohn & Strodtbeck, 1961; Trompenaars & Hampden-Turner, 1997). Further commonly used agile methods were studied in detail to understand the nature of agile methodologies. From this study a list of agile techniques were identified. Based on the twofold study between culture and methodology, an outcome was achieved that helped answer the above research questions.

1.6 Thesis Structure

The thesis contents are summarised in this section. This thesis comprises eight chapters, each of which is described in the following sub-sections. The sequence of the chapters and the structure of the content of each chapter reflect the process undertaken during the course of this research programme. A description of the supporting appendices is also given.

1.6.1 Chapter One: Introduction

Chapter One introduced the thesis and its purpose. The introduction reflected the need and importance of this thesis including the research background and the research problem. The significance of the study was highlighted with references to the research problem. The interest of the researcher to study this topic was also highlighted and the reasons discussed. The chapter also included discussion on key issues, such as need for a solution for project failure and the importance of cultural study and software development methodology. In summary this chapter identified the research problem, reasoning behind the research, the contribution of the research and the structure of the thesis.

1.6.2 Chapter Two: Literature Review – Agile Philosophy

Studies of agile development methods are covered in this chapter. The trends and use of methods were studied in depth. The common terminology is defined, followed by a discussion on the history of agile methodologies. The origin and principles of agile methods, as well as the Agile Manifesto are discussed.

Characteristics and drawbacks were examined to understand the real values of agile methods. Further to that, six common agile methodologies were studied in detail. These six methods were chosen based on an understanding of commonly used methods. A comparative study of different agile methods and the techniques used in each method were analysed and tabulated. Agile techniques were collated by the researcher and were used for the purpose of data collection for this study to analyse different cultures. These agile techniques are the fundamental foundation for this research.

1.6.3 Chapter Three: Literature Review – National Culture

Literature of societal culture was investigated and Hofstede's and Hall's cultural dimensions together with other significant research in the field were reviewed. The chapter begins with an introduction to culture and the previous studies on culture. Different culture definitions defined by researchers were then discussed. Subsequently, five cultural dimensions were selected from the studies of Hofstede, Hall and other authors in relation to agile methods implementation. These five dimensions were then mapped to the agile techniques defined in Chapter Two. As the cultural dimensions were at a high level, a list of cultural agile attributes was formulated. Cultural agile attributes were then utilised in planning the interview questions. This chapter concludes with highlighting the importance and concerns of cultural challenges in a global market and in implementing agile methods.

1.6.4 Chapter Four: Research Methodology

This chapter discusses the methodological framework for the qualitative study. It presents a discussion of the research process undertaken to conduct this study. The rationale behind the choice of the method and data gathering techniques are discussed in detail. First, the study domain, research problem and goal, research questions and outcomes are discussed. Based on this discussion, an appropriate research method and data gathering techniques selected are presented. This is followed by a description of the data collection and data analysis process suggested for the research. This research is studied based on a qualitative study within an interpretivist paradigm with case study as the data collection method. Finally, the boundaries and limitations of the research and the methodology used are presented.

1.6.5 Chapter Five: Research Design

This chapter builds on the justification of the method selected in Chapter Four. Chapter Four answers 'why' and 'what', whilst this chapter answers 'how'. It describes the processes conducted to collect and analyse data. This chapter describes the different stages involved in this study and then explains in detail how it was conducted.

1.6.6 Chapter Six: Data Collection

Chapter Six discusses the foundation for the data collection and details of data collected in the different cultures Australia, India and the United Kingdom. Data collected are presented in relation to cultural dimensions and different cultures.

1.6.7 Chapter Seven: Data Analysis and Discussion

This chapter analyses the data based on the research goal and the research questions. The results are studied, reviewed and explained. The results gathered were critically analysed and compared to provide meaningful information to the study. The list of cultural agile attributes and coding were tabulated and a detailed analysis was done to identify cultural differences. Both quantitative and qualitative analyses were conducted on the interview data collected. Then a further analysis was also done based on data collected from observation.

1.6.7 Chapter Eight: Research Summary and Conclusion

This chapter provides an overview of the findings of the study. The outcome of this research was explained clearly in this chapter. The thesis concludes with a review of the research problem, research goal and research outcomes and questions in the context of the findings and outcomes.

1.6.8 Appendix A: List of Abbreviations and Glossary of Terminology Used in the Thesis

This study involved some instances where the terms used had more than one definition or meaning as there were some which created a great deal of debate. As this is a reasonably new area of study, it is common to have confusion in terminologies.

Therefore, a glossary was defined to avoid confusion. A list of abbreviations is also provided here.

1.6.9 Appendix B: Data Collection- Transcribed and Edited Notes

Data collected through interviews were listed in a tabular format for ease of readability. As there were many interviews conducted, the data were organised in an order reflecting different cultures and cultural factors separately. These data are listed based on cultural agile attributes and coding that were defined in Chapter Five.

1.6.10 Appendix C: Cultural Agile Attributes and Coding - Foundation for Interview Questions

This section listed a tabular presentation of the cultural agile attributes and coding related to this study. A cross-sectional relationship between self-defined agile attributes and Hofstede and Hall's cultural dimensions were used to get the initial list of questions for data collection.

1.6.11 Appendix D: Interview Questions

The interview questions were listed here categorised by cultural dimensions.

1.6.12 Appendix E: Past Papers Published

This appendix listed all the relevant past papers published by the researcher.

1.6.13 Appendix F: Cultural Agile Attributes – Brief Description

Agile attributes were compiled by the researcher for this study. Based on agile principles and agile values defined by the Agile Manifesto and further literature search, a list of agile attributes was defined to help study culture in the context of agile methods.

1.6.14 Appendix G: Agile Methods Overview

Extreme Programming was discussed and explained as part of the main thesis content and other agile methods such as Scrum, DSDM, FDD, Crystal and Lean development are explained in this appendix.

1.6.15 Appendix H: Hofstede's Cultural Dimensions - Overview

This appendix shows literature details of Hofstede's cultural dimensions.

1.6.14 Thesis Structure

Figure 1-4 shows the logical flow of information from chapter to chapter.

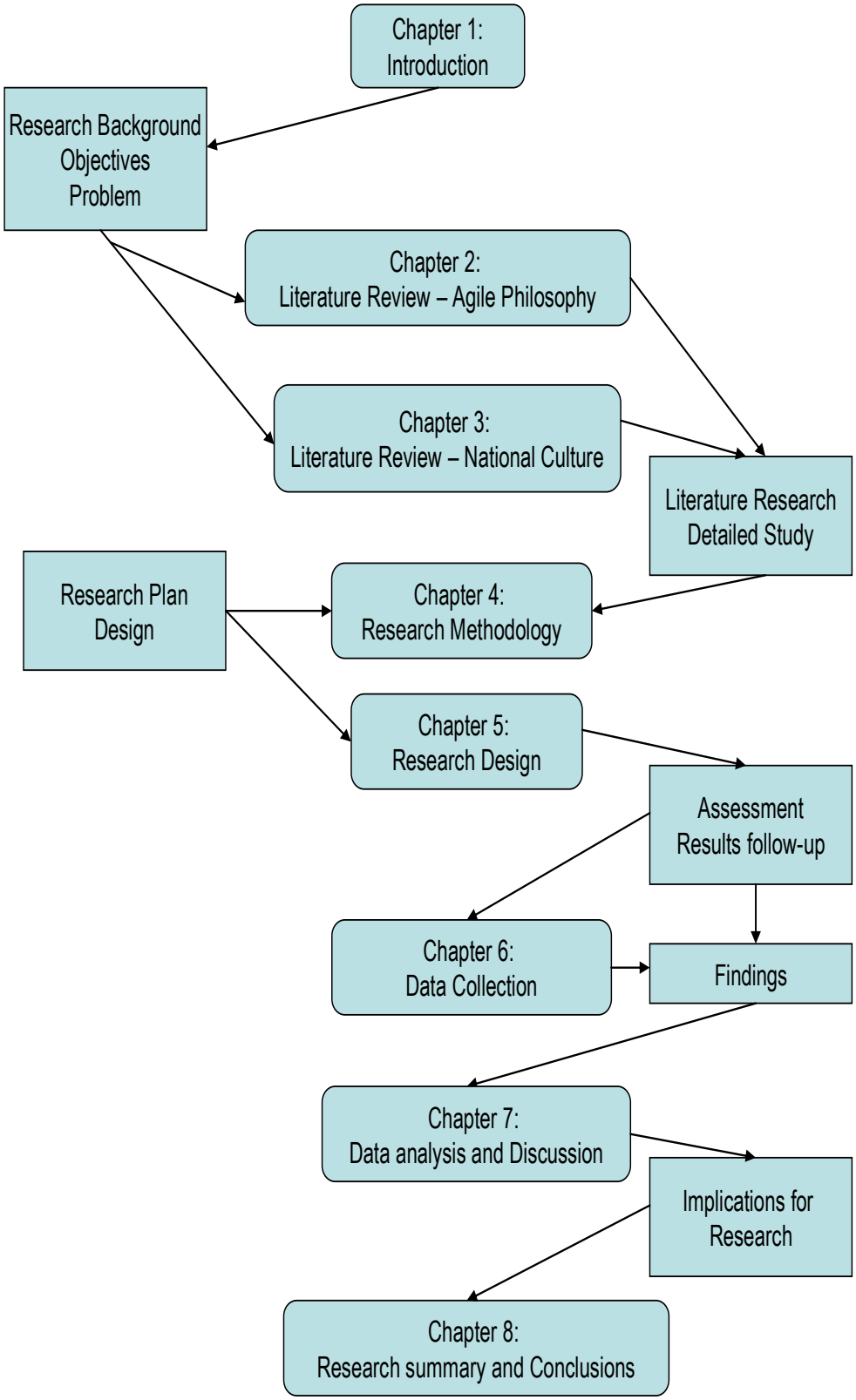


Figure 1-4: Thesis chapter outline – flow of information.

1.7 Terms Defined by Researcher

For the purpose of this research programme, the researcher has defined some terms which are critical to the understanding of this research programme.

- ‘Societal culture’ is used to denote culture in a specific society or community. In this research programme, societal culture reflects the culture of the software engineering community. The terms ‘culture’ and ‘societal culture’ are used interchangeably in this thesis to denote the same meaning.
- ‘Methodology’ is the general term used for a framework or approach and ‘methods’ are specific methods of an approach. For example, agile methodology denotes an approach and Extreme Programming, Lean and Crystal are methods within that approach.
- A linear and sequential approach to software development methodology is also named as ‘heavy weight’, ‘plan driven’ and ‘waterfall’ methodology in the literature and in this research, the term ‘traditional methodology’ is used throughout the study chapters to cover those terms.
- For the purpose of this study, some culture related agile attributes were defined based on study of literature, agile principles, cultural dimensions and agile techniques (explained in Chapters Two and Three). These attributes are denoted as ‘cultural agile attributes’ throughout the thesis. This term is further defined and explained in Chapter Three. This list was used as the basis for interview questions.

CHAPTER 2
LITERATURE REVIEW - AGILE PHILOSOPHY

2.1 Introduction

This chapter provides a background of the trends and use of software development methodology, and an insight into agile methods. The first section discusses the need for improved methodologies due to the current software failure rate, current business needs and the impracticality of existing software methodologies. Then, based on the software project failure factors, the suitability of using agile methods in relation to agile principles is discussed. Next, characteristics of agile methods are analysed. Several commonly used agile methods were studied and agile techniques used in each agile method are tabulated. The next section deals with agile techniques and the connection between agile methods and culture and the importance of research questions in context. Lastly, limitations of agile methods and how this research will help overcome some limitations are discussed.

2.2 Do Current Software Development Methods Work?

This section starts with statistics in relation to software project failure, which show that software project failure still exists. Literature studies show that in today's business, business processes are more complex, interconnected, interdependent and interrelated than ever before (Hass, 2007) and business related software projects could be efficiently managed with better process and techniques. Many organizations are changing from the traditional way of business management to cope with today's business and technological environment (Schwartz, Hwang, & Hwang, 1995). There is challenging business demands and some software development methodologies are unable to cope with current business needs (Cooper, 2000; Fitzgerald, 1997; Gottschalk, et al., 1997). Today's competitive world of fluctuating demands on organisations has created the need for incremental delivery and cultural changes to cater for business success (Siakas & Siakas, 2007).

2.2.1 Software Project Failure

A survey conducted over 8000 software projects in 350 US software development companies revealed that one third of the projects never saw completion and one half of the projects succeeded only partially, with major cost issues and major delays(Van Lamsweerde, 2000).Gartner research conducted with 845 IT and business professionals in the US, UK, France and Germany indicated 42.5% projects did not deliver all functionalities and expectations, 44% projects were delivered but with cost overrun, and 42% projects were not delivered on time (Tan, 2011). These claims for software project failure have been seen for many years(Standish Group, 2004). Table 2-1 presents the statistics of project benchmarks over the period from 1994 to 2009. This study highlights a serious problem that needs immediate attention and investigation.

Table 2-1: Project Success and Failure (Eveleens & Verhoef, 2010).

Standish project benchmarks over the years

Year	Successful (%)	Challenged (%)	Failed (%)
1994	16	53	31
1996	27	33	40
1998	26	46	28
2000	28	49	23
2004	29	53	18
2006	35	46	19
2009	32	44	24

Though some increase can be seen in project success from 1994 to 2009 (16% to 32%), the issue of software project failure is widespread and has raised concerns for the whole of the software community (Standish Group, 2004). From data compiled by the Standish group and other authors, it is clear that past software development project performance indicates the importance of research in this area. Though researchers and practitioners have spent many years identifying ways for better software project implementation, organisations still find it difficult to deliver high quality projects covering user expectations within time and budget (Johnstone, Huff, & Hope, 2006).

2.2.2 Change in Business and IT Trend

Why are many software project failures seen? Why is managing software project so difficult? It is evident that software projects are still failing and a need for a different approach is critical to reflect changing business needs. The need for quick delivery and adaptability to constant change is seen as critical to the software development community. Throughout the literature (Baskerville, Ramesh, Levine, Pries-Heje, & Slaughter, 2003; Farhan, Tauseef, & Fahiem, 2009; Fitzgerald, 2000; S. C. Misra, Kumar, Kumar, & Grant, 2007; Nandhakumar & Avison, 1999), it is seen that the software development methodology needs attention to help manage business needs. Very often in the literature, developing software is compared with developing a building; the difference is with the building there will be a blueprint and very rarely is there a rapid change in the specification. However in software development, the changes occur frequently and there is a need to modify software to reflect constantly changing requirements.

In the early days of information systems, information technology (IT) professionals alone were responsible for managing the software systems, whilst staff in the rest of the organisation took care of the business processes and their outcomes (Avital & Vandenbosch, 2000). These different responsibilities were seen as acceptable, until businesses started depending on information technology for their daily operations and meeting business needs became harder. Developing software systems became an expensive, and often a difficult process, due to the complex nature of business (Cerpa & Verner, 2009). The need for new methodologies is emphasised clearly by many authors (Begel & Nagappan, 2007b; Boehm & Turner, 2004; Murauskaite & Adomauskas, 2008) and it was found that the study of eight ‘leading edge’ system development organisations in the USA and Finland who all have been following rigid methodologies admitted that their established development methodologies did not work with the business environment and were striving to simplify their processes (Lytinnen & Rose, 2003).

While there is no single cause of software project failure, better methodology to manage requirements and understand the culture are seen important by the software development community (Cockburn & Highsmith, 2001; Dahiya & Jain, 2010; Leidner & Kayworth, 2006; Livari & Huisman, 2007). Thus, this research focuses on these two key issues in software development. One is the software development methodology or

approach to help project success which is discussed in this chapter and the second is 'human' and 'culture' factors discussed in Chapter Three.

2.2.3 The Use and Adaptation of Software Development Methodology

Methodologies for the building of software systems are important elements in the software development discipline (Dahiya & Jain, 2010; Truex, Baskerville, & Travis, 2000) and the adoption and implementation of systems development methodology has been an important topic for discussion over many years (Kautz & Pries-Heje, 1997). With moving into a global economy, understanding the impact of software development methodology on software systems and adopting the right techniques have highlighted the importance of methodology on business plans (Dahiya & Jain, 2010). According to Fitzgerald (2000), most systems development methodologies that are being practiced currently are based on the concepts that were highlighted in the ten-year period from about 1967 to 1977. The study of the history and evolution of methodologies helps to understand different methodologies, key features and limitations, and their techniques to help project success. Technology advancement coupled with changes in business, internationalisation and globalisation of multi-national organisations, heavy competition among nations, changes in values such as customer orientation and quality of the working life, have emphasised new demands on the growth of software development(Iivari, Hirschheim, & Klein, 2000).

Are software development methodologies used effectively? Many questions such as to what extent the methodology is being used and how the methodology should represent the current business needs are important areas of software engineering and these questions are rarely being answered in literature and research. Changes in business needs have led to an increasing research and studies in the field of software engineering and in particular, the various software development methodologies and approaches (Hirschheim, et al., 1997).

- According to Kautz and Pries-Heje (1997), 'a number of previous studies indicate that methods are mostly under used, wrongly used, not usable or simply over-sold'.
- Although 90% of the software development community members are aware of and practice software development methods, only 10% of the IT

organisations use them in an effective and appropriate way (Fitzgerald, 1997; Hirschheim, et al., 1997; Morien, 2005; Yourdon, 1986).

- Though there is only limited evidence on the actual use of methodologies, existing evidence (Hardy, et al., 1995; Vavpotic & Bajec, 2009) suggests that their use in practice is low and they are not fully utilised and applied.
- Chatzoglou and Macaulay (1996) reported that almost half of the projects (47%) did not use a methodology in their survey of 72 projects within the UK, and another survey conducted in Britain suggest 18% for the non-use of methodologies (Hardy, et al., 1995). Interestingly, 38% of methodologies used were developed in-house and were customised in 88% of cases (Hardy, et al., 1995).

These references indicate lack of usage of software development methodology. Study conducted to identify popular software development methodologies used in industry indicated that 'there was no common methodology which could be identified as heavily used' (Rahim, Seyal, & Rahman, 1999). The other interesting factor that was identified in this study was that in-house methods were found to be used quite commonly. Existing methods were also seen as not widely accepted and not satisfactory (Vavpotic & Bajec, 2009). From another perspective, during a study conducted with ex-graduates of a university, out of 117 respondents, 83% of the participants replied that they had never used the methodology outside university. However, the majority of them were willing to adopt a methodology (Kautz & Pries-Heje, 1997). This was an interesting and promising fact, that the majority of the participants were willing to adopt a methodology. From the above discussion, it is clear that though many software development methodologies exist, the extent to which they are being used is not very satisfactory.

Hidding (1997) claims that methodologies are used by only a third of the software development community and argues that the reason is because satisfying a variety of requirements of different needs has been difficult. Some believe that the interest and use of software development methodologies has been reducing, due to reasons such as perceived impracticality and change in business environment (Fitzgerald, 2000). The reason for this impracticality is because of the way

methodologies are created without considering usability. Raghavan and Chand (1989) argue that there is a difference in the way methodology creators see methodologies, and how practitioners perceive them in real life and thus creating a gap between availability and usability. According to Fichman and Kemerer (1993), methodologies are either over sold with too much expectation or poorly promoted.

2.3 Agile Methodology – An Overview

This section studies the characteristics of agile methods and investigates if agile methods can be used to mitigate software project failures. First, some terminology is defined. The next section explains and reflects the fact that there are many methodologies available in the market. Following that, agile methods are discussed briefly, with areas such as characteristics and principles. Based on these discussions, a review of agile methods to assess their sustainability to avoid existing software project failure factors is provided. This discussion is critical to this study, to show the connection between current project failure factors and how agile methods can help resolve these factors. The discussion is conducted based on analysing the current factors and studying them based on agile principles (defined by the Agile Manifesto).

2.3.1 Terminology

"What is a methodology?" This term is used loosely and extensively. This loose use of the term does not mean that there are no definitions, simply that there are no universally agreed definitions (Avison & Fitzgerald, 2000). The terms "methodology" and "method" used in the study of systems development methodologies are not clearly defined (Avison & Fitzgerald, 2000). In the literature, the two terms are frequently used interchangeably (Cockburn & Highsmith, 2001) and the term "methodology" is commonly used among the software development community, to mean the same as "method" (Jayaratna, 1994). For the purpose of this thesis, the term 'methodology' is used to define an approach and 'method' is used to identify a specific method. For example, agile methodology is a methodology and Lean and Crystal are methods.

Finding a common definition to define software development methodology is problematic, but several authors have attempted to define the term (Cronholm, 2008).

> A methodology will lack the precision of a technique but will be a firmer guide to action than a philosophy. Where a technique tells you 'how' and

a philosophy tells you ‘what’, a methodology will contain elements of both ‘what’ and ‘how’ (Checkland, 1981).

The British Computer Society Information Systems Analysis and Design workgroup defined Information System Methodology as ‘a recommended collection of philosophies, phases, procedures, rules, techniques, tools, documentation, management, and training for developers of information systems (Maddison, 1983).

A coherent collection of concepts, beliefs, values, and principles supported by resources to help problem-solving groups to perceive, generate, assess and carry out, in a non-random way, changes to an information situation (Avison & Wood-Harper, 1990).

An explicit way of structuring one’s thinking and actions. Methodologies contain models and reflect particular perspectives of ‘reality’ based on a set of philosophical paradigms. A methodology should tell you ‘what’ steps to take and ‘how’ to perform those steps but most importantly the reasons ‘why’ those steps should be taken, in that particular order (Jayaratna, 1994).

At the general level methodology is defined as “a collection of procedures, techniques, tools, and documentation aids, which help the systems developers in their effort to implement a new information system (Avison & Fitzgerald, 2000).

The above definitions explain the term ‘methodology’.

2.3.2 Methodology Jungle

In 1994, over one thousand brand named methodologies were reported in use around the world (Jayaratna, 1994) and in the decade since then more have been developed (Graham, Henderson-Sellers, & Younessi, 1997). The unorganised collection

of numerous methodologies is referred to as a 'methodology jungle' by Avison and Fitzgerald (2000) as shown in table 2-2.

Table 2-2: Compiled from Avison and Fitzgerald (2000) and Dahiya and Jain (2010).

Methodology	**Authors**	**Technique**	**Year**
STRADIS – Structured Analysis, Design and Implementation of Information Systems	Chris Gane Trish Sarson	Process oriented	1974
JSD – Jackson Systems Development	Michael A. Jackson	Social approach	1975
MERISE	French Ministry of Industry	Decision making mechanism	1977
IE - Information Engineering	Clive Finkelstein James Martin	Packaged based approach	1981
SSADM – Structured Systems Analysis and Design Method	LBMS and CCTA	Data driven methodology	1981
SSM – Soft Systems Methodology	Checkland	Social approach	1981
Spiral model	Barry Boehm	Iterative approach	1986
Multiview	Avison and Wood-Harper	Human and Technical approach	1990
OOA – Object Oriented Analysis	Coad and Yourdon	Object Oriented Approach	1990
RAD – Rapid Application Development	James Martin	Iterative approach	1991
YSM – Yourdon Systems Method	Yourdon	Top down/functional decomposition	1993
ETHICS – Effective Technical and Human Implementation of Computer-based Systems	Enid Mumford	Participative approach	1995
RUP – Rational Unified Process	Rational software corporation	Iterative approach	2003
Agile Unified Process (AUP)	Scott Ambler	Iterative	2005

Table 2-2 shows some common methodologies available in the market with authors, techniques used, and year. The methodologies are listed to show the variety

available and to reflect the fact that these methodologies have been established over the years from 1970 – 2003.

Traditional (plan driven) methodologies are based on an approach with a sequential set of steps carried out in a linear fashion, such as requirements analysis, development, testing and deployment. They impose a disciplined process upon software development, maintaining and assuming software development to be predictable. These traditional software development methodologies require the definition of and documentation of an acceptable final set of requirements at the initial stage of a project. Traditional methodologies involve detailed planning and analysis and these methodologies are useful when the project is large and the level of risk is very high. They are characterised by extensive design and long increments in development (Rehman, Ullah, Rauf, & Shahid, 2010).

According to Awad (2005), traditional methodologies have characteristics such as a predictive approach, comprehensive documentation and process orientation. With many traditional methodologies available, one would think that business and IT had a good selection from which to choose a methodology that suited them. At the beginning, the steps and logic with traditional methodologies were accepted widely and seemed to be working well in projects, but later on, with the change in business need, the software development teams and businesses started realising that there were some practical deficiencies involved in these development methodologies (Rehman, et al., 2010; Vavpotic & Bajec, 2009).

There were several authors who believed traditional methods were not practical for current needs and requirements:

- Though traditional methodologies have been used successfully in the past, Floyd argues that these methods are not capable of modelling complex and current aspects of information systems and are therefore not readily accepted and adopted by software developers (Floyd, 1986).
- Traditional methodologies can be seen as useful in some cases, but these traditional software development methods are considered to be too mechanistic for the current state of software development (Avison & Fitzgerald, 2000; Nandhakumar & Jones, 1997). The common understanding of traditional methodologies is that these methods require too much initial planning, are too sequential and involve too much documentation.

- It has also been stated, that these methodologies are bureaucratic and there are so many steps and processes to follow that the whole pace of development slows down dramatically (Beck & Fowler, 2001).
- Traditional software development methodologies are identified as too cumbersome to meet rapidly changing requirements and short product cycles demanded by business (Livermore, 2007).
- To compete in the digital economy, companies must be able to develop high quality software systems at 'internet speed' – that is, deliver new systems to customers with more value and at a faster pace than ever before(Baskerville, et al., 2003).
- Today, organisations are expected to address the pressures of unprecedented change, global competition, time-to-market compression, rapidly changing technologies and increasing business complexity and traditional methods donot seem to be suitable for these situations (Hass, 2007).
- Traditional methodologies do not fit normal social characteristics and are not seen as socially appropriate for some software development teams (Vavpotic & Bajec, 2009).

From the above discussions, it is concluded that a need for a new, practical software development methodology is required that can manage current business needs and in turn be a successful software project.

2.3.3 Characteristics of Agile Methodologies

Further to the discussions and study of the principles of traditional methods for several decades (Checkland, 1981; Jayaratna, 1994; Yourdon, 1986), the need for a new methodology and processes are seen as critical due to the change in environment, change in problems, needs, ideas, people and their mannerisms(Awad, 2005). During the mid to late 1990s systems development methodologies called 'agile methodologies' were developed, to help changing business needs. What is agile methodology? Though there are many definitions by academics, it was hard or problematic to find an agreed upon definition of the concept of agile methodology. A broad definition is presented by Cockburn and Highsmith (2001), who define the process of agile development as the 'use of light but sufficient rules'. According to Abrahamson et al.(2002), the academic research on agile methods still seems to be very limited. Most of the publications have

been identified as being written by consultants or practitioners. This leaves a gap academically and thus the need for more research in agile methodology is seen as important. The literature has shown little attention to the adaptation of Agile methodologies, the need for adapting agile practices and the challenges involved (Cao, et al., 2009).

Agile methodologies are a refinement and amalgamation of earlier methodological concepts and practices (Strode, 2005). Agile methodology and approaches appear as new innovative ideas, but looking back into manufacturing, it can be seen that the practices have been followed for a while (Highsmith, 2002b).

Figure 2-1 shows the range of software engineering approaches and flow effects from one to the other. This figure clearly shows the evolution and flow-on from previous methodologies and a new methodology has been developed, based on pros and cons from previous methodologies and reflects a combination of existing and new practices. New methodologies were created based on existing methodologies and trends to help project success.

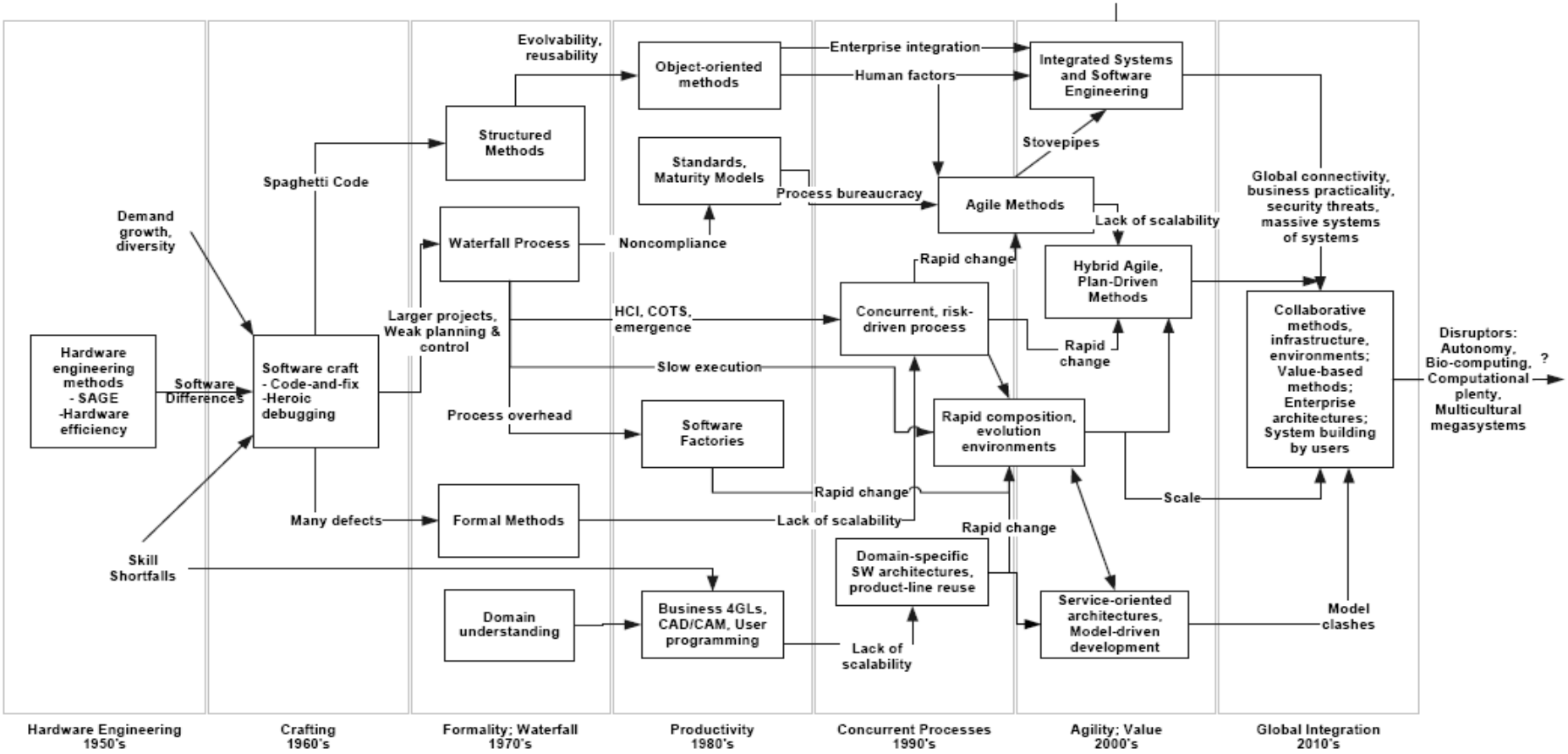


Figure 2-1: A range of software engineering approaches (Boehm, 2006).

Agile methodology is a framework which provides steps to help embrace change. For example, software development is often complex, and requirements in the beginning of a project are unknown or ambiguous. Therefore, an agile framework must have built-in mechanisms to allow the project to tackle and reduce these uncertainties (Krebs, 2009). Currently, agility is seen as a way of life and business needs are constantly emerging and changing (Highsmith, 2002a). According to Highsmith and Cockburn (2001), 'what is new about agile methods is not the practices they use, but their recognition of people as the primary drivers of project success, coupled with the intense focus on effectiveness and maneuverability'. The major areas that show the difference between traditional methodologies and agile methodologies are 'culture orientation' and 'adaptivity'.

Culture Oriented: Agile methodologies show the importance of people, such as customers, developers, project managers, stakeholders and end users, as the most critical factor in software development methodologies. When dealing with people, culture starts to play an important role. The most important implication to managers working in the agile manner is that it places more emphasis on cultural factors in the project (Cockburn & Highsmith, 2001). No agile project would be a success without team involvement.

Adaptivity: The management and gathering of software requirements is the most difficult and error prone task in the software development life cycle (Abernethy, Kelly, Sobel, Kiper, & Powell, 2000). Agile methodology practitioners welcome changes at all stages of the project. Agile projects are not controlled by conformance to plan but by conformance to the business value. Agility for a software development organisation is the ability to adapt and change according to demand and business needs (MacGregor, Hsieh, & Kruchten, 2005b).

This thesis is focused on both 'people' and 'process' to cater for project success. In summary, it is clear that 'culture' and 'agility' are two major characteristics of agile methodologies and this thesis will help in successfully implementing agile methods in different cultures.

2.3.4 Agile Principles and Processes

The Agile Manifesto was developed at a summit by seventeen practitioners in February of 2001. They defined four main values and twelve principles.

The values are:

- Individuals and interactions over processes and tools;

- Working software over comprehensive documentation;

- Customer collaboration over contract negotiation;

- Responding to change over following a plan.

The authors of the Manifesto had previous knowledge and understanding of similar development methodologies, as they had already published individual agile software development methodologies with similar characteristics. Each of these individual methods is based on practitioner experience and evolutionary software development practices, with focus on early delivery of quality software (AgileAlliance, 2001).

Figure 2-2 shows common agile methods that contributed to the Agile Manifesto.

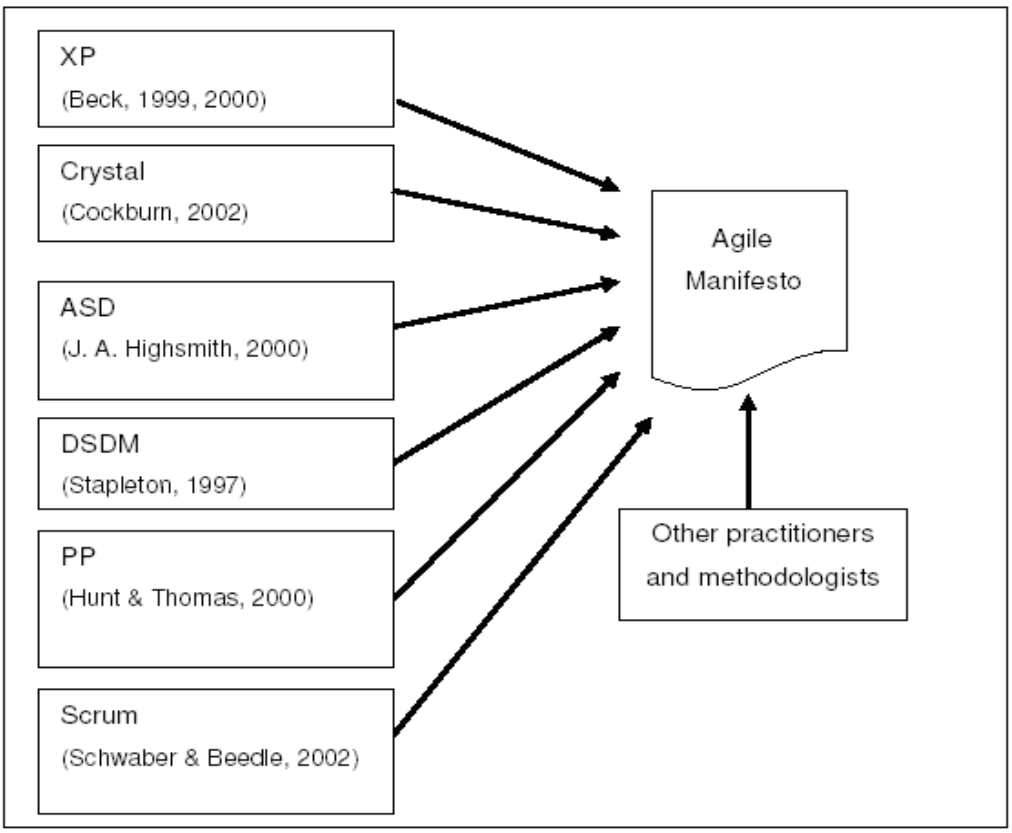


Figure 2-2: Contributors to the Agile Manifesto - adapted from Abrahamsson et al. (2003).

The twelve principles developed by agile alliance are considered the foundation for agile methods. The purpose of the Manifesto and its principles is to uncover better ways of developing software and these are seen by many practitioners of agile methods as common sense and not completely new ideas (Saarnak & Gustafsson, 2003). Commonly used agile methods are developed based on these agile principles.

Table 2-3: Principles behind the Agile Manifesto.

Principles Behind the Agile Manifesto	
1	Our highest priority is to satisfy the customer through early and continuous delivery of valuable software
2	Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage
3	Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale
4	Business people and developers must work together daily throughout the project
5	Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done
6	The most efficient and effective method of conveying information to and within a development team is face-to-face conversation
7	Working software is the primary measure of progress
8	Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely
9	Continuous attention to technical excellence and good design enhances agility
10	Simplicity – the art of maximising the amount of work not done – is essential
11	The best architectures, requirements and designs emerge from self-organising teams
12	At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly

Table 2-3 lists the twelve agile principles. In recent years, processes based on the Agile Manifesto have been gaining acceptance among practitioners (Farhan, et al., 2009; Livermore, 2007; Rehman, et al., 2010; Valencia, Olivera, & Sim, 2007). The principles behind the Agile Manifesto suggest that change should be welcomed at every stage of the software development cycle, that working software should be delivered frequently, and that conveying information via face-to-face conversation is more efficient than through written documentation (Valencia, et al., 2007). Agile processes are characterised as informal and minimally documented. In addition, these processes put more emphasis on verbal and social communication within the development team (Valencia, et al., 2007). These light weight characteristics help in developing software quickly and efficiently to cater for business needs.

2.3.5 Software Project Failure – Review Based on Agile Principles

The literature indicates that there are many project success and failure factors. This review does not analyse and validate these factors, yet consideration was given as part of this study, to look at these factors to identify if agile methodologies can mitigate some of these factors. From the Standish Group (2004), the factors that have been identified for challenged projects are:

1. Lack of user input;
2. Incomplete requirements and specifications;
3. Changing requirements and specifications;
4. Lack of executive support;
5. Technology incompetence;
6. Lack of resources;
7. Unrealistic expectations;
8. Unclear objectives;
9. Unrealistic time frames; and,
10. New technology.

It was noted, that the factors identified by different studies regarding project success / failure were directly or indirectly related to team and culture. Table 2-4 shows how the factors have been repeatedly highlighted by different authors. The next step

here was to study the factors and verify if agile method was able to help improve the project success and failure factors.

Table 2-4: Literature study of project success and failure factors.

Literature	Empowered Team / Lack of resources	Manage scope creep	Technical challenge	Manageable / realistic schedule	User involvement	Experienced Project Manager	Clear requirements	Stakeholder management	Over budget	Effective communication
Linberg(1999)	✓	✓	✓	✓						
Reel (1999)	✓	✓	✓	✓	✓	✓	✓	✓		
Nah (2001)				✓				✓		✓
Standish group (2004)	✓	✓	✓	✓	✓	✓	✓		✓	
Emam& Koru (2008)	✓	✓	✓		✓		✓	✓	✓	
Verner and Cerpa(2009)	✓	✓		✓	✓	✓	✓		✓	

It was observed how most project success and failure factors were able to be matched with agile principles defined by the Agile Manifesto. This indicates that agile methods will be suitable to help successfully implement software projects.

Table 2-5: Project success failure factors - Agile review.

Success / Failure factors	**Can agile help?**	**Agile principle** **(Refer figure 2-4 for numbers used below)**
Empowered team / Lack of resources	Agile insists on close collaboration and communication, including concepts like pair programming, constant stakeholder involvement etc. Agile teams must be empowered.	5) Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done. 11) The best architectures,

		requirements, and designs emerge from self-organising teams.
Manage scope creep	Agile methodology helps in clear definition of scope and objectives and details are allowed to emerge throughout the development, through the concept of refactoring. Agile methodology will stick to the main scope and also allows requirements to change and emerge and evolve.	2) Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
Technical challenge	Agile methodologies can surface inappropriate technology choices early, as they encourage frequent delivery on an incremental approach basis. Testing is also integrated throughout the development cycle. This helps to ensure inappropriate technology choices at an early stage, before too much of the software has been developed. Though technical skills cannot be helped by agile, it can still help to surface such issues early and make them visible.	9) Continuous attention to technical excellence and good design enhances agility.
Manageable realistic schedule	Like agile enthusiasts many others also believe that it is practically impossible to plan every detail of many software development projects upfront. Hence expectations are better managed by active involvement, frequent delivery and incremental development. Agile methods provide some important principles to help with accuracy of estimating. In agile methodology, estimation is done by the whole team as a collaborative process. Tasks are broken into smaller units, ideally less than one day and the progress is measured on a daily basis. Agile methodology encourages short and regular iterations, developing the software delivery working product.	3) Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale. 8) Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
User involvement	Active user involvement and continuous feedback is one of the most important principles of agile methodologies.	4) Business people and developers must work together daily throughout the project.
Experienced	Agile practices have daily stand-up meetings and	Not applicable.

Project Manager	Reporting built into the process; this provides clear visibility and measurable progress on a very regular basis. Daily visibility of measurable progress.	
Clear requirements	Agile methodologies expect requirements to be incomplete and changing.	7) Working software is the primary measure of progress.
Stakeholder management	One of the reasons product owners are unclear in traditional projects is because they are asked for far more detail than they can handle, too early in a project when they cannot visualise the solution. Instead, agile requirements are kept lightweight and visual and delivered just in time for a feature to be developed. Availability must be forthcoming for agile principles to work so it is essential for constant collaboration. Active user involvement ensures two way feedback.	1) Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
Over budget	Daily visibility of measurable progress	Not applicable.
Effective communication	Agile methods expect and insist on good communication	6) The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

Table 2-5 clearly shows that most software success and failure factors can be managed using the agile principles.

2.4 An Analysis of Agile Methods and Agile Techniques – People Oriented therefore Culture Oriented?

In this section, agile methods are compared and by studying processes and practices involved in agile methods, agile techniques are gathered and compiled. The intention here is not to compare and find the benefits of one method over another, but to gather some common agile techniques with the help of studying the agile methods in detail. The first section explains the agile methods and agile techniques and this led to a discussion on mixing and matching agile techniques, for better software project

management. Further, some common agile methods are studied in detail. Extreme Programming is discussed in this section and the other selected agile methods are listed in appendix G. This exercise is used to analyse and gather some common agile techniques. The need for a list of agile techniques is critical to this study, as these techniques are used as a base for data collection. This section concludes with a brief discussion on agile techniques and culture.

2.4.1 Agile Methods and Agile Techniques

The researcher's interest in agile methods and the discussions around the impracticality of the existing software development methodologies led to an approach of combining agile methods and further raised some queries on combining agile techniques. With the current complaint on not having effective methodologies and balancing the fact that it is difficult to get a methodology that will be suitable for the current complex software projects, the solution may arise if the project can use a combination of agile methods and/or a combination of agile techniques, depending on the need of the project. This blend of agile methods and/or agile techniques, will provide a successful hybrid and flexible method.

There have been previous studies conducted to merge different agile methods for a successful software project implementation. Figure 2-5 shows which phases of software development are supported by different agile methods. This study is conducted by Abrahamsson (2002) and in the figure, each agile method is divided into three elements. The first element indicates if a method supports project management; the second indicates if the process suggested describes within the method; and, the third element indicates whether the method describes the practices, activities and work products that could be followed and used under different circumstances (Abrahamsson, et al., 2002). The diagram shows a possibility and a need for combining agile methods, depending on what each agile method can provide and what each software project needs.

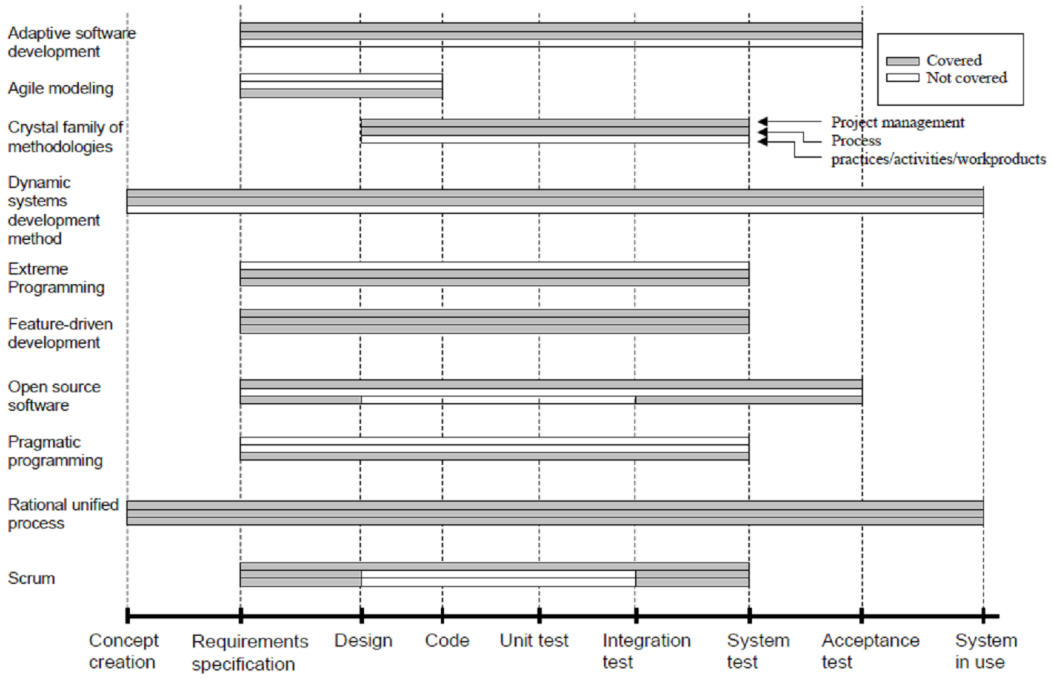


Figure 2-3: Software development life-cycle support - adapted from Abrahamsson et al. (2002).

There have been suggestions in the literature for the adoption of two agile methods for a project. Crystal in fact hypothesises about XP with Crystal and Scrum with Crystal. From the analysis of different agile methods, it can be concluded that while agile methods practice current software development approaches, they are not all suitable for all phases of the software development life cycle. In some situations, the need for merging more than one method is required.When amalgamating two or more methods, it may give a solid basis for management of the projects. There are further practical reasons for combining methods: XP lacks support for project management (Abrahamsson, et al., 2003); Scrum lacks specific practices for managing iterative and incremental projects. XP and Scrum (Visconti & Cook, 2004), XP and Crystal methods (Cockburn, 2002), XP and ASD (Highsmith, 2002b) are a few of the combinations that have been proposed in the past.

In a similar fashion, the review of literature suggests that the agile techniques can be mixed and matched according to the need of the software project and the project environment. The researcher believes this combining of agile techniques will help and provide advantage to control the resulting method. The researcher also observes that a combination of different agile techniques according to the situation, will give a better setup for software project success. Here the emphasis is more on agile techniques, rather than agile methods. The ability to blend agile techniques to enhance the management of

software is a feasible proposition to manage software projects successfully. This recommendation to combine methods or use techniques from one method in another method has come from a need to address current weaknesses in existing methodologies. Hence a project manager can select a specific combination of methods or combination of techniques best suited to the software development project. Thus in summary, amalgamating more than one agile method or agile technique depending on the project requirement, will help provide flexibility in successfully managing software projects.

This research programme looks at cultural changes required to implement agile methods and does not test the ability or success of combining agile techniques. This approach will help teams to adopt the right agile mix, when implementing agile methods. It also helps a team to choose the agile techniques that are suitable for a specific team and to gradually introduce techniques from the specific agile method or from another agile method. It also helps in developing a best practice approach for that software project team and environment. Discussion arising from this topic will be given as research progresses.

2.4.2 Overview of Extreme Programming – A Sample of Agile Method

As part of this thesis, different agile methods are studied in detail in relation to the agile principles defined by the Agile Manifesto. The methods which are studied include eXtreme Programming (XP), Dynamic Systems Development Method (DSDM), Crystal Method, Scrum, Adaptive Software Development (ASD) and Feature Driven Development (FDD). The purpose of this research programme is to understand common techniques that agile methods use. These techniques are used as the basis for data collection. Agile principles are abstract and for the purpose of this research programme, the more concrete agile techniques were taken to provide a meaningful outcome. This section includes a study of Extreme Programming and other selected agile methods, which are described in Appendix G.

The most recognisable agile method is eXtreme Programming (XP) which is communication oriented and team oriented (Cordeiro et al., 2008). XP practices were originally intended for use with small, co-located teams. The Extreme Programming Method arose as a response to the problems caused by long development cycles of traditional development models (Beck, 2000). The individual practices used in XP are not new, but they have been collated and organised to function with each other in a new way, so that they can be regarded as a new methodology. The term “Extreme” comes

from taking these common sense practices into extreme levels (Abrahamsson, et al., 2002).

The information gathered in this section was gathered from Beck (2000) and Fowler (2001). The Extreme Programming process consists of six separate phases, as illustrated in figure 2-4.

2.4.2.1 XP - Process

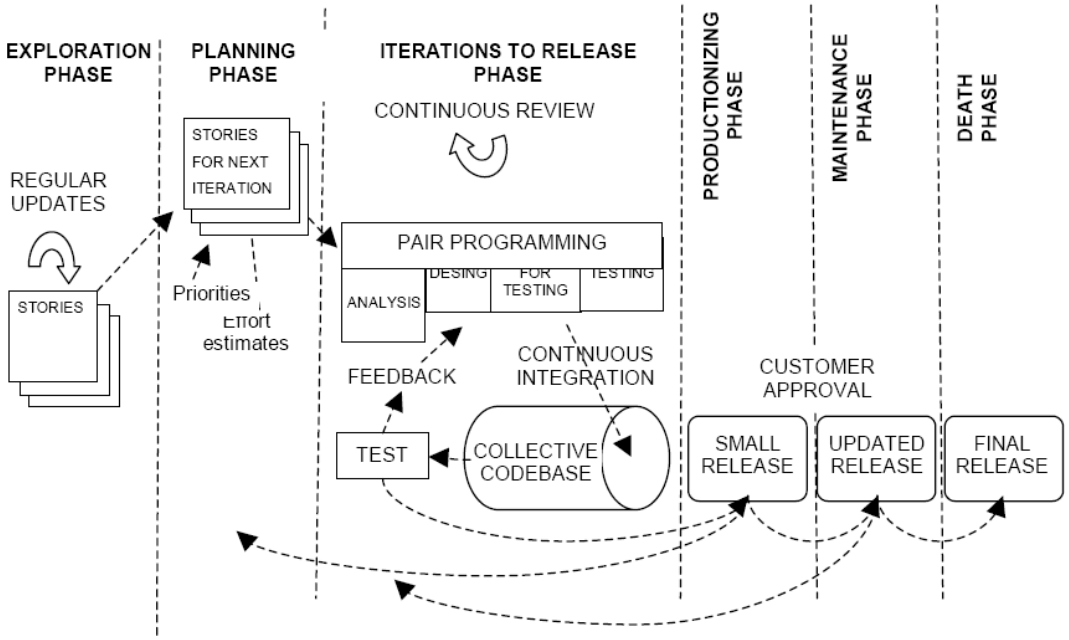


Figure 2-4: Extreme Programming process (Abrahamsson, et al., 2002).

In the Exploration Phase, user stories are created to help customers understand the reasoning of the requirements. This phase is used to write down the areas that are required in the first release of the software. Each story card contains one feature. Simultaneously, the project team familiarises themselves with the tools and technologies needed for the project. The Exploration Phase takes generally from a few weeks to a few months. In the Planning Phase, the user stories that were identified will be organised based on priority order and the team agrees with the list for the first release. Programmers make effort estimates for the stories and the schedule is agreed among the team members. The Planning Phase takes a couple of days and the first release usually takes not more than two months. The Iteration to Release Phase consists of several iterations of the system to create the first release. The customer decides the stories to be implemented in the iteration.

At the end of every iteration cycle, the functional tests planned and identified by the customer are run. After the last iteration, the system is ready for migration to production. In the Production Phase additional testing and checking is conducted before the system is released to the customer. The important aspect is that new changes can still be found at this phase and it has to be decided if they are to be included in the current release. If some changes are postponed, they are documented for later implementation in the Maintenance Phase. In the Maintenance Phase, after the first release to production and in use, the XP project has to keep the system running whilst implementing new features. The Maintenance Phase may require incorporating new people into the project team and changing the team structure. The final phase (Death Phase) is reached when the customer does not have any stories to be implemented, i.e. the customer is satisfied with the system. In the Death Phase the necessary documentation of the system is finally written. "Death" may also occur if the project is terminated for some reason.

2.4.2.2 XP - Practices

Extreme Programming is a collection of existing practices, listed below.

The Planning Game: Short three week iteration, frequent plan updates, and assigning stories. Although this provides an indication of the entire project's scope, cost and schedule, all parties assume the plan is really a speculation about the future. Both customers and developers work a lot together in the planning game. Although unwieldy at times, joint participation assists everyone to understand the plan in ways that reading a document could not (Highsmith, 2002a).

Small Releases: Every release should be as small as possible, containing the most valuable business requirements (Beck, 2000). Small releases provide a sense of accomplishment, that is often missing in long projects (Highsmith, 2002a). After the first release new versions are released even daily or at least monthly (Abrahamsson, et al., 2002).

Metaphor: The metaphor describes the broad sweep of the project, while stories are used to describe individual features (Highsmith, 2002a). The system is defined by a metaphor or a set of metaphors, created together with the programmers and the customer (Abrahamsson, et al., 2002).

Simple Design: XP emphasises the importance of creating the best, simple design you can today, and not to guess about the future. It is argued, that if the future is uncertain and it is believed that it can be changed, then putting in functionality on speculation is not going to deliver required functionality (Beck, 2000). This does not mean that no anticipatory design ever happens; however, it does mean that the viability of anticipatory design has changed dramatically in a volatile business environment (Highsmith, 2002a).

Refactoring: Refactoring is the ongoing redesign of software to improve its responsiveness to change (Highsmith, 2002a). XP should be thought of as a continuous, incremental design. Examples of refactoring include removal of duplicate code, improved communication, and simplified and flexible code (Abrahamsson, et al., 2002). Refactoring does not change the outward look and feel of the software, it enhances the internal backend code (Highsmith, 2002a).

Testing: XP utilises two types of testing: unit and functional. Unit testing involves writing the test case before the code is written. Functional testing involves identifying the requirements and writing test cases to test the functionality.

Pair Programming: Pair programming involves two people working together trying to simultaneous programming (Beck & Fowler, 2001). This technique involves having two people sitting in front of the same terminal, one entering code or test cases, with the other reviewing and thinking. The two members work as a developer and analyst, to help each other achieve functionality.

Collective Ownership: Collective ownership allows the entire team to work in a collaborative manner. It allows collective ownership to everyone on the project team and gives permission to change the code at any time. This requires a controlled way of managing code.

Continuous Integration: XP's feedback cycles are quick. New pieces of code are integrated to the code-base as soon as they are ready (Abrahamsson, et al., 2002). The software system is built multiple times a day, and all tests are run immediately to make sure code is functioning well. Tests have to be passed for the changes in the code to be accepted.

40-hour Week: Hours are not the entire issue, but the 40-hour rule establishes a philosophy that if you go beyond that, there is something wrong.

On-site Customer: This practice corresponds to user involvement with the project team. Extreme Programming states that the customer has to be present on the same premises with the developers (Abrahamsson, et al., 2002). The customer has to be available full time for the team.

Coding Standards: With pair programming and when anyone from the team is allowed to modify the collective code, coding standards become necessary. XP uses coding standards heavily and when followed by the programmers, communication through the code is also encouraged (Abrahamsson, et al., 2002).

2.4.2.3 XP – Techniques

Techniques used for XP includes: Pair Programming; Planning game; Simple design; Refactoring; Small releases; Iterative; Incremental development; 1-4 week iterations; Coding standards; Collective ownership; Continuous integration; Test first development; 40 hour week; Metaphor; On-site customer; Metrics; Room arrangements; and, User stories.

Based on the study of XP, a list of agile techniques is shown in table 2-5. Other common agile methods were reviewed with a similar approach and the techniques were identified. For further details of other agile methods, refer to Appendix G. Further to the study of different agile methods, the agile techniques were compared to each other and tabulated in table 2-6.

Table 2-6: Agile techniques with XP, Scrum, DSDM, FDD, Crystal and Lean.

Agile Technique	***XP***	***Scrum***	***DSDM***	***FDD***	***Crystal***	***Lean***
Daily builds of complete system		✓				
Iterative development	✓		✓	✓	✓	✓
Iteration of fixed length			✓		✓	
Stand-up meeting	✓	✓				
Customer on-site	✓					
Frequent delivery			✓	✓		✓
Whole team works same location	✓	✓			✓	✓
Dedicate meeting place		✓				
Daily team meetings		✓	✓			
Testing is integrated	✓		✓		✓	
PM emphasis		✓				
Communication	✓	✓	✓	✓	✓	✓
Collaboration	✓	✓	✓	✓	✓	✓
Coordination	✓	✓	✓	✓	✓	✓
Knowledge sharing	✓	✓		✓	✓	✓
Working with uncertainty	✓	✓				✓
Empowered to make decisions			✓			✓
Courage to make mistakes			✓			
Requirements as prototypes rather than text			✓			
40 Hours week	✓					
Pair programming	✓				✓	
Refactoring	✓					✓
Small software product releases	✓	✓	✓			
Collective ownership of code	✓				✓	
Champion role		✓		✓		

From table 2-5, the argument of combination of agile techniques appears feasible. For example, a technique such as the ’40 hour week’ from XP can be used as an additional technique, while using another agile method such as Scrum. Thus the project team can manage a project using Scrum, with an additional technique such as ’40 hour week’. From the other side, ‘pair programming’ may not be selected as a technique while using Extreme Programming as an agile method. If the project team decides that the technique of pair programming is not an appropriate option, then the technique could be identified as not needed for that specific project. This is a new idea that the researcher is suggesting for future project management.

This research will enable the combination of agile techniques and the identification of hybrid models to help in the management of software projects with more success.

2.4.3 Agile Techniques – Culture Oriented?

From the previous section of agile method study, it can be confirmed that there are common techniques that are adopted by most agile methods and there are specific techniques that are highlights of different agile methods. From the researcher's point of view, as discussed in the previous section, to choose an agile technique or combination of agile techniques was a better way to manage software development projects. Agile methodology is a culture based approach (Cho, 2009; McAvoy & Butler, 2009; Miller & Larson, Winter 2005) and to implement agile, there is a need to analyse the agile techniques based on a cultural perspective. The agile concepts focuses on planned, iterative and early releases of working products using collaborative and communicative techniques, such as pair programming, refactoring and having business work on site along with the team members (S. Misra, Kumar, & Kumar, 2010; Reifer, 2002).Based on the literature search many authors have identified the closeness of agile methodology with culture. With existing agile techniques gathered, there is a culture factor that needs attention to help understand implementation of agile techniques. This is why the researcher initiated the review of these agile techniques in detail. Previous software development methodology evaluation models consider almost every possible technical aspect, however they mostly omit the social and cultural aspects of methodology users (Vavpotic & Bajec, 2009). In this research the cultural factors in relation to agile implementation are studied in relation to agile techniques.

These agile techniques are impacted by the cultural context. For example a technique such as, 'daily builds of complete system' has cultural factors such as team participation, involvement, time management, quick decision making, proactive acting, taking initiative and communication influencing the successful implementation of the technique. Another example is 'pair programming'. This technique requires developers to trust each other, transparency, dedication, self-organising, working together, open and honest communication, time keeping, and being proactive. Another interesting technique 'knowledge sharing' is encouraged by agile methods. If working well in a team and transparency is not maintained among team members, this technique will be very difficult to be implemented. An interesting match was found between the agile techniques and cultural influence. This understanding helped to conclude that basic cultural factors may be needed to correlate techniques to help use an agile method.

A further clarification is necessary. Consider one of the agile techniques such as 'pair programming'. Students who pair-program were seen as more confident in their

work and were more satisfied with their programming tasks (Hanks & McDowell, 2004). Contradicting this study, there are other studies that discuss problems encountered by students introduced to pair programming (Sanders, 2002). A 2003 survey about pair programming (Gallis, Asisholm, & Dyba, 2003) concludes that existing published research includes significantly contradictory findings about the consequences of paired programming (Gallis, et al., 2003; Loftus & Ratcliffe, 2005). Reading different outcomes of the same technique 'pair programming', reveals that these techniques have influence on people factors and becomes successful or not depending on different values of people in different cultures. Thus though the techniques can help project success, these techniques need cultural factors that helps improve the technique. The researcher will try to fill in this gap by studying the cultural factors to bridge the relationship between the agile techniques and project success.

This study does not analyse the credibility of an agile technique like 'pair programming', but it discusses the aspects of human factors that affect agile technique implementation. This contribution to the software engineering community provides a better framework to implement agile in different cultures.

2.5 Agile Techniques and Culture

The concept of culture has recently attracted much attention from researchers as well as practitioners. The culture of an organisation is an important factor, when choosing a methodology (Awad, 2005) and the importance of matching culture and software development approaches was discussed in several papers (Berger, 2007; Conboy & Morgan, 2011; Dyba & Dingsoyr, 2008; Wan & Wang, 2010). In order to understand and appreciate any software development method, it is necessary to understand its underlying culture. The idea of social contracts runs deep for agile authors. According to Kent Beck, his most important vision is about changing social contracts, changing the way people treat each other and are treated in organisations (Highsmith, 2002a). Agile software development emphasises teams and dynamics of team interaction (Vishnu, Craig, & Sridhar, 2006). Agile and traditional systems development have conflicting organisational cultures and management styles (Nerur, Mahapatra, & Mangalaraj, 2005). While agile practices support and motivate social activity during software development, there is still a limited understanding of how social forces come to play in project teams (Whitworth & Biddle, 2007). Though the need and importance of culture for agile implementation was recognised as critical, any

understanding of the cultural and social contexts in different cultures were identified as a gap (Siakas & Siakas, 2007).

This section reviews the research questions briefly and will discuss the importance of the research questions.

> Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?
>
> Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?
>
> Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

The above will give an understanding of what cultural changes are required if agile methods are implemented in different cultures. A study in agile method implementation and culture is critical to the software development community. From previous studies, Agile methods have been viewed positively. The adoption of agile methods is considered non-problematic except for potential incompatibilities between agile methods and culture adoption (Iivari & Iivari, 2011). The next two sections discuss the context of these research questions and the need for the study.

2.5.1 Do Agile Methods Work Differently in Different Culture?

Whilst analysing the agile techniques, the researcher was able to understand that agile method implementation is more about culture than process. The techniques listed and reviewed in previous sections provide an understanding that a need for a study based on cultural factors will be beneficial for software development community. This study explores the cultural differences and changes needed in different cultures to implement agile methods. According to Highsmith (2002b), agile methods are based on one's culture, beliefs and values. This statement aligns with the researcher's belief, that

the agile implementation needs different cultural values when compared to other methodologies.

Agile methodologies represent a ‘people’ centred approach to delivering software and in fact the ‘people’ focus of agile methods is singled out as an essential factor in their success and growing popularity (Whitworth & Biddle, 2007).Software through people is the motto of the Agile Manifesto (Highsmith, 2002a).According to Whitworth and Biddle (2007), during the research, a tangible agile culture and value were seen which had the following characteristics: open and respectful environment, strong whole team participation, high value in action, initiative and continuous improvement. The importance of culture can be illustrated with the statement below. Beck and Andres (2005)state, “If an organisation’s actual values are secrecy, isolation, complexity, timidity, and disrespect, suddenly expressing the opposite values through a set of new practices will cause trouble rather than create improvement”. Several researchers have argued that culture is an important factor in agile implementation. ‘Agile is for people, but are people prepared for agile?’ (Adolph, 2005). Studies also revealed that what is new about the agile method is not the practices they follow, but the recognition of people as the primary drivers of project success (Cockburn & Highsmith, 2001; Highsmith, 2002b; McHugh, Conboy, & Lang, 2011). Cockburn and Highsmith also continue to emphasise the nature of agile methods as people oriented – customers, developers, stakeholders, managers and end users and also identified the importance of the global market. Based on a study by Ruhnow (2007), it was obvious that the agile team had to go through efforts to change simple attitudes and when done so, it made a real difference to the development team.

Process does not turn people into good performers; people turn people into good performers (Highsmith, 2002a; S. Misra, et al., 2010). The Agile Manifesto proclaims a focus on people with a value statement ‘Individuals and interactions over process and tools’ and a principle to ‘Build projects around motivated individuals’. Giving the environment and support the team needs and trusting them, will get the job done (Highsmith, 2002a; McHugh, et al., 2011). Introducing an agile method can change the command and control model in a company; developers need more autonomy and decision-making power than what they are used to, to be able to implement the agile practices (Passivaara & Lassenius, 2006). In the researcher’s view, implementing agile method does not just deal with process and technique; it also deals with people and culture. Giving top priority to people-related factors such as staffing, culture, values,

communications, and expectations management, is critical to successful software development and management (Boehm & Turner, 2004).

The connection and importance between concepts of culture and agile methods implementation were discussed and the need for future research in this area was highlighted (Iivari & Iivari, 2011). Further to the importance of 'culture and people' for implementing agile, the researcher will study the cultural factors and identify a good framework to help in implementing agile in different cultures. This section simply shows the interconnection between agile methods and culture and also reinforces the importance of this study.The next chapter provides some insight into culture.As culture can only be measured indirectly, it is important to identify elements of culture to help study 'implementing agile in different cultures'.

2.5.2 Intercultural Teams and Agile Methods

Many organisations have begun to reap the benefits of agile development in their internal projects – shorter time to market, better quality software, more team productivity (Rubinstein, 2007). The need for getting those same advantages when doing agile development throughout a distributed team has now become important. Thus the need for not just cultural study is critical, but also the cross-cultural study. Cultural awareness and cross cultural skills have become critical to the software development community. The need to work with distributed teams has become essential and unavoidable in the current market. A survey conducted in 2013, concluded that agile development projects failure was often due to staffing, culture and team work issues. The study also revealed that other contributing factors were the failure to integrate the right people and a lack of understanding of team-based culture (Paul, 2013b). Agile methods require cultural factors such as trust, motivation, decision making ability and this study reveals practical difficulties and differences in different cultures in dealing with these cultural factors. This research programme will provide guidance to identify best practices in managing and working with distributed teams. This study is new and the researcher strongly believes that the benefits gained by this study will help manage software projects better.

There are some concerns and a criticism that agile methods are inherently Western in nature and do not translate well to other cultures (MacGregor, Hsieh, & Kruchten, 2005a). This study helps to review whether agile methods are designed for a specific culture. There are some cultural changes required in different cultures to adapt

to the agile approach. The cultural understanding and adapting to these ways will help facilitate agile methods. This study will provide a good foundation to a better understanding of how to implement agile methods in different cultures. In addition this study will also help understand that different cultures could use different agile techniques that are suitable for their cultures. When dealing with multiple cultures, the agile techniques can still be used accordingly and selected, based on cultural factors and different combinations of agile techniques to help the success of a software project. The main challenge here will be for the organisations to tailor agile methods as a part of the development and how to assess agility (Pikkarainen & Passoja, 2005).

2.6 Benefits and Limitations of Agile Methods

This section provides a discussion reviewing the benefits and limitations of agile methods. Though several studies reveal positive outcomes of the use of agile methods, there are some limitations as well. These limitations are discussed and further review of how this research programme can help overcome some of the limitations is also briefly identified. The researcher believes that this research will help manage agile methodology related software development projects.

2.6.1 Evidence Supporting the Use of Agile Methodologies

There is considerable evidence that waterfall based traditional methodologies for software development projects have resulted in difficulties and issues (section 2.3.2). Since the 1990s agile methodologies have started getting attention and the use of agile methodologies has significantly increased, but there has been very little evidence to support their use and adoptability (Denning, 2013; Good, 2003). There is as yet, no convincing empirical evidence that agile methodologies outperform other approaches, but there is equally little evidence to suggest the opposite (Wendorff, 2002).

A global survey conducted in 2003 carried out by Shine Technologies (2003), an Australian company produced the following results:

- 88 percent of organisations identified improved productivity;
- 84 percent of organisations reported improved quality of software products;

- 46 percent of respondents reported that development costs were unchanged using agile methodologies, while 49 percent stated that costs were reduced or significantly reduced;
- 83 percent stated that business satisfaction was higher or significantly higher;
- 48 percent cited that the most positive feature of agile methodologies was their ability to 'respond to change rather than follow a predefined plan'.

Agile software development methodologies have since their inception claimed to improve the quality of the software product (Mnkandla & Dwolatzky, 2006). Agile methodology helps to achieve customer perceived value (Gat, 2006).

Another question is, 'Is agile methodology able to manage current trend in business and IT?'

- Current issues that the software engineering community faces are changing business requirements, dynamic market situation and new technical challenges and agile methods are able to successfully address the challenge of the rapid development and changing customer demands (Pikkarainen & Passoja, 2005).
- Agile methods have gained tremendous acceptance in the business environment since the late 1990s because they are able to cope with quick changes in business requirements, focus on effective relationships between developers, customers and the project team and support fast and early product delivery (Huo, Verner, Zhu, & Babar, 2004).
- Agile methodologies such as Extreme Programming and Scrum promise increased customer satisfaction, lower defect rates, faster development times, and a solution to rapidly changing requirements (Boehm & Turner, 2003).

The numerous success stories highlighting the benefits experienced by organisations that have successfully adopted agile practices are a clear indication of the value of agile methods (Sidky & Arthur, 2007). Results from a survey done in 2006 at Microsoft to identify what the participants thought were the top 10 benefits with agile development are listed below in table 2-7 (Begel

&Nagappan, 2007b). The top benefit was improved communication and coordination among team members. It was seen as useful to bring testers, developers, users, and business all together. The second most cited benefit was quick releases. This was a consequence of continuous integration, where workable software was released every few weeks rather than months or years.

Table 2-7: Benefits to agile development methodologies (Begel & Nagappan, 2007b).

No.	Benefits with agile development	Number of Participants
1.	Improved communication and coordination	121
2.	Quick releases	101
3.	Flexibility of design – Quicker response to changes	86
4.	More reasonable process	65
5.	Increased quality	62
7.	Better customer focus	50
8.	Increased productivity	28
9.	Better morale	23
10.	Testing first	22

While agile methodologies can be seen as very effective in the current software development market, there are some drawbacks and barriers or limitations, which are discussed in next section.

2.6.2 Limitations and Key Barriers to Agile Methodologies

The enormous usage and acceptance of agile methods does not justify an uncritical review. Drawbacks identified on agile methods include:

Attitude and Culture of the Organisation: The real challenge is to ensure the culture and attitude of the software development team and business are supportive of agile implementation or else developing using agile methodology will ultimately be

unsuccessful and unmanageable (Good, 2003; S. Misra, et al., 2010; Paul, 2013a). The expectation of customer involvement is highly important. 'Agile development is not just about technical change; it is about cultural change' (Hayes, 2003). Agile works and can work better with executive support and sponsorship (Heimgartner, 2006). Thus success of agile methodology depends a lot on the culture of the organisation.

Large Teams, Globally Distributed Teams, Cultural Barriers: With global software development growth, the major issue and challenging problem identified is communication and the agile methods rely a lot on communication, preferably face-to-face communication, instead of documentation (Passivaara & Lassenius, 2006). A counter argument against this barrier was that by learning key lessons about successfully scaling agile practices, large teams or even globally distributed teams can be managed well, to make the project a success (Gat, 2006).

Quality Team and Team Harmony Expectation: It is also a common understanding that agile expects highly qualified team members with good skills and experience and a mature software process is already in place in the organization (Coram & Bohner, 2005). Agile software delivery works best, when the groups of team members all work in the same direction and have a similar culture, thoughts and practices. Communication strategies adopted among team members will work for small to medium, highly cohesive teams, but when dealing with a large number of stakeholders there may be several challenges (Cao, et al., 2009). When everyone in the team follows the same practices with similar effort, then there is greater harmony (Rasmusson, 2006). Though these qualities are beneficial for any methodology, the need for quality team and harmony has been identified as a major requirement for agile methodologies.

This study helps to overcome the above three limitations. The research question directs attention towards understanding the attitudes and culture of the team. There is a real benefit seen in this research, as it not just helps with team management and culture, but it also helps with working among different cultures. With the current global market, any piece of study that provides an understanding of how to work with different cultures is essential. Cultural barriers and working in a globally distributed team are current issues in the software development community. This research will help practitioners work better, in implementing agile methods related projects and also will provide a foundation to academics for further research.

Other limitations that are identified are listed below:

Managing Contracts: One of the major drawbacks with agile methodologies is that when contracts are being formulated and a requirement specification is being documented, it is hard to clearly define the requirements. Thus, this will lead the software development companies to be able to develop 'as they please', leaving the customer unable to rely on legal means to enforce contracts (Good, 2003). This could lead to major problems and create issues for agencies.

Difficulty in Cost Estimation: A critical issue with the agile methodologies is that the task of cost estimation will become impossible and identifying the potential cost of development will become harder (Good, 2003). Due to unclear project scope, there are difficulties in identifying accurate estimates and tracking for agile projects. Due to the fact that the requirements can be added or updated at a later stage, estimation can be difficult. According to Keaveney and Conboy (2005), experience and past project data should be documented and used for subsequent projects. They also identified that the estimation process is an iterative one, whereby cost estimation and difficulty in contracts will be seen.

Sufficient Documentation: Other barriers related to software development that can affect agile methods include insufficient documentation. The question is 'How much documentation is enough?' and it is a crucial question to getting the balance right. Agile methodologies argue that the goal of the methodology is to develop software and that documentation is only useful as long as you reach this goal (Cozzetti, Anquetil, & Oliveira, 2005).

Possibility of Poor Design: Possibility for poor design or architecture due to the level of attention and refactoring used to cover up bad planning (Good, 2003), can be considered as one of the barriers in agile methodologies. Lack of architectural scalability can create irrecoverable architectural mistakes if formal design was not done well (Cao, et al., 2009). It becomes harder to design well and instead of getting it right the first time, the teams rely and redesign improvements as they go (Begel & Nagappan, 2007a). Designing and building only what is needed at that moment, with the confidence the software can be re-factored and improved evolutionary over time, can have a significant impact for better or worse.

Table 2-8: Problems with agile development methodologies (Begel & Nagappan, 2007b).

No.	Problems with agile software development	Number of participants
1.	Does not scale to larger projects	52
2.	Too many meetings	44
3.	Management buy-in	37
4.	Unfamiliar with agile	36
5.	Coordination with other teams	29
6.	Loss sight of big picture	29
7.	Culture	27
8.	No up-front design, bad design	23
9.	Lack of schedule	19
10.	Dev/Test integration is difficult	19

Table 2-8 highlights the top 10 problems with agile software development, as perceived by the respondents from Microsoft and the number of participants who cited it as a problem in the survey conducted in 2006 (Begel & Nagappan, 2007b). The top concern that was identified by the developers is whether these methods are scalable to larger software teams. Due to constant release and close communication, there may be difficulties in managing projects, if the number of team members grows. The other area of concern was 'too many meetings'. If a critical review of the problems listed above is analysed, it is obvious that these issues can all be avoided if managed well.

This study will offer management challenges for some problem areas related to agile implementation. From the top 10 concerns listed, two of the issues can be managed better with the help of this thesis. 'Coordination with other teams' and 'Culture' are two issues that have direct connection to this research and with the help of this thesis a better understanding to manage teams and culture will be seen. It is also noted that from further analysis of the problems listed in the above table 2-8, there are others that can indirectly be resolved with the help of managing the culture and the team effectively.

2.7 Summary

This chapter focused on concepts of agile methodology and techniques used in agile methods. The list of agile techniques compiled helped in structuring the questions for data collection. Understanding concepts and limitations of agile methods helped in formulating and contributing to the field of agile methods and culture. Chapter Two focused on agile methods and related topics, and Chapter three focused on culture and related topics.

CHAPTER 3
LITERATURE REVIEW – NATIONAL CULTURE

3.1 Introduction

Following the discussion in Chapter Two, which described and explained software development methodology, especially agile methodology, this chapter focuses on the literature on culture and related topics. From Chapter One, the researcher argued that there is a close relationship between agile methodology and culture. This chapter addresses the concepts and different definitions by experts in culture and introduces a detailed review of cultural dimensions.

This chapter begins with definitions related to culture, followed by a brief description of cross culture, and its importance and need for culture study. The next section reviews various cultural dimensions identified in the literature and subsequently cultural dimensions that are relevant to the study of agile implementation are selected. Brief descriptions of the selected dimensions are discussed, followed by the pros and cons of this model. A discussion of how this study addresses these limitations is given. The following section describes the challenges, specifically in implementing agile methods and inter-culture. The last section discusses the instrument selected for this study. Cultural dimensions are at a high level and for the purpose of this study, cultural agile attributes (defined in Chapter One) are collated, based on agile techniques (defined in Chapter Two) and the last section explains the process involved in consolidating cultural agile attributes. These cultural agile attributes are the foundation for data collection for this study.

3.2 Study of National Culture

This section starts with the common definitions of culture, as this common understanding of culture is critical to the study. Further to that, a brief note on cross culture is provided to show the current literature available. The need and importance for this study is emphasised based on the literature review conducted.

3.2.1 National Culture - Definition

There are a number of national cultural definitions and each of these definitions show a relevant claim to a meaningful understanding of culture (Jones, 2007). Several academics discuss and identify the choice of cultural dimensions most appropriate for conceptualising and operationalising culture (Dorfman & Howell, 1988; Hofstede, 1980a; Schwartz, et al., 1995). From studying the literature, a universally accepted definition of culture remains a difficult task, but all definitions generally relate to the shared ways of thinking, feeling and reacting, shared meanings and identities, shared socially constructed environments, common ways in which technologies are used, and commonly experienced events (House, Wright, & Aditya, 1997). Olie (1995) discusses over 164 different definitions for culture collected up until 1951.

Hofstede defines culture as, *"A collective programming of the mind which distinguishes one group from another"*(Hofstede, 1980a). Hofstede further defines culture as, *"Mental programming… patterns of thinking and feeling and potential acting"*(Hofstede, 1997). According to Jones (2007) the key term is 'programming', as culture is not something that is easily acquired, and is a slow process of growing into a society. Kluckhohn and Strodtbeck (1961) were among the first researchers who engaged in a systematic discussion of national culture. They put forth the concept of national value orientations and their influence on organisational systems.

Definitions of culture in the literature include:

> Culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, consisting of the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional ideas and especially their attached values; culture systems may, on one hand, be considered as products of action, and on the other as conditioning elements of further action (Kroeber & Kluckhohn, 1963).

> National culture relates to a set of traditions, values and beliefs that are shared by a group of people (Hofstede, 1980).

Jaeger (1990) defined culture as a system of shared meaning, where members of the same culture have a common way of viewing events and objects, and therefore are likely to interpret and evaluate situations and management practices in a consistent fashion (Jaeger, 1990).

Triandis (1994) defined culture as a set of human-made objective and subjective elements; he distinguishes the objective elements of culture from subjective elements. Objective aspects of culture include tools and technology, while subjective aspects include categorisations, associations, norms, roles, and values, which form some of the basic elements affecting socialbehaviour.

Culture is defined from a sociological context, as a basic set of assumptions that define people, what they pay attention to, what things mean, how they react emotionally to what is going on, and what actions they should take in various kinds of situations (Schein, 1992).

Culture is a set of underlying assumptions, norms, and beliefs shared by members of a group (Earley & Erez, 1997). According to Earley and Erez, it denotes a set of common theories and behaviours or mental programs that are shared by a group of individuals.

Culture is the way in which a group of people solve problems and that problems that people regularly solve disappear from consciousness and becomes a basic assumption, an underlying premise (Trompenaars & Hampden-Turner, 1997).

An analysis of these definitions clearly indicate that all these definitions have certain aspects in common: culture is learned, culture is associated with values and behaviours that are shared by a group and these values are passed from generation to generation. These definitions also provide an understanding that culture relates not only to societies (or nations) but also to different professional groups, organisations, and industries. National culture is largely based on distinctive cultural values, whereas professional, organizational or industrial culture is confirmed by distinctive practices (Hofstede, 1997).

This study focuses on national culture, focusing on a ‘software engineering’ society. Henceforth, when the term ‘culture’ is mentioned, it means culture in a software engineering society, within a particular nation and in following sections and chapters ‘culture’ and ‘societal culture’ are used interchangeably.

3.2.2 Cross Culture

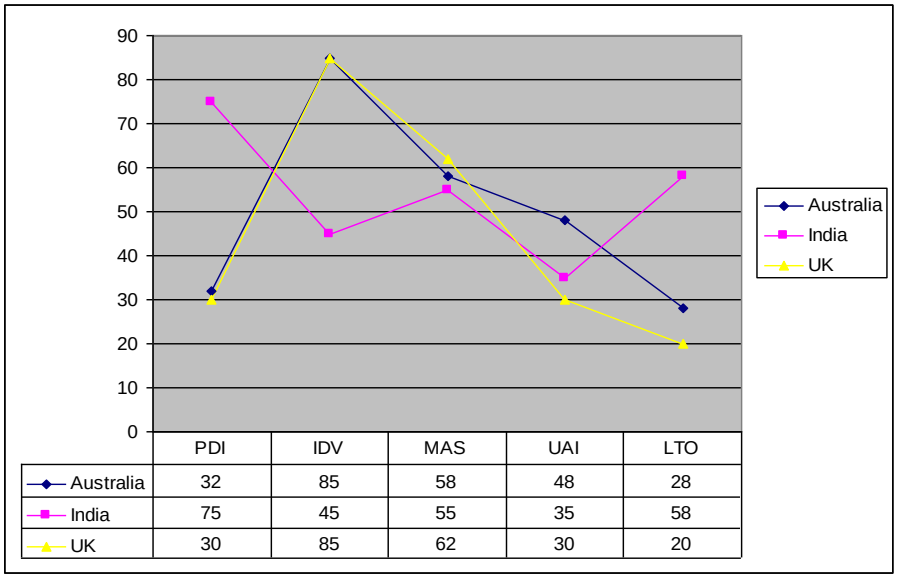
Further to the study of culture, and acknowledging the existing body of research, some authors discuss and believe that cross-cultural studies is in its infancy because of the frequent disagreement concerning how to define culture and epistemological differences between researchers (Sornes, et al., 2004). As organisations expand globally, more attention has been given to socio-cultural factors operating across nations (Kwantes, 2003). The importance of soft skills in different cultures, in North America, Australia, Asia and Europe were studied and the importance of team building and communication were seen as critical in these cultures (Ahmed, Capretz, Bouktif, & Campbell, 2012). Organisations working with other cultures and societies have become common and with the current global market, cultures are extended and have become complex. By understanding the culture of the team member, leaders can understand the underlying assumptions, beliefs and values of their team, and thereby develop greater awareness about the team (Gomes, 2012; Singh & Krishnan, 2007).

Below, a table and chart are provided in table 3-1 and figure 3-1, which shows the different values and complexity, when dealing with different cultures. The table and figure are provided based on the values calculated by Hofstede. The variance in numbers for different dimensions shows how difficult it can be to work with team members from different cultures.

Table 3-1: Selected country scores on the five cultural dimensions (Hofstede, 1980a).

	Power Distance Index (PDI)	Individualism (IDIV	Masculinity (MAS)	Uncertainty Avoidance Index	Long Term Orientation
Australia	32	85	58	48	28
India	75	45	55	35	58
United Kingdom	30	85	62	30	20

Figure 3-1 reflects Hofstede's five cultural dimensions 'Power Distance Index', 'Individualism/Collectivism', 'Masculinity/Feminity', 'Uncertainty Avoidance Index', and 'Long Term Orientation' in three different countries and a complex chart can be seen that reflects the difficulty in managing people from different cultures.



	PDI	IDV	MAS	UAI	LTO
Australia	32	85	58	48	28
India	75	45	55	35	58
UK	30	85	62	30	20

Figure 3-1: Cross-cultural reflection of power distance index and Individualism.

These values in turn helps understand different cultures better and how to manage and work together in an intercultural project. The highs and lows also indicate the diversity and difference in different cultures and the need for study to manage them effectively.

3.2.3 History and Importance

A brief description of the history and importance of culture is discussed in this section, to emphasise the need to include it in this study and the associated influence it has on this study.

Culture has long been recognised as important in explaining behaviour among people. Further, the need for cultural study has become critical to many aspects of business, especially when there is a requirement for a business to interface with people, either as customers, employees, suppliers or stakeholders. Knowing the criticality of the study of culture and the importance in current business trends, this study emphasises not just the study of culture, but also intercultural.

This problem of culture may be exacerbated when projects are multicultural. It has become common to have software development teams in more than one location. There have been many reasons for this change, including concern for cost, to gathering highly skilled resources, and to effectively cover investment requirements imposed by governments in foreign markets. Increases in global markets are seen as opportunities, increased access to expertise, round-the-clock service, fast response to demands and saving of travel costs (Kankanhalli, Tan, Wei, & Holmes, 2007). This trend is expected to grow and there is little possibility of it diminishing in the future. Increasing globalisation and managing projects globally, with teams in multiple locations, has become commonplace. Cultural factors may have an impact on the success of software development (Avital & Vandenbosch, 2000; Beise, 2004; Kaye & Little, 1996). Differences in culture have influence over people's attitude towards other cultures (Ng, Lee, & Soutar, 2007).

In recent years, multicultural practices and values have become significantly conspicuous in corporate businesses (Kanungo, 2006). According to Herbsleb (2007), globally distributed projects are rapidly becoming the norm for large software systems, even as it becomes clear that global distribution of a project seriously impairs critical coordination mechanisms (Herbsleb, 2007). Over decades, organisations have devoted considerable effort to address this issue. Cross-cultural research has had most value, when it has been able to provide substance to modern management practices and techniques (Jones, 2007). Connections between software development methodologies and cultural issues have been discussed previously (Abrahamsson, et al., 2002; Yourdon, 1986).

Greg Borchers of Sharp Laboratories of America reported that until studies were done on cultural factors, there was difficulty in understanding software development problems with two projects that involved software developers from India, Japan and the United States (Chand, 2004).Such issues have led the researcher to consider this as a significant problem that needs attention and this study involved similar research, in finding ways to work among different team cultures from different nations, to help implement software engineering methodologies such as agile methods. Thus, this study has highlighted the important and critical aspects of current issues such as inter culture [RQ1], intra culture [RQ2], and software development as important to the study. The research questions and findings will help provide a solution to the limitations expected in working inter culturally and intra culturally (as defined in Chapter Two).

3.3 Culture Study in Relation to Agile Implementation

The following sections describe the cultural context and the concepts used for the foundation of this study. The importance of work culture and self-organising teams were some aspects that were seen as significant in agile implementations (Ferreira, Sharp, & Robinson, 2011). This study goes on to highlight many cultural aspects that are believed to help implement successful software development projects. Analysing cultural studies, the researcher was able to review different cultural dimensions used by different researchers, which resulted in convergence into five distinct dimensions, directly related to agile implementation. Hofstede's three dimensions and Hall's two dimensions were considered appropriate for this study. A brief analysis of the five dimensions has been discussed. The next section analyses the pros and cons of these studies. The last section provides a table, with agile techniques identified from Chapter Two, and the five cultural dimensions identified in this section as a matrix. This matrix representation maps the five cultural dimensions to the agile techniques.

3.3.1 Overview of this Study – Cultural Context

This research discusses connections between different cultures and the cultural attributes that influence implementing software development methods (SDMs), specifically agile software development methodology. There is an ongoing debate in the software engineering community, over the usefulness and applicability of software development methodologies versus agile methodologies, as was presented in Chapter Two. It is also accepted that agile methods involve culture related influence (Cho, 2009; Ingalls & Frever, 2009; Strode, et al., 2009). When studying agile principles, it is clear that agile methods are defined, keeping people or cultural factors in mind. Specifically, based on the research on cultural issues related to software development teams, a model is proposed that can help predict what cultural changes are required to effectively implement agile methods.

3.3.2Convergence in Models of National Culture

There are many researchers and scholars who have contributed to culture study such as Kluckhohn & Strodtbeck, Hofstede, Hall and Trompenaars & Hampden-Turner (Hall, 1976; Hofstede, 1980a; Kluckhohn & Strodtbeck, 1961; Trompenaars & Hampden-Turner, 1997). Also some cultural dimensions are common among multiple researchers. However, there are some cultural dimensions that are specific to individual researchers. This previous knowledge of culture dimensions and studies helps current research by providing a foundation for future research.

Table 3-2 provides a matrix representation of studies conducted by different culture experts and their dimensions. This table shows where dimensions have been identified by more than one researcher.

Table 3-2: Study of cultural authors and their cultural dimensions.

Cultural dimensions	**Hofstede**	**Trompenaars**	**Hall**	**Kluckhohn & Strodbeck**	**Schwartz**	**Globe**
Individualism / Collectivism	✓	✓			✓	✓✓
Power distance Index	✓	✓			✓	✓✓
Uncertainty Avoidance Index	✓	✓				✓
Masculinity/Feminity	✓	✓				✓
Long term orientation	✓	✓		✓		✓
Universalism/particularism		✓				
Neutral/affective		✓				
Specific/diffuse		✓				
Human nature relationship		✓		✓		
Human time relationship				✓		
Human nature belief				✓		
Context			✓			
Time			✓			
Space			✓			
Mastery-Harmony					✓	
Humane orientation						✓
Performance orientation						✓

These cultural dimensions are studied keeping agile implementation in mind. Each dimension is reviewed to ascertain their relevance to agile implementation. Given the agile techniques defined in Chapter Two, the analysis was conducted to filter the cultural dimensions based on which have influence on agile method implementation.

3.3.3 Cultural Dimensions Suited for Agile Implementation

The cultural context is complex and multileveled. To overcome this issue, only those cultural dimensions that have direct influence in agile method implementation were considered as part of this analysis. The following table shows the discussion to select / not select a specific cultural dimension. The reason for consolidating these dimensions was to make this research manageable.

Table 3-3: Justification for selecting five dimensions from available study.

Cultural dimension	Description	Yes/No
Individualism / Collectivism	There was a connection and need for this dimension was seen by the author for agile implementation as agile methods require a good team for best solution	✓
Power distance Index	Again this dimension was seen as critical for this study as 'power and authority' can delay the decision making, and quick response etc.	✓
Uncertainty Avoidance Index	Tolerance for change was seen as an important aspect to agile implementation and was included in this study	✓
Masuclinity/Feminity	This dimension deals with social gender roles and it was not seen as directly related to agile implementation	X
Long term orientation	This dimension stands for the fostering of virtues oriented towards past, present and future. This dimension was seen as partly appropriate for agile implementation and was included as part of the dimension 'Time'	X
Universalism/particularism	This dimension discusses about following the rules and dealing with equally and fairly with circumstances. This aspect of cultural dimension was not seen directly related to agile implementation and part of it was also covered in Power distance index.	X
Neutral/affective	This dimension focuses on the degree to which people readily express their emotions. Though there was some connection to agile in relation to 'openness', this aspect was covered as part of the dimension 'individualism / collectivism'	X
Specific/diffuse	This dimension explains how different cultures see each element in the perspective of the complete picture or specific picture. This dimension was not seen as directly related to agile implementation and not included in this study	X
Human nature relationship	This deals with human nature and the ability to change. This dimension was not seen as related to agile implementation and was not included	X
Human time relationship	This dimensions speaks of human focusing on past, present and future and this dimension was treated and was included in dimension 'Time'	X
Human nature belief	This dimension looks at how much control the nature has towards people. This was not considered as related to agile implementation	X
Context	This covers the way in which people communicate and this dimension was seen to have a good connection to agile implementation and was included in the study	✓

Time	The time dimension has two aspects: the importance a culture gives to time (time commitment and staying on schedule) and their approach to time management 'Long term Orientation' and 'Human time relationship' were merged into this dimension and called 'Time'	✓
Space	This dimension looks at space and the relationship between space and people. This was not seen related to agile implementation and was not included in this study	X
Mastery-Harmony	This dimension incorporates ideas of how people cope by proactively managing or content to accept etc. This dimension is included as part of power distance index	X
Human orientation	This dimension looks at human nature to be fair, altruistic, generous, caring and kind to others. These are partially covered in other dimensions and was not seen as related to agile implementation and not included	X
Performance orientation	The degree to which people are encouraged and rewarded for performance improvement and excellence is covered here. This was not seen as related to agile implementation	X

Thus these five dimensions (indicated with a tick in the last column of the table) were used to analyse software engineering community to study the cultural factors of different national cultures. The researcher believes these five dimensions are a good coverage of the aspects needed to be studied in relation to agile methods implementation.

Table 3-4: Core cultural dimensions related to agile implementation.

Cultural dimensions	Hofstede	Trompenaars	Hall	Kluckhohn	Schwarts	Globe
Individualism / Collectivism	✓	✓		✓	✓	✓✓
Power distance Index	✓	✓			✓	✓✓
Uncertainty Avoidance Index	✓	✓		✓		✓
Context			✓			
Time	✓	✓	✓	✓		✓

Based on detailed analysis and study three dimensions of Hofstede's and two dimensions of Hall's were seen as covering all the dimensions needed for this study.

Table 3-4 lists the five cultural dimensions as discussed above. They are:

1. Individualism / Collectivism (Hofstede)
2. Power distance index (Hofstede)
3. Uncertainty Avoidance Index (Hofstede)
4. Context (Hall)
5. Time (Hall)

The following section provides more discussion on the selected three dimensions of Hofstede and two dimensions of Hall to understand the dimensions better.

3.3.4 Hofstede's Model

Hofstede's work on culture is widely cited (Hofstede, 1997; Jones, 2007). Hofstede's cultural study and observations have provided researchers and practitioners with a highly usable and valuable view into the dynamics of cross-cultural relationships. The literature on societal culture was scarce until 1970, when Hofstede reported his detailed study of cultural values in more than forty countries around the world providing meaning to cultural differences around the world. Geert Hofstede's research effort commencing in 1980 has been recognised by most researchers and study has been used by many researchers and practitioners (Hofstede, 1997). The study was conducted with over 60,000 people responding to 116,000 questionnaires over 50 countries. Hofstede worked at IBM at that time and conducted data collection over the years 1967 to 1978. From the data collected, Hofstede was able to provide a factor analysis of 32 questions in 40 countries. Based on the study, Hofstede identified four cultural dimensions (Hofstede, 1980b)

1) Power distance index (PDI)
2) Individualism / Collectivism (IDV)
3) Masculinity (MAS)
4) Uncertainty avoidance index (UAI).

Hofstede's work has been identified as a source for many other studies and his contribution to the field has been recognised by many scholars. A subsequent study revealed a fifth dimension.

5) Long term orientation (LTO)

As discussed in previous section, not all five dimensions are discussed here; only the three relevant cultural dimensions of Hofstede in relation to agile method implementation are discussed in following sections.

3.3.4.1 Individualism - Collectivism

The dimension of individualism-collectivism is one of the major cultural dimensions discussed by theorists across disciplines (Hofstede, 1980b; Wong, 2001). Individualism-Collectivism dimension focuses on human togetherness. Individualism is the nature of dealing between individuals in a society and the approach of individuals to only look after themselves and their immediate family primarily. According to Hofstede, a culture that is high on individualism would value individual authority and achievement, the right to make self decision and self opinion, and autonomy. Collectivism is the lifestyle where people in a society are integrated and intertwined from their birth onwards and they have a close relationship with each other in their groups and continue to protect and help each other throughout people's lifetime Therefore, on the Individualism-Collectivism continuum, a culture high on collectivism would value group's well-being more than individual desires.

3.3.4.2 Power Distance Index

Hofstede defines power distance as "the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally; from relatively equal (that is, small power distance), to extremely unequal (large power distance)". In practice, a culture that has a higher power distance value accepts decision of superiors without consultation and is generally fearful of disagreeing with superiors. A high power distance culture feels that inequality is acceptable and it the normal way of behaving in the world.

3.3.4.3 Uncertainty Avoidance Index

Uncertainty avoidance index (UAI) is the extent to which in a culture members feel threatened by uncertainty or unknown situations. In uncertainty avoiding nations, people are more expressive, and in uncertainty tolerating nations the expression of feelings is inhibited. High level of stress and anxiety are seen in people in high uncertainty avoidance cultures and they expect a strong need for consensus when they are dealing with uncertainty that is inherited in life. They exhibit rule orientation and prefer employment stability.

3.3.5 Hall's Model

While Hall's publication covered countries or societies in each group, he did not conduct systematic research to provide scores or dimensions for countries similar to Hofstede's work (Tamas, 2007). Hall's work has assisted academic research and studies at universities (Rogers, Hart, & Mike, 2002). Hall's research results in a dimensional model that examines culture from a more anthropological standpoint (Hall, 1976). As part of this research two cultural dimensions of Edward T Hall are studied and discussed. They are, time (polychromic vs. monochromic) and communication patterns (high context vs. low context).

3.3.5.1 Time

Hall's concept of time deals with the ways in which cultures structure time, how cultures perceive and manage time. A linear approach is considered for time in a monochromic culture and here only one event takes place at a time. Individuals from a monochromic culture see time as being divided into fixed elements and can be organised, quantified and scheduled. Activities such as meetings have a definite start and end time and many scheduling mechanisms are enforced to avoid interruptions. Here planning is seen clearly and lists keep track of activities and organise time. On the other hand, in a polychromic culture, time is considered more flexible. Here it involves many things at once, usually with varying levels of attention to each. Time is continuous here, moving from an infinite past through the present into the infinite future. Interruptions are common here and many activities are handled at the same time. In a polychronic culture, the preference is not to have detailed plans imposed, but to make own plans and meet deadlines in own way.

3.3.5.2 Context

According to Hall, a communication pattern falls within high context and low context. He identified high-context and low-context cultures as primarily concerned with the way information is communicated. In a low context culture the speaker is expected to be explicit in their messages. The speaker's intensions are directly stated. In a high context culture, the speaker assumes that the others in the team understand the conversation and because of this there may be confusions seen during conversation.

Although this concept is one of the easiest to witness in intercultural projects, these communication differences poses considerable challenges

3.3.6 Hofstede Model – Pros and Cons

Hofstede's work has been simultaneously appreciated and criticized (Soares, Farhangmehr, & Shoham, 2007). Hofstede has provided a good base for culture study and many scholars have conducted research and study based on the foundation that Hofstede has provided. Further, there has been a considerable amount of research conducted based on Hofstede's dimensions.

3.3.6.1 Argument for Hofstede's Study

While there are many criticisms for Hofstede's study (discussed in section 3.3.6.2), there is enough evidence to suggest that Hofstede's research is one of the most widely used studies. In addition, qualitative reviews covering cross-cultural studies increasingly reference Hofstede's research (Taras, Kirkman, & Steel, 2010). Academics and practitioners have heavily used Hofstede's study to research their own research as defined in Table 3-5. With the current demand for culture study, Hofstede's work has helped and met the demand effectively. Table 3-3 below shows how frequently Hofstede's study has been used.

Table 3-5: Past national culture studies.

Title	**Authors**	**Researcher**
Towards modeling the effects of national culture on IT implementation and acceptance	Veiga, Floyd &Dechant (2001)	Hofstede
Organisational citizenship and withdrawal behaviors in the USA and India: Does commitment make a difference?	Kwantes, 2003	
The reflexivity between ICTs and Business culture: Applying Hofstede's theory to compare Norway and the United States	Sornes, Stephens, Saetre, Browning (2003)	Hofstede
Cultural consideration in business process change	Martinsons& Davidson, 1998	Hofstede, Bond
Analysing and Understanding cultural differences: experiences from education in	Livonen, Sonnenwald, Parma & Poole-	

library and information studies	Kober (1998)	
Non-face-to-face international business negotiation: How is national culture reflected in this medium?	Ulijn, Lincke $ Karakaya (2001)	Hall
Dimensions of National culture and corporate adoption of IT infrastructure	Png, Tan & Wee (2001)	Hofstede
Mexican and Swedish Managers' Perceptions of the Impact of EIS on Organisational Intelligence, Decision Making, and Structure	Leidner, Carlsson, Elam & Corrales (1999)	
Cross-cultural study: Perception, Usage, and Adoption of Technology	Prabhu, Greving	Common cultural theories
Customer evaluations of after-sale service contact modes: An empirical analysis of national culture's consequences	Van Birgelen, Ruyter, Jong &Wtzels (2002)	
The structure of work perceptions among Hong Kong & US IS Professionals: A multidimensional scaling test of the Hofstede Cultural Paradigm	Bryan, McLean, et al. (ACM 1994)	Hofstede
The Influence of Culture on Usability	Vohringer-Kuhnt	Hofstede
A cross-cultural investigation of the use of knowledge management systems	Yoo, Ginzberg, Ahn	Hofstede
Cultural Influence on User Preference on Groupware Application for Intercultural Collaboration (2010)	Suadamara, Werner, Hunger	Hofstede, Gudykunst, Triandis and Hall

Hofstede was considered a pioneer who constructed framework for research related to culture and cross-cultural issues (MacGregor, et al., 2005a). Hofstede's framework is simple, practical, and usable (Soares, et al., 2007). This work provides the foundation that helps build cross-cultural study. Hofstede has done groundbreaking work which helped create valuable guidelines. On the other hand, Hofstede's work has several shortcomings, which are discussed in the following section.

Though Hofstede's model is widely used, such a piece of work does rarely escape criticism. Though plenty of credits were given to the study including identifying Hofstede's study as a base that has helped research, there are some criticisms that are discussed in the next section.

3.3.6.2 Arguments Against Hofstede's Study

Though Hofstede's work has been used in many researches, Hofstede's study has been controversial and there have been arguments against Hofstede's work. Some of the issues are captured here.

Data Collection Appropriateness: As culture is seen complex, more questioning and analysing is needed in measuring culture. It is hard to measure culture with quantitative study such as surveys. Hofstede addresses this criticism by saying that though surveys are not the only method to use, it is one method that was used (Hofstede, 1998).

One Company Approach: This is perhaps the most frequently cited criticism (Soares, et al., 2007). Hofstede's study was conducted only at one company and this cannot possibly reflect the entire culture of a country. Against this, Hofstede points out that the use of a single multi-national employer eliminates the effect of the corporate policy and management practices from different companies influencing behaviour differently, leaving only national culture to explain cultural difference (Hofstede, 1980b). But in reality, the tendency for a company to represent the whole culture does not reflect true national culture.

Data Too Old: Some researchers have claimed that the study is too outdated to be of any modern value, particularly with today's rapidly changing globalisation and internationalization (Soares, et al., 2007). Thus the findings might be believed to be outdated. Although Hofstede does not agree (Hofstede 1998, pg. 481), many researchers find culture to be a dynamic, constantly changing field. With the current globalisation and multicultural influence there is a lot of change in different national cultures. Cultures are merging, technology is changing the way we communicate, and globalisation is changing the way we trade and interface (Jones, 2007). Hofstede argued that culture change is basic enough to invalidate the country index scores and should not be recognisable for a long period of time period, perhaps until 2100 (Hofstede, 2001).

Cultural Heterogeneity: Hofstede's study assumes the national population to be a homogeneous culture. In the current market, there are many cultures that are heterogeneous due to globalisation. A criticism against Hofstede work was that he treated large nations such as Australia and India as a single unit (Singh & Krishnan, 2007). Even in Australia, we could openly see different cultures working together and to tie down a homogeneous culture to the whole nation is not accurate. Some authors on Indian culture have identified the diverse nature of culture that are part of the society,

but still feel that there is an underlying unity and similarity behind the diversity (Gupta, 2002). Hence, it may be reasonable to use a common scale to measure the whole nation.

Applicability and Generalisation: Critics believe that these cultural dimensions do not reflect and apply to all cultures (Soares, et al., 2007). Some theories and practices that have been developed in the Unites States have been criticised by some researchers that their applicability to other countries and cultures need to be re-examined (Kwantes, 2003). Some researchers believe that Hofstede's cultural dimensions have western influence and may not be suitable for all cultures.

Better Dimensions: Hofstede's dimensions are very high level and broad. A detailed study of culture will require a further layer of detail to study in depth.

While the criticisms may be sound, Hofstede's research is still one of the most widely used pieces of research among scholars and practitioners (Martinsons & Davison, 1998; Vogel, Davison, & Shroff, 2000).

3.3.7 Hofstede's Study Limitations vs. this Study

As part of this research an attempt was made to try and avoid the criticisms that were raised about Hofstede's study. As part of this culture study, the researcher has pre-empted the arguments against Hofstede's study. Limitations identified in the previous section are listed below in table 3-6 and further analysed to show how these limitations are avoided in this research.

Table 3-6: Review study based on Hofstede's limitations.

Limitations of Hofstede's study	**Evaluation based on this research**
Data collection appropriateness	Hofstede's study was criticised for using surveys. Considering the concern of using surveys as the data collection method, this study used interviews and observations as a mechanism to collect data. The researcher believed this study will benefit by using interviews and observations as understanding the culture in depth can be aided by asking more leading questions as appropriate.
One company approach	To avoid this limitation, study involved collecting data from multiple organisations of medium to large size.

Data too old	New data was collected as current as possible.
Cultural heterogeneity	Hofstede assumes that the national culture to be homogeneous. To avoid assumption of cultural homogeneity, this study collected data from smaller groups such as software engineering community; this study also made sure that the cultural heterogeneity was considered while conducting data collection.
Applicability and generalisation	To avoid applicability to only specific cultures, this study has considered the cultural dimensions used to study and categorise the cultural dimensions suitable for this study in implementing agile methods.
Better dimensions	Considering the five dimensions, the researcher felt that these dimensions need more depth to it. This study involved combination of dimensions from different authors and keeping these dimensions as a foundation, they were studied further and broken down to get to the next level detail. This will help avoid the criticism that the cultural dimensions were too broad.

3.3.8 Match Agile Techniques to Relevant Cultural Dimensions

Further to selecting the five cultural dimensions that this research is based on, a co-relational match was conducted to see if all agile techniques could match with at least one cultural dimension. This action was to make sure that all required cultural dimensions that are needed to analyse agile methods implementation were identified. Details of a match between cultural dimensions and agile techniques are provided in table 3-7.

Table 3-7: Impact of cultural dimensions in agile techniques.

	Agile Technique	**Individualism/ collectivism**	**Power distance index**	**Uncertainty avoidance Index**	**Time**	**Context**
1	Daily builds of complete system		✓		✓✓	✓
2	Iterative development	✓			✓✓	✓
3	Iteration of fixed length	✓			✓✓	✓
4	Incremental development		✓		✓✓	✓
5	Customer on-site	✓				✓✓
6	Frequent delivery	✓			✓✓	✓
7	Whole team works same location	✓	✓			✓✓
8	Dedicate meeting place					✓✓

9	Daily team meetings	✓	✓			✓✓
10	Testing is integrated	✓✓			✓	
11	Project management emphasis		✓	✓✓		
12	Communication	✓✓				✓
13	Collaboration	✓✓	✓			✓
14	Coordination	✓✓			✓	✓
15	Knowledge sharing	✓✓	✓			✓
16	Working with uncertainty			✓✓	✓	
17	Empowered to make decisions		✓✓	✓	✓	
18	Courage to make mistakes		✓✓			
19	Requirements as prototypes rather than text	✓				✓✓
20	40 Hours week				✓✓	
21	Pair programming	✓	✓			✓✓
22	Refactoring					✓✓
23	Small software product releases	✓			✓✓	✓
24	Collective ownership of code	✓	✓✓			✓
25	Champion role		✓✓			✓

The number of ‘ticks’ indicate how strong the relationship is. To keep it simple one or two ticks are used. Table 3-7 shows that all agile techniques identified can be matched to a cultural dimension.

For example ‘pair programming’ has a strong relationship with what communication style is seen in that culture. But in addition to how communication is done, the ‘individualism / collectivism’ and ‘power distance index’ are also important for pair programming to work well. If the nature of the culture is to work in a collective manner, and to help each other, then the accessibility of ‘pair programming’ technique is higher. With regards to ‘power distance index’ if the nature of the culture is that the hierarchy is flat, then the two members will be able to work in less controlled manner and will be happy to share and work with less ego clash. Another good example is ‘frequent delivery’. For this technique to work, ‘time’ should be well managed and prioritisation and commitment to delivery is critical to this technique. In addition to being able to deliver on time, another important aspect is to be able to work well with each other. Thus to achieve ‘frequent delivery’, the team members will need to be able to work in a collective way and help each other. It will also be expected that the communication style is good so that the delivery can be managed well and openly discussed.

3.4 Cultural Challenges

This section discusses the two challenges that arise in relation to culture in this research. The research questions are:

> Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?
>
> Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?
>
> Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

The challenges described below are based on the research question. The first challenge is related to the first research question and discusses the cultural challenges in implementing agile methods within a team and the second relates to second research question and analyses the challenges involved with global market where teams work across different cultures.

3.4.1 Cultural Challenges in Implementing Agile Methods

Hofstede (1997) conceptualises culture as programming of the mind; however people are not programmed like computers; human beings have a basic ability to deviate from their cultural programs in creative ways. The challenge in implementing agile also includes training the human mind to shift to the values that help implementing agile. There are two major challenges seen which are challenges with the process and challenges related to culture. This study analyses the cultural aspects of implementing agile.

Cross-cultural studies have shown that the assumptions that hold for one country may not be suitable for another and not shared by all the cultures of the world (McSweeney, 2002). When teams from different cultures interact, the complexity of work relationships can result in extra challenges (Ahmed, et al., 2012). It is anticipated

that there will be unique dimensions in implementing methodologies in different cultures (Metcalf, Bird, Peterson, Shankarmahesh, & Lituchy, 2007). The next question that arises is whether large and diverse nations such as Australia, and India can be assumed to have one common culture. This study uses a small group namely the software engineering community.

Researchers have called for a re-examination of theories and practices that have been developed in the United States for their applicability and generalisability to other countries and cultures (Eriz, 1997). The thinking of managers about such concepts can be different across different cultures (Singh & Krishnan, 2007). Martinsons and Davison also discuss that when theories tend to be developed in a specific cultural environment there is an expectation to transfer seamlessly to a different cultural environment, but this is not always true and easy (Martinsons & Davison, 1998). Significantly there are concerns that agile methods are inherently Western in orientation and do not translate well into other cultures (MacGregor, et al., 2005a). According to Hofstede(1997), foreign companies have a tendency to use their own management control systems in the host countries without taking into account cultural sensitivities. This research studies the nature of different cultures with detailed analysis in relation to implementing agile.

Therefore, the effect of national culture on the relationship between agile techniques and cultural dimensions is an important area of research. This research examines if this is true and what changes are required for cultures to successfully implement agile.

3.4.2 Cultural Challenges in the Global Market

In addition to software project failures, global software development is facing a variety of challenges, including the challenge of cross-cultural management. The importance of culture in global teams was highlighted by many researchers and practitioners (MacGregor, et al., 2005a). When liaising and dealing with another country it is important to have a good understanding about the culture that the person is dealing with so that it will help to build up sustainable and good relationships. Understanding about different cultures can help in identifying how to behave in a business situation and helps to know why people from other countries' act in a certain way. This knowledge of intercultural understanding is crucial and can be the main factor that determines success or failure of a project (MacGregor, et al., 2005a).

It is no longer unusual for a large software project to have teams in more than one location, often on more than one continent. Many forces have conspired to bring about this situation, including concern for cost, the need to tap global pools to acquire highly skilled resources, finding an appropriate mix of expertise for a project, satisfying investment requirements imposed by governments in foreign markets, and mergers and acquisitions (Herbsleb, 2007). There is little reason to expect these factors to diminish in the future. Rather, it appears that we face increasing globalisation of markets and production, increasing the pressure to distribute projects globally.

This study addresses problems that arise when developers from different culture work together and also focuses on problems that originate in gaps between a national culture and the culture that is inspired by a given software development methodology, here agile methodology. This research deals with the connection between cultural characteristics and the willingness of software engineering teams to adapt a given software development methodology.

Global economic integration is growing rapidly and acceleration of this integration has been facilitated by information and communication technologies which allow the creation of organisations that span national and regional cultures (Kaye & Little, 1996). According to Kaye, organisations that distribute centrally developed systems must either accommodate such differences, or demand that end user groups adopt the technology (Kaye & Little, 1996). Second, despite several companies using agile methodologies in different cultures, there is a lack of agile, societal-culture related research in the software community. Third, according to Chow et al., (1991), Harrison (1992), Hofstede (1991) and O'Connor (1995), most of the existing management practices and processes were developed in Western countries for their own needs. This research compares Indian national culture to verify this issue.

While global software development (GSD) is becoming a way of life, such work takes much longer than co-located work (Herbleb, 2003), and suffers from a wide range of problems (Olson & Olson, 2000). In a traditional, co-located project, teams with a history of working together have naturally built up a number of ways of coordinating their work (Herbsleb, 2007; Ahmed, et al., 2012). According to Herbsleb (2007), they have a shared, defined process or just by acquiring a common set of habits and vocabulary over time. There is relatively little miscommunication as teams share a common native language as well as national and corporate culture. Geographic distance profoundly affects the ability to collaborate (Olson & Olson, 2000). Global interaction

has become a reality for business enterprises but global acceptance of the facilitating technologies is not a certainty (Kaye, 1996). The cultural differences that underpin business practices must be addressed as intercultural differences (Kaye, 1996).

3.5 Developing an Instrument for Study

This section looks at the selected cultural dimensions. These cultural dimensions are at a high conceptual level and it is clear that more detailed culture related classifications are required to answer the research questions. The researcher collated set of cultural agile attributes are listed and the match between cultural agile attributes and agile techniques defined in Chapter Two are analysed.

3.5.1 Cultural Dimensions – Is It Suitable?

‘Cultural dimensions’ are a widely accepted measure to study culture and inter-culture. However, detailed reflection of the cultural dimensions indicated that the cultural dimensions are of a very high level and for the purpose of this study cultural dimensions will need to be defined at the next detailed level down. When reviewing the cultural dimensions in relation to agile techniques, the researcher could see a need to be more specific in the cultural dimensions.

The agile techniques were reviewed and by studying the cultural dimensions, agile principles defined by the Agile Manifesto and agile techniques defined in Chapter Two, it was possible to define some more specific culture related agile attributes. These attributes are called ‘cultural agile attributes’ and this term is used throughout the thesis. The five cultural dimensions that were selected for this study are reviewed and deconstructed into smaller meaningful ‘cultural agile attributes’.

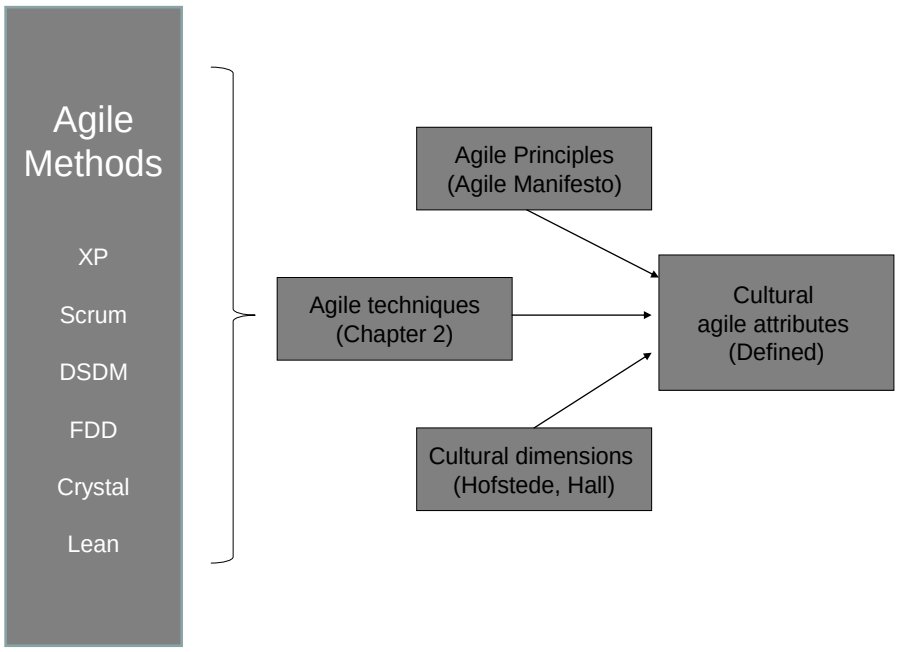


Figure 3-2: How do we define cultural agile attributes?

Figure 3-2 shows the flow which helped to collate cultural agile attributes. This model first defines the term 'cultural agile attributes'. Cultural agile attributes are used as a basis to compile the interview questions. These attributes are defined keeping ‘culture’ in mind and they are helpful for this thesis to study the cultural aspects in relation to agile implementation. Then, based on these mappings, the fitness of agile methods implementation to a culture is examined. It is proposed that this fitness can serve as a tool for predicting the degree to which agile methods will be accepted by a specific national culture in general, and by a specific team that is part of that culture. This research will also help in global software development where the software team will be able to establish a good understanding in working together in relation to agile methods implementation.

The following table 3-8 reflects the breakup of cultural dimensions into cultural agile attributes. Literature review provided some attributes that were collated based on agile techniques that are culture related. These cultural agile attributes are defined to make sure all the aspects of agile in relation to culture are covered. These researcher collated cultural agile attributes were sent to agile experts to confirm they are comprehensive. The expert’s view was that these were well defined and covered all important aspects of agile implementation.

Table 3-8: Impact of cultural dimensions in agile attributes.

	Cultural Agile Attributes	**Individualism /collectivism**	**Power distance index**	**Uncertainty avoidance Index**	**Time**	**Communication pattern**
1	Trust people more than process		✓			
2	Transparency		✓			✓
3	Team collaboration	✓				
4	Self-organising team	✓				
5	Dedicated team	✓				
6	Risk Taking			✓		
7	Innovation			✓		
8	Authoritative		✓			
9	Quick Decision Making		✓			
10	Open and honest communication	✓				
11	Tolerance for change			✓		
12	Meeting deadlines and expectations					✓
13	Proactiveness					✓
14	Time keeping				✓	
15	Management support	✓				
16	Blame Sharing		✓			
17	Negotiation					✓

This table shows how one cultural dimension can be broken done into smaller cultural attributes. For example individualism/ collectivism can be looked at from different perspectives such as: team collaboration, self organising team, dedicated team, open and honest communication, and management support. Then again looking at power distance index, the different cultural attributes that can be seen are: trust people more than process, transparency, authoritative, quick decision making, empowered, and blame sharing. These cultural agile attributes assist in understanding the different facets of a cultural dimension

3.5.2 Agile Techniques and Agile Attributes

As discussed in the previous section, agile techniques defined are matched with cultural agile attributes.

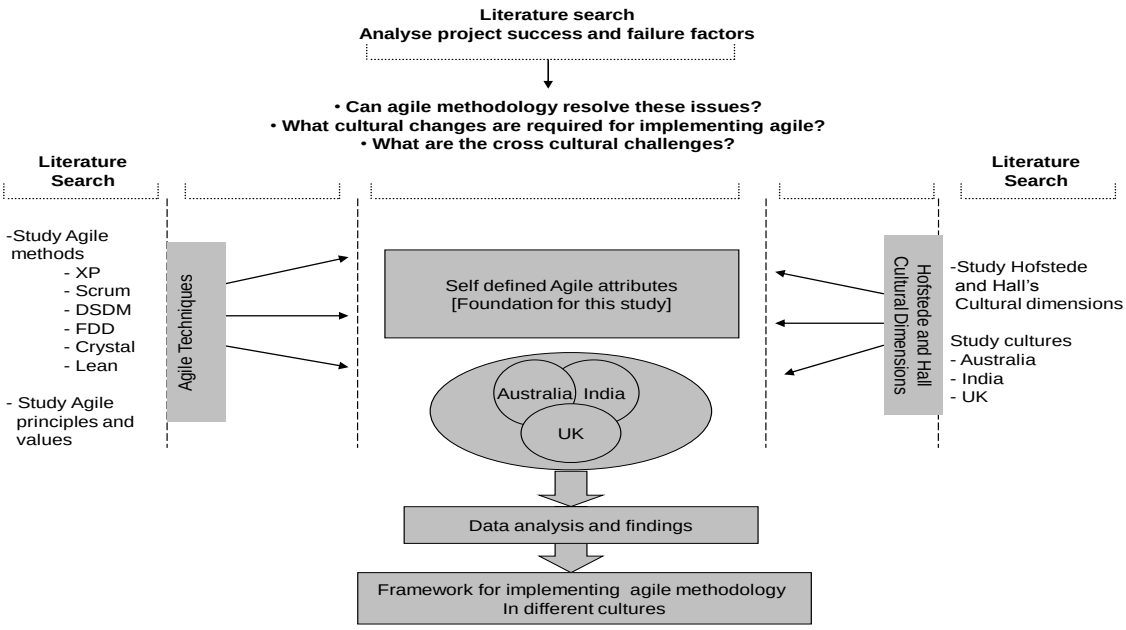


Figure 3-3: Background to the research.

This figure 3-3 was shown in Chapter One to explain the background to this research. The diagram is repeated here again to explain briefly the next steps. Table 3-9 explains a connection between agile techniques and cultural agile attributes.

Table 3-9: Matrix representation of agile attributes and agile techniques.

Cultural Agile Attributes / Agile Techniques	Trust people more than process	Transparency	Team Collaboration	Self-organising team	Dedicated team	Risk taking	Innovation	Authoritative	Quick decision making	Open and honest communication	Tolerance for change	Meeting deadlines and expectations	Proactive	Time keeping	Management support	Blame sharing	Negotiation
Daily builds of complete system				✓	✓							✓		✓			
Iterative development	✓	✓	✓					✓	✓								
Iteration of fixed length	✓	✓	✓						✓					✓			
Incremental development									✓								
Customer on-site										✓		✓					
Frequent delivery		✓	✓	✓	✓			✓	✓	✓				✓			✓
Whole team works same location	✓	✓															✓
Dedicate meeting place	✓	✓		✓	✓				✓	✓		✓					
Daily team meetings			✓	✓					✓	✓		✓	✓				
Testing is integrated		✓							✓	✓	✓			✓			
Project management emphasis		✓							✓	✓		✓		✓			
Communication	✓	✓	✓	✓	✓			✓	✓	✓							
Collaboration			✓												✓	✓	✓
Coordination										✓				✓			
Knowledge sharing	✓	✓	✓							✓							
Working with uncertainty								✓	✓	✓	✓		✓	✓		✓	✓
Empowered to make decisions		✓				✓	✓	✓	✓				✓				
Courage to make mistakes						✓	✓			✓			✓			✓	
Requirements as prototypes rather than text	✓	✓	✓						✓	✓	✓				✓		
40 Hours week			✓	✓	✓					✓				✓			✓
Pair programming	✓	✓	✓	✓	✓			✓		✓			✓	✓			
Refactoring																	
Small software product releases	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Collective ownership of code	✓	✓	✓							✓			✓			✓	✓
Champion role	✓	✓					✓	✓	✓	✓			✓				

The next step was to draft questions needed for the data collection. Based on the cultural agile attributes the questions were drafted. Interview questions are given in appendix D and an explanation of cultural agile attributes is given in appendix F.

The stages and steps involved in progressing are discussed in detail in Chapter Five.

3.6 Summary

This chapter focused on ‘culture’ based topics starting from history, the study of cultural dimensions defined by other cultural authors and cultural challenges. This chapter then continued to examine the relationship between cultural dimensions and agile techniques (defined in Chapter Two). A logical evolution from a list of cultural dimensions and agile techniques that lead to the final set of cultural agile attributes were also discussed in this chapter. This final list of cultural agile attributes was used as the basis for defining interview questions. The next chapter discusses the research methodology used in this research programme.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 Introduction

The purpose of this chapter is to explain the research approach and methodology adopted in this study. This chapter provides a comprehensive discussion of the research methodology and an account of the rationale for the choice of the research method and data gathering techniques selected for this study. Deciding on the appropriate research methodology is an essential part in defining the steps to be taken toward the completion of the research (Trauth, 2001). The decision involved determining which approach was the 'best fit' for the research questions. It was crucial for the researcher to understand the circumstances surrounding the research in order to select the most appropriate method(Given, 2006; Trauth, 2001). There are many definitions and interpretations of research methodology, research method and data gathering methods (Creswell, 2003; Kaplan, 1964). For the purpose of this study the terms were defined as follows:

- Research Methodology: The "description, explanation and justification" of the process used to identify the most relevant approach to the research. How the best approach and methods were determined and why they were determined to be the most appropriate to the research (Kaplan, 1964, p.18);
- Research Method: The "traditions of inquiry" or the specific approach used to undertake the research (Cresswell, 1998); and
- Data gathering methods (Techniques): The ways in which the data to be used within the research method can be gathered (McNiff & Whitehead, 2006).

The study domain, research problem, goal and questions guided the selection of an appropriate research method and data gathering techniques. Then, paradigms (explained later in the chapter) were applied as a lens to look at a real situation in relation to the research problem. Guided by these paradigms, the research questions were analysed and a research design has been developed to fit the research. The chapter explains the instruments used for data collection and analysis. Finally, the boundaries and limitations, researcher biases and the verification processes are discussed.

4.2 Study Domain

Software development methodology and societal culture are the study domains most closely aligned with this research. The literature on software development methodology was explained in Chapter Two and societal culture was discussed in Chapter Three. This study was about implementing software development methodology, specifically the agile methods in different cultures such as Australia, India, and United Kingdom. The relationship between software development methodology implementation and culture was studied to provide strategic outcomes and assist in process involved in software development and project management.

This section looks at the research approach chosen for this thesis, the process involved in selection and the reasons behind this selection.

4.2.1 The Research Context of the Study

According to Patton (2002) and Given (2006), a key starting point in selecting research method is an understanding of the intended goals or purpose of the research. They also explain that 'methodological appropriateness as the primary criterion for judging methodological quality'. Complementing this view, Denzin and Lincoln (2005) suggested the main areas to consider for research method selection are the research problem and research questions. With this advice in mind, the research problem, goal, outcome and questions were used as a basis to determine an appropriate research method. The review and analysis of the current literature in Chapters Two and Three also identified the paucity of research on this problem and thus demonstrated the limited potential for existing software development methodology and culture theories, concepts and frameworks to address this problem.

Though the research goal and questions were discussed in Chapter One, these topics are discussed again here in the context of literature study described in Chapter Two and Three. In support of this research problem, the research goal for this study was described as:

> The goal of this thesis is to determine the extent to which agile methods can be adopted in different cultures such as Australia, India and the UK and the changes required in values and principles to successfully implement agile methods.

Within the context of managing and implementing agile methodology in different cultures, the research questions addressed by the study are:

Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?

Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?

Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

These research questions revealed that this study is therefore largely exploratory research. There was little evidence of existing research in software development methodology, specifically agile methodology and societal culture. There have been several studies conducted in relation to methodologies and culture as separate research areas. But there are few with a combination of methodologies and culture, specifically agile methodology (Livari & Huisman, 2007). In fact, Strode, Huff and Tretiakov (2009) omitted agile methodology in their study and suggested this was an area of future interest. Though a strong relationship between agile and culture (Cho, 2009; Ingalls & Frever, 2009)has been studied in the past, implementing agile methods in different cultures has not been studied previously.

4.2.2 The Prospective Research Outcome

To identify the prospective research outcomes, the research objectives defined in Chapter One was analysed. The research objectives were:

1: To understand, compare and contrast different agile techniques in commonly used agile methods [Literature study].

2: To identify culture related agile factors that can be used to describe, analyse and understand culture which in turn will help to implement agile methods successfully [Literature study and Analysis].

3: To synthesise a framework for implementing agile approaches in different cultures [Data collection].

4: To provide an understanding of cross-cultural challenges seen when implementing agile methods in different cultures [Analysis].

The prospective high level outcomes based on research objectives are:

- Determine the existing techniques of agile methods and define culture related agile attributes (from research objectives 1 and 2);
- Increased body of knowledge in the areas of agile methodology development and cultural dimensions. This led to a theoretical framework related to cultural changes required for implementing agile (from research objective 3); and,
- Practical assistance and guidance to software development teams in developing a positive culture to work within the culture and cross-culture to deliver successful projects using agile software development methodologies (from research objective 4).

The outcomes will not just help software development project teams to work among them better, but also guide and suggest better techniques and approach to work in multicultural projects. This research also helped to implement agile in a better way and provide definitive techniques that can be used for each agile method chosen. This research also helped to find different agile techniques for different software development projects and to mix and match based on the software requirement. This research is centred on the concept of implementing agile methodology within a culture represented by a national boundary. It is believed that the implementation of an agile method will have an impact based on national culture due to the cultural agile attributes (defined in Chapter Three) that can make an influence on culture.

4.2.3 Research Approach

Research methodologies are often divided into two approaches, quantitative approach and qualitative approach. The quantitative approach can also be referred to as the scientific tradition specifically with numeric measurement, quantities and qualitative approach is known as naturalistic inquiry (Lincoln & Guba, 1985; Mertler, 2009). Qualitative is traditionally used in social sciences to gather in-depth understanding of human behaviour. Quantitative research methodologies utilises a deductive approach to reasoning whilst qualitative research methods typically utilise an inductive approach to reasoning (Mertler, 2009). Deductive reasoning works from the general to the specific, in a top-down manner. Inductive reasoning begins with specific observations and concludes in broader generalisation and theories and works using a bottom-up approach (Trochim, 2002). From Elo and Kyngas (2007) it is advised to use inductive approach if there is not enough previous knowledge to the study. This clearly indicated this study to select an inductive approach. These two approaches of reasoning have totally different "feel" to them when conducting the research. Inductive reasoning is more open-ended and exploratory in nature and deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses.

Figures 4-1 and 4-2 show a diagrammatic representation of these two approaches.

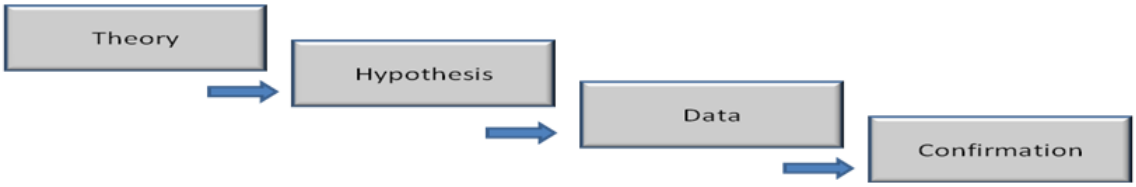


Figure 4-1: The Process of Deductive Reasoning(Creswell, Hanson, Clark Plano, & Morales, 2007; Trochim, 2002).

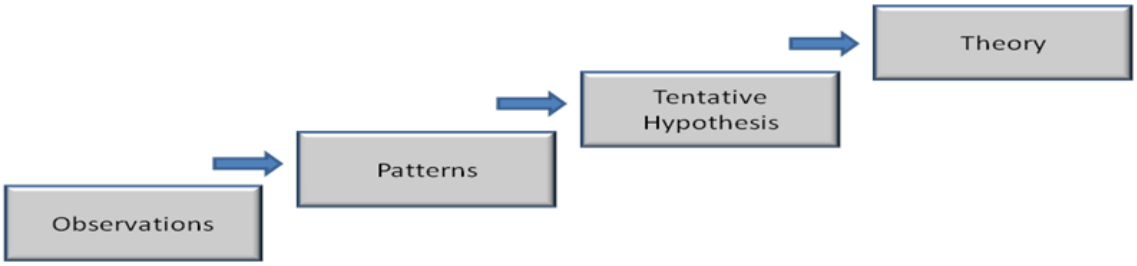


Figure 4-2: The Process of Inductive Reasoning (Trochim, 2002).

Given the limited research on the topic being investigated, this research can be classified as exploratory in nature and employs inductive reasoning.

Table 4-1: Comparison of qualitative versus quantitative research (Cook & Reichardt, 1979).

Qualitative Research	Quantitative Research
Phenomenological	Positivistic
Inductive	Deductive
Holistic	Particularistic
subjective centred	objective cantered
process oriented	outcome oriented
anthropological worldview	natural science worldview
relative lack of control	attempted control of variables
dynamic reality assumed	static reality assumed
discovery orientated	verification orientated
Explanatory	Confirmatory

Table 4-1 defines the differing characteristics of qualitative and quantitative methods. This research follows a qualitative methodology, which is appropriate to the 'how' type of research question (Walsham, Robey, & Sahay, 2007; Yin, 1994) and to contextually-based studies of socio-technical environments where reality is perceived as a composite of multiple and subjective views (Orlikowski & Baroudi, 1991). This thesis has a good match with qualitative characteristics.

The research is predominantly qualitative because the rationale for employing socio-cultural approaches is based on the recognition that the issues within cross-cultural collaboration between culture and agile are complex and multi-faceted and so could benefit from a combination of approaches. This approach can also be described as socio-technical. According to Philip Piety (2011)**,** socio-technical perspective looks at technical and people aspects, how they are used and interactions. Qualitative data, usually in the form of words rather than numbers, have always been the staple of some fields in the social sciences, notably anthropology, history and political science (Miles & Huberman, 1994). Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena (Lillieskold, 2002). These were designed to help researchers understand people and the social and cultural contexts within which they live. Additionally, the qualitative approach allows a further definition of the study's nature and limitations, as the objective of this qualitative research was not to provide statistical validation and universal generalisations but to discover patterns and develop theories or descriptions for a better

understanding of the subject under investigation (Yin, 1994).Therefore, since this study aims to generate understanding of human action in context, the use of qualitative data rather than quantitative data was chosen as appropriate for this study.

In summary, the qualitative nature of the research will help reveal hidden and unsuspected issues to be analysed. Further, it also helps in exploring attitudes, emotions, sensitive issues, opinions, and conceptions. In addition exploring context, relationships, processes were also possible. Qualitative research typically was enacted in natural settings focuses on context, is emergent and evolving, and is fundamentally interpretive (Marshall & Rossman, 1989). For this reason and as it is directly involved with culture and human attributes, a qualitative research style was seen appropriate for this research as it facilitates deeper understanding and affords the flexibility to respond to unexpected and new developments in the data. Thus the study domain of this thesis seemed well suited with the qualitative approach. This thesis used a qualitative method to empirically test the research questions. Using qualitative research in the area of implementing agile software development methods in different cultures provided a better understanding of the social and cultural context of the software development community and a clear indication of the changes needed to implement agile methods. Qualitative researchers believed that humans are conscious of their own behaviour, and of the thoughts, feelings and perceptions of their informants (Burns, 1997). Subsequently qualitative research helped researchers to understand the social and cultural contexts of people (Myers, 1999) and in turn to answer the research questions with more meaningful information.

4.3 Research Philosophy

The underlying assumptions of qualitative research are based on specific research paradigms. The three basic research paradigms are positivism (quantitative, scientific approach), interpretivism, and critical theory (Neuman, 2003). Paradigm comes from the Greek '*paradeiknyai'* to show side by side and is a pattern or example of something. "A paradigm may be viewed as a set of basic beliefs … that deals with ultimate or first principles" (Guba & Lincoln, 1994, p.107-108).

Guba and Lincoln (1994) state that the basic beliefs that define a particular research paradigm may be summarised by the responses given to three fundamental questions:

1. The ontological question i.e. what is the form and nature of reality?
2. The epistemological question i.e. what is the basic belief about knowledge? (i.e. what can be known)
3. The methodological question i.e. how can the researcher go about finding out whatever s/he believes can be known?

(Creswell, et al., 2007; Guba & Lincoln, 1994)

In relation to point 1, ontology refers to the nature of social reality and epistemology refers to the nature of knowing and the construction of knowledge(Burrell & Morgan, 1979). Table 4-2 encapsulates these philosophical perspectives and the matching qualitative characteristics.

Table 4-2: Characteristics of Qualitative Research (Creswell, 2003; Denzin & Lincoln, 2005; Guba & Lincoln, 2005).

Philosophical Perspective	Qualitative characteristics
Ontology: the nature of the reality	Reality is subjective; multiple as it presents the views of different participants
Epistemology: the nature of the relationship between the researcher and that being researched	Researcher is not independent and interacts with that being researched, subjective, multiple realities
Method: the nature of the process	Bound by context; accuracy and reliability obtained through a process of verification
Logic: deductive or inductive	Inductive process

Quantitative and qualitative methods may appear to be opposites derived from different philosophies, yet both are legitimate tools of research and can supplement each other, providing alternative insights into human behaviour (Burns, 1997). Qualitative research involves an interpretive approach and is able to study considering their natural settings trying to make sense and interpret meanings people bring to the researchers. The key to effective qualitative research is being systematic, thinking outside the box and logical thinking ahead to the challenges that the researcher will encounter (Barbour, 2008). Qualitative research involves studying information through collection of a variety of empirical materials such as case study, personal experience, introspective, life story interview, observational, historical, interactional, and visual texts that describe routine and problematic moments and meaning in individual's lives (Guba & Lincoln, 1994). According to Creswell (1994), 'a qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting'. Creswell, Hansen, Clark Plano and Morales (2007, p.238) remind researchers that they should begin their study with an analysis and interpretation of the philosophical perspective, questioning the nature of reality (ontology), what is known and how they know it (epistemology), the nature of the emergence of the research (methodology).

In order to determine the most appropriate paradigm for this study three common classifications offered by researchers and scholars were identified: positivism, interpretivism and critical theory (Denzin & Lincoln, 2005; Guba & Lincoln, 2005).

Table 4-3: Analyse paradigm and match to this study (Denzin & Lincoln, 2005).

Analysing paradigms	**Research paradigm**		
	Positivist	**Interpretivist**	**Critical Theory / Post modernism**
Ontological	An objective world, true reality exists with stable pre-existing patterns; science can mirror with privileged knowledge	Complex and dynamic world which are interpreted and experienced by people; social construction of reality	Conflicting underlying structures with critical reflection; structured contradictions
Epistemological	Can be verified hypothetically and probabilistically; knowledge is accurate and certain	Knowledge is gathered through subjective belief and observed phenomena; is a way in which people make meaning in context	Knowledge is dispersed and distributed; are constructed in the act of critique; promoting critical consciousness
Role of researcher	Objective, independent of the subject; values have no place in research, must eliminate all bias,	Brings own subjective experience to the research; values are an integral part of social life	Adopts role of facilitator encouraging participation and involvement; facts can never be isolated from values
Methods	Structured and replicable observation; empirical; experimental; Survey, verification of hypothesis, statistical analysis, Quantitative descriptive studies; tests, scales	Unstructured observation; open interviewing; field research conducted in natural settings; ethnography, participant observation, case studies, etc.	Participatory action research; field research, dialectical analysis; textual analysis

Table 4-3 presents a comparison of these three paradigms and the supporting details from the literature. From the table it is clear that positivist paradigm is centred on existence of natural phenomenon and they are direct and objective. The role of the research is to test theories that can be replicatable and generalizable (Bryman & Bell, 2003). As this study was carried out in a subjective manner rather than an objective manner, and it does not have strong theories the positivist approach was not considered for this study. The focus of critical theory is not just to understand theory or society which provides the details, but also to identify and focus on reconstructing the world. Critical theory requires some action based where it also involves careful collaboration and deployment and was not seen suitable for this thesis. As this study involves mental,

social and cultural phenomena and knowledge was framed based on review of analysis of what people think, this study can be discussed as adopting interpretivism. According to Guba and Lincoln (2005), the researcher was aligned to producing reconstructed understanding of the social world. The interpretivist column is shaded in grey in the above table 4-3 to show the similarity between interpretivist paradigm and this research.

Deciding in which paradigm this study will fall raises important methodological implications and therefore implies certain data collection methods. As the study involves individual software development team member's experience, this study lies within the interpretivist paradigm which is illustrated below:

- The reality of each software development team member's experience was within the individual's view point and the participant was subjectively involved in sharing his or her experience. People's view point of what they saw, felt and said was very important.
- In this study, knowledge was gathered not just from observing phenomena, but also on the beliefs, values, reasons and understanding of the participants.
- This study involved understanding of why people behave in a certain way and also involve study of mental, social and cultural phenomena.
- In this study it was clear that values were an integral part of social life – no values are wrong, only different.

The goal of this research was to investigate the influence of national culture on implementing agile. As explained in previous chapters cultures have a strong influence on agile software development methodology and depending on understanding and a study of the culture based on agile attributes will help improve project success and outcomes. This research is primarily qualitative, which is fundamentally 'interpretive' (Creswell, 2003). Interpretive research assumes that knowledge is derived from the process of interpretation and that the researcher's own world view and assumptions become part of the research process (Guba & Lincoln, 2005). The interpretive paradigm assumes that the world is ordered as a whole and is comprised of interwoven and complex variables that must be researched in relation to one another. This approach argues that it is impossible to separate values and theory from research. Interpretive research aims to understand meaningful social action through precise descriptions of people's actions and words in a particular research context. Using a variety of different

methods can strengthen findings in interpretive approaches (Denzin & Lincoln, 2005). In general, the interpretive approach "is the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (Neuman, 2003).

This research has been framed to explore interpretations that participants have of their national culture with regards to culturally based agile attributes. The data collection also allows for interpretations that may be created with participants through their interaction in the research process. Discussing the interpretations may develop deeper understanding of their national culture and implementation of agile methodologies. In sharing this process with the researcher new and deeper interpretations may emerge and thus result in the co-creation of interpretations about the studied topics. The data collection was designed to collect interpretive, meaningful and rich data from a variety of different organisations.

4.4 Discussion and Rationale for Choice of Research Methods

Each of the paradigms has specific research methods which can be used for research. As this research falls under the interpretivist approach, there were few research methods that were identified as appropriate for this research such as subjective/argumentative, reviews, action research, case studies, descriptive / interpretive, future research and role / game playing (Galliers, 1990). Positivism emphasises objectivist approach to studying social phenomena and gives importance to research methods which focus on quantitative analysis such as surveys, experiments and the like. On the other hand, critical theory suggests ideology critique and action research as research methods to explore existing phenomena. Interpretivism which is the appropriate approach for this thesis stresses on subjective approach to studying social phenomena and uses research methods such as case studies and action research.

The range of qualitative, in particular interpretivist research methods listed ethnography, participant observation, interviews, case studies etc. as the research methods (Creswell, 2003; Denzin & Lincoln, 2003, 2005). With the range of methods, an important guiding principle was the advice from Myers (1999, p.3) who said, "clearly, it is important for anyone considering employing a research method to be aware of the potential benefits and risks beforehand, and to know in which circumstances it might or might not be appropriate". The research questions and ethics

are two of the practical considerations in selecting the approach. Highlighting these factors Bryman and Bell (2003, p. 28-29) advises researchers not to overlook 'the importance and significance of practical issues' such as getting enough participants. Another viewpoint on selecting a research method is that the researcher makes selections based on considerations such as researcher's familiarity with an approach and researchers training and knowledge of research methods.

A research method is a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection. The methods available to researchers are many and diverse. There was the need to identify the most suitable research method and a method that can be easily and flexibly used to effectively collect data. The choice of research method influences the way in which the researcher collects data. The researcher needs to investigate the degree to which the research method is right for the study.

Table 4-4 shows Galliers (1990) taxonomy of research methods. Galliers study was used to select some choices of appropriate methods for this thesis. Table 4-5 also shows the filtered methods that may be suitable for this research and the highlighted columns show some choice of research methods such as case study, survey and others.

Table 4-4: Taxonomy of Research methods (Galliers, 1990).

Object	***Theorem proof***	***Laboratory experiment***	***Field experiment***	***Case study***	***Survey***	***Forecasting***	***Simulation and game/role playing***	***Subjective / argumentative***	***Descriptive / interpretive***	***Action research***
Society	No	No	Possibly	Possibly	Yes	Yes	Possibly	Yes	Yes	Possibly
Organisation group	No	Possibly	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual	No	Yes	Yes	Possibly	Possibly	Possibly	Yes	Yes	Yes	Possibly
Technology	Yes	Yes	Yes	No	Possibly	Yes	Yes	Possibly	Possibly	No
Methodology	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Theory building	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Theory testing	Yes	Yes	Yes	Possibly	Possibly	No	Possibly	No	Possibly	Possibly
Theory extension	Possibly	Possibly	Possibly	Possibly	Possibly	No	No	No	Possibly	Possibly

The four research methods that will be discussed here are action research, case study research, ethnography and grounded theory.

4.4.1 Action Research

4.4.1.1 Description and Definition

Action research involves and is conducted in a variety of contexts, including social, educational and management and is defined as:

> ‘Action research is a process of systematic reflection, enquiry and action carried out by individuals about their own professional practice (Frost, 2002, p.25).
>
> Action research combines a substantive act with a research procedure; it is action disciplined by enquiry, a personal attempt at understanding while engaged in a process of improvement and reform (Hopkins, 2002, p.42).
>
> Action research is a flexible spiral process which allows action (Change, improvement) and research (understanding, knowledge) to be achieved at the same time (Dick, 2002).

Action research is thought to be especially suitable when the research question is related to describing an unfolding series of actions that are taking place over time in a group, organisation or community (Paivi & Kovalainen, 2008). Also, if the research questions are related to understanding the process of change, development or improvement of some actual problem, then in order to learn from it, action research is an appropriate research method. According to Mertler (2009), action research involves some observation or monitoring of current practices, followed by the collection and synthesis of information and data, then finally some sort of action taken which serves as the basis for the next stage of action research. Action research is a ‘simple, yet powerful framework’ consisting of a ‘look, think, and act’ routine (Stringer, 2007). The literature clearly indicates that most action research supports and consists of iterative cycles of planning, acting and reflecting or actioning (Costello, 2003; McNiff & Whitehead, 2006; Mertler, 2009; Reason & Bradbury, 2006; Stringer, 2007).

4.4.1.2 Application to this Study

A number of weaknesses in action research have been identified. Action research is of particular use and relevance to research addressing issues of a particular organisational concern (Coghlan, 2001). As this study involves studying different societal culture, it is wider than a single organisation. This study involves complex issues in different cultures thus the variables are too complex. A further practical difficulty also includes that action research requires implementation of the findings to help proceed to the next stage of action research.

In summary these are the main reasons why action research will not be suitable for this study:

- This study is complex as it involves studying different societal culture and practicing action research though is not impossible, is not ideal and practical.
- Action research is a cyclic process which involves action and implementation and acting based on the findings will be difficult for this study.

4.4.2 Case Study Research

4.4.2.1 Description and Definition

Case studies are widely used as a qualitative research method across a broad range of disciplines (Yin, 1994). A qualitative case study is an intensive, holistic description and analysis of a single instance, phenomenon or social unit (Merriam, 1988). While the case study has been popular as a qualitative research technique for many years, there is an uncertainty about its nature and appropriate usage (Merriam, 1998).

> Based on Yin (2003, p.13-14), case study is defined as ‘an empirical inquiry that investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used’.
>
> Merriam (1988) defines case study as an end product, ‘A qualitative case study is an intensive, holistic description and analysis of a single instance, phenomenon, or social unit.

Wolcott (1992) sees it as ‘an end product of field-oriented research’ rather than a strategy or method.

Miles and Huberman (1994) think of the case as ‘a phenomenon of some sort occurring in a bounded context’.

Case studies concentrate attention on the way particular groups of people confront specific problems, taking a holistic view of the situation, and they are problem centred, small scale and entrepreneurial endeavours (Shaw, 1978).

Each of these definitions reveals something about case studies and contributes to a general understanding of the nature of case study research.

Case studies are holistic, and as such provide an extensive description and analysis of the phenomenon or setting being studied in an attempt to capture its totality (Yin, 1994). Limitations to the case study include their time consuming nature and associated cost, the need for careful training of the researchers, the possibility that volumes of data may be gathered documenting the obvious and yet missing the truly significant, and the length of the report may be such that the primary audience does not read it. Case study is used in many setting including the conduct of a large proportion of dissertations and thesis in the social sciences (Yin, 1994).

4.4.2.2 Application to this Study

Case study can be used for both quantitative and qualitative data collection methods. Merriam (1998) also discusses that as the case study is focused in a real-life situation, it results in a rich and holistic account of a phenomenon. As this study is a contemporary issue, ‘implementing agile methods in different societal culture’ and is also in a real-life context in a software development community, case study can be suggested as an appropriate research method for this study. Case study is an approach that complements the exploratory nature of the research and a ‘how’ or ‘why’ questions is being asked and investigated or explored (Yin, 1994). This study answers queries related to ‘how do cultural dimensions and multicultural factors influence in implementing agile methods?’ and this study suggests that the case study approach may be an appropriate method of enquiry.

The strengths of case study research that provides the rationale for its selection for a study can also present certain limitations in its usage.

- According to Merriam (1998), although rich, thick description and analysis of a phenomenon may be desired, a researcher may not have the time and money to devote to such undertaking.
- Guba and Lincoln (1994) note an additional limitation of case study, 'Case studies can oversimplify or exaggerate a situation, leading the reader to erroneous conclusion about the actual state of affairs'.
- Merriam (1998) and Guba and Lincoln (1994) also identified the sensitivity and integrity of the investigator as another limitation.
- Further limitation involve the issues of reliability, validity and generalizability (Hamel, 1993).

To avoid these criticisms of the case study method, the researcher exercised great care in design and analysis of the study. While case study method may be appropriate to this study, it is acknowledged that the ability to generalise results and managing potential volume of data should be designed well. To overcome this limitation, many interviews were conducted and verification and generalisation enabled to compare results. Large volumes of data were managed well and also by adopting some guidelines and processes in data analysis.

4.4.3 Ethnography

4.4.3.1 Description and Definition

In recent decades ethnography has been used as a common approach to social research (Hammersley & Atkinson, 2006). Ethnography has a long history in learning about what it is to be a human. Cultural anthropologists have engaged in the ethnographic method to understand people, their cultures, their way of life, and meanings. One notable difference between an ethnographer and a researcher using other methods is that, rather than 'studying people', the ethnographer attempts to 'learn from the people' (Liamputtong & Ezzy, 2005). This involves participating for an extended period of time, watching what is happening, listening to what is said, gathering all relevant details available to understand the issues clearly (Hammersley & Atkinson, 2006). Ethnography utilises many approaches such as in-depth interviews, focus group

interviews, life history, rapid assessment, questionnaires (Liamputtong & Ezzy, 2005). Most of these approaches are interactive and involve dealing with people. However there are other non-interactive methods such as outcropping, and folktales.

Ethnography: Advantages and Limitations (Brewer, 2000; Gobo, 2008; Hammersley, 1990; Hammersley & Atkinson, 2006; Liamputtong & Ezzy, 2005)

Advantages

- As ethnography expects the researcher to spend a lot of time in the field, talking with people and gathering information, it provides a deep and rich understanding of people in a way that is impossible in other qualitative methods; this helps in seeing the world from people's perspective and prevents false interpretation of the culture studied.
- Information obtained from an ethnographic study helps to formulate sensible questions in the native language and helps to make the participants understand the questions better.

Limitations

- Ethnography expects researchers to spend a long period of time in fieldwork (Liamputtong & Ezzy, 2005). This may not be possible for those who have limited time and budget.
- The difficult task in ethnography is to get access into the group or community that is being studied. In some cases it is possible but in other cases, it is difficult. As a result, the research proposal may have to be changed and the project may not be able to be completed as planned.
- Information collected by means of ethnography from a relatively small number of people from one setting cannot be generalised to the wider population.

In discussing the relative advantages and limitations of ethnography, key strengths of the method are its intensity and depth, and its ability to challenge a researcher's assumptions (Myers, 1999). On the other hand, ethnographic research takes longer than most other research methods in the field work, the analysis and write-up (Cresswell, 1998). As an ethnographic study is usually conducted in one culture it does

not have much breadth and thus only leads to an in-depth understanding of that particular context or culture (Myers, 1999).

4.4.3.2 Application to this Study

This study was to be undertaken at a few software development agencies in different cultures such as Australia, India, and the United Kingdom, and aimed to produce both a theoretical and practical outcome. Ethnography may help the researcher in identifying and understanding the culture and people, but does not help the researcher help develop a solution or bring about change. Using ethnography also involves a prolonged period of time being spent in the organisations, sometimes even two years. Though this would have helped in intimate observation and behaviour, interaction and even sensitive political solutions, access for an extended period of time to a number of agencies would have been difficult to negotiate.

When considering the suitability of ethnography as a research method for this study, the researcher identified some limitations that are listed below:

- The need for access to a large number of participants and agencies over a prolonged period of time;
- The limitation of being able to provide a solution to an issue or to provide a practical solution or outcome; and,
- The study requires a depth not just breath and the need to compare cultures.

4.4.4 Grounded Theory

4.4.4.1 Description and Definition

The foundation work on grounded theory is that of Glaser and Strauss (1967). Subsequent work was done that elaborated on the initial work (Glaser, 1978, 1992, 2001; Strauss & Corbin, 1994). Grounded theory is relevant to, and used extensively in, social and organisational contexts having originally emerged from the social sciences. Grounded theory asserts that theories are grounded in the data, especially in the interaction and actions of people and their engagement in social processes (Cresswell, 1998; Strauss & Corbin, 1994). Grounded theory is inductively derived and analysed through systematic data collection and study of data pertaining to that phenomenon (Strauss & Corbin, 1990). While grounded theory is an evolving, inductive form of

qualitative research, it is a systematic approach utilising specific data collection steps (Cresswell, 1998).

The researcher collects data in the study field, mainly from interviews. In grounded theory the process of analysis is the data begins almost immediately and then more information is gathered in the field, then more analysis is undertaken and so the process continues (Strauss & Corbin, 1990). Constant comparative decoding occurs through taking the information gathered in the data collection and comparing to emerging and existing categories (Glaser, 1978, 1992; Glaser & Strauss, 1967). A conceptual model is developed out of this process and it is continually modified as new data are explored and new concepts are integrated into the emerging theory.

Grounded theory is seen as a scientific method as its procedures are designed in such a way that the method meets the criteria for doing 'good' science: significance, theory-observation compatibility, generalisability, reproducibility, precision, rigour, and verification (Strauss & Corbin, 1990). Strauss and Corbin (1990) also think that creativity is a vital component of grounded theory as its procedures force the researcher to break through assumptions and to create new order out of the old.

Silverman (2004) says that grounded theory 'can also degenerate into fairly empty categories to legitimate purely empiricist research'. As there is no apparent guideline on judging relevance of a particular category or sub-category as long as the researchers have met their aims, the elimination process is one of the limitations of the grounded theory (Chong, 2008).

4.4.4.2 Application to this Study

As this study involves exploring the participants perspective of what constitutes cultural factors that influence agile implementation, grounded theory method seemed to be a good fit (Singh & Krishnan, 2007). But as the emerging of the theory related to this study is not grounded in the data collected, the grounded theory method was not selected for this study. Grounded theory is of most benefit when the researcher has limited or little knowledge of the area of research (Cresswell, 1998). As the researcher in this study was very experienced in and had considerable knowledge of the environment and cultural factors of the participants, grounded theory was not a good match due to the participation of the researcher.

4.4.5 Comparison and Selection of Suitable Research Method

Further to the previous sections, the following table 4-6 analyses some basic criteria needed for this research. Based on previous section a comparison of some research methods are shown below in a tabular representation. Case study was seen as the best suited and appropriate method for this thesis. This table 4-5 lists the criteria that were selected based on literature study and from other researchers who have conducted similar study. Then the appropriate criteria that are suitable for this research programme are selected and tabulated. Four research methods that are most suitable for this research programme are compared to these criteria. The selection of 'case study' as the best suited methodology for this research programme was confirmed.

Table 4-5: Selection of appropriate research method.

Criteria	Requirement for this research	Action Research	Case Study	Grounded Theory	Ethnography
Significance to practical situations and natural setting	✓	✓	✓	✓	✓
Research built upon inductive logic	✓	✓	✓	✓	✓
Study is not very theory based	✓	✓	✓	X	✓
Necessity of holistic approach	✓	✓	✓	✓	✓
Study involve comparison between different cases	✓	X	✓	✓	X
Researcher's time for data collection and analysis	✓	X	✓	✓	X
Resources readily available for data collection	✓	X	✓	✓	X
Criteria for selection of the case availability	✓	✓	✓	✓	✓
Generalise based on the data collected	✓	✓	X	✓	X
Respondents likely to give honest information	✓	X	✓	✓	✓
Unbiased and open minded	✓	X	✓	X	X
Avoid misinterpretation and to present a true reflection	✓	X	✓	✓	✓
Confidentiality will be maintained and identities protected	✓	X	✓	✓	✓
Research settings inter connected and inter-related	✓	✓	✓	✓	✓
Direct observation with field work	X	✓	X	✓	✓
Simple process of data collection	✓	X	✓	X	✓
Cyclic process of implementation and action	X	✓	X	X	X

4.5 Data Gathering Methods (Techniques)

Qualitative research methods are flexible and dynamic and allows for great variations in the material used to create a deeper understanding of the situation through the collected data. There are four basic types of qualitative research data gathering techniques (Creswell, 2003) that were seen in the literature.

- Observation
- Interview
- Documents and
- Audio visual

For this study, Interview and Observation were used for data collection and these are discussed in detail. The reason for using two different techniques was to cross check data from multiple angles to help provide a multi-dimensional view of the data. Thus the following sections will only discuss data gathering techniques 'observation' and 'interviews'.

4.5.1 Observation

Observation is a way of gathering data by watching behaviour, events, context, activities, and discussions and noting physical characteristics in natural settings. An observer's responsibility lies in responsibly translating a participant's action and reflecting meaningful information from the observation. Some methods only study an individual at a time, but observation helps in studying a group of people together and also the interaction between the groups of people.

Observation can be overt where the participants know they are being observed or covert where no one knows that they are being observed and the observer is concealed. The benefit of covert observation is that the tendency for people to behave naturally can be observed. However in some cases overt observation will be required to avoid ethical consideration. Observation can also be direct or indirect. Direct observation is when interactions are watched directly, for example, phone call interruptions during the meeting. Indirect observations are when you watch the results of interactions, for example, observing the way closed doors of the manager.

Table 4-6: Advantages and disadvantages of using Observation (Burns, 1997).

Advantages	**Disadvantages**
Gives information and context related to the situation	Ethical issues concerning confidentiality or privacy may arise
Permits collection of information on facts not mentioned in an interview	Observer bias may occur – observer may only notice what interests him or her
Permits tests of reliability of responses to questions	The presence of an observer can influence the situation
Exists in natural, unstructured and flexible setting	Observer may not be objective
	Time consuming and most times expensive

4.5.2 Interviews

Interviews which involves in-depth exchange between researcher and researched are often presented as the 'gold standard' of qualitative research, (Barbour, 2008). The fundamental idea in interviews is not to lead a respondent into a particular direction or affect his/her responses in any way however opinions differ as to whether it is possible for an interviewer to remain objective. When interviews are performed, care is taken to include questions that clarify the respondent's personal views in a situation or context in order to correctly interpret the replies. Further it is also important that a respondent feels comfortable and relaxed with answering questions on his/her involvement in the studied events in order to get honest and unbiased replies to questions. In social constructivism it is believed that the researcher at all times will be a part of the phenomenon that is being studied. Interviews are considered both an art and science (Barbour, 2008).

Table 4-7: Advantages and disadvantages of using Interviews (Burns, 1997).

Advantages	**Disadvantages**
Is suitable for both literates and illiterates	The presence of the interviewer can influence the interview
Allow interviewer to explain or help clarify questions, increasing the likelihood of useful responses	Interviewee may distort information through recall error, selective perceptions, desire to please interviewer
Has higher response rates than written questionnaire	Volume of information very large; may be difficult to record and reduce data or compile
Permits collection of in-depth information and exploration of remarks by respondents	More expensive and time consuming
Permit face-to-face contact with respondents – helps with rapport and a higher level of motivation	Finding skilled and trained interviewers with appropriate interpersonal skills
Useful when extensive data is required on a small number of complex topics	Respondents may feel that they are being 'put on the spot'
Probing may be used to elicit more complex responses	
Observation of the respondents' non-verbal communication may provide extra dimensions to data collection	
The interviewer is able to control the sequence of the items as the respondents cannot look ahead and anticipate trends in the enquiries	

4.5.3 Data Gathering Techniques for this Study – in Context

Qualitative research is demonstrably trustworthy and rigorous when the researcher demonstrates that the participants' interpretation and meaning are clearly worked out and understood (Ezzy, 2002). According to Babbie (2002), face-to-face interviews in field research improve researchers understanding related to different variables, provide a better interpretation with close proximity with the participants and ensure the consistency of the information obtained in different cultural settings. Interviews were therefore selected as one of the data collection techniques. Open-ended

nature of interview questions was used to allow researcher to explain various complex issues and assists in observing the respondent's attitude and reaction to conscious matters. These interviews also allowed the researcher to be able to ask respondents somewhat sensitive questions, which perhaps would not be possible under a self-administered postal survey. Further, observations revealed additional data not elicited through the interviews. Observations also helped to confirm some information from the interviews and helped to see not just individual view point but group interaction in a natural setting.

Analysis of the research questions and context of this study, both interviews and observations were appropriate and valuable as they have different criteria that are being covered. Having multiple data collection techniques helps in studying the data through different lenses.

The approach used semi-structured interviews in order to gather data on understanding of the perceived problems in IT projects from the interviewees' collected experiences and opinions and to study the culture of the software community to understand what changes will be required to implement agile in that particular culture.

Table 4-8 lists the aspects that were seen during observation and identified through the interviews.

Table 4-8: Data collection methods – Observation and Interviews (Barbour, 2008; Burns, 1997; Ezzy, 2002).

Criteria	**Observation**	**Interviews**
Participation	Active	Active
Data analysis	Acts/events are studied in context	Words are studied in context
Sensitivity	Managed better (covert observing)	May not reflect truth
Misunderstanding	Often can be misinterpreted (things can be seen through differently)	Often can be misinterpreted (words can be misinterpreted differently)
Frequency	More incidents can be noticed such as phone call interruption	Once off information gathering
Openness	Can see things that people would not talk about	Unwillingness to openly discuss
Inter-group study	Able to see/understand among different groups	Information gathered in relation to one individual only
Time	Have more time to observe again later	Once off time spent with the participant
Naturalism	Much closer to naturalism	Can be sometimes not relaxed
Ethical consideration	Difficult situation cannot be seen	Can be discussed (with prior approval)
Coverage	Less coverage	More coverage

4.5.4 Issues or Errors in Data Collection Methods in this Research

Based on the understanding that 'reality is tricky' (Babbie, 2002), though there are two methods used for this study, there are possibilities for errors. With social and cultural study there may be situations where data may not really explain to us the real situation if the data collection has not considered these possible issues. The objective of this thesis is to gain a deeper understanding of the working situations in IT project teams in large organisations and the problems that arise and may contribute to the large numbers of IT projects that are considered to be failures. First with an understanding of what the problems are in projects is it possible to discuss what causes them and compare them to theories that seem appropriate, in this case agile methodologies, in order to attempt to bring forth suggestions of possible solutions that may counteract those

problems. Then, based on the set of cultural agile attributes defined in previous chapters, collect data to help answer the research questions. To achieve answering these research questions, study was needed in different agile methods and culture.

Some of the issues and errors that could have possibly seen in the data collection methods used include (Babbie, 2002):

- Inaccurate information gathering could have occurred due to making erroneous conclusions in observations and in interviews.
- Over generalisation of things observed or listed while looking for patterns.
- Selective observation may have occurred once a pattern is getting formed or concluded.
- Illogical reasoning where there could be other ways of handling observations that contradicts conclusions about the way things are in daily life.
- Open ended questions without guidelines or vague questions during the interviews can lead to an issue with validity.
- Hear or see things of interest and miss critical details.

As part of this study the researcher took extra care to avoid the above issues. Inherent biases were also recognised. The common biases are:

1. Procedural bias: Care was taken to make sure no pressure was applied to the participants to take part in the study. The participants were allowed to withdraw at any time and were allowed to choose when, where and how long they wanted for the interview.

2. Interviewer bias: While the interviews were in progress, care was given not to provide any prompts even if they were subtle to change the participant's mind. Further care was taken to make sure wrong assumptions were not made with the participant's body language and tone of voice. For example, if the participant was reluctant to provide the answers for any specific question, they were not forced to and their answers were not included in the study. Questions asked were unbiased keeping in mind not to ask leading questions and not to suggest what answers should be.

3. Response bias: There is a possibility that the respondents subconsciously respond the response that they think the interviewer would want to hear. Thus, these

sorts of responses were factored in to make sure that response bias did not influence the final study outcome.

4. Reporting bias: The researchers ensured that the ways in which the results are disseminated were not biased. In some cases, there are situations that the researcher would like to predict some information and to help that outcome, some reporting results are ignored.

4.6 Summary

This chapter described the research questions and justification for choosing the research methodology used in this research programme. Several relevant research methodologies were studied in this chapter and the reasons behind the selection of best suited methodology adopted was also discussed. The next chapter discusses the details of the research approach taken for this research programme.

CHAPTER 5
RESEARCH DESIGN

5.1 Introduction

The previous chapter justified the research method selected and used in this study. This chapter describes the processes undertaken to plan, collect and analyse the qualitative data which formed the foundation of the study. The quality of any research project will be enhanced by good research design. The function of a research design is to ensure that the evidence obtained is able to answer the research questions as unambiguously as possible. In this research the design is presented against a theoretical framework provided by consideration of the research problem, the research goals and the research questions. This chapter presents the research design related to the use of agile methods together with the research questions to test the system of relationships associated with culture and methodology.

5.2 Overview of the Stages of the Method

The different stages in this research programme for data collection are discussed in relation to the research questions namely:

> Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?
>
> Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?
>
> Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

Keeping these research questions in mind, based on the research methodology discussed in Chapter Four, the research design is discussed in this chapter. The conclusions from the literature review (Chapters Two and Three) are given below and demonstrate the research questions for the research design.

1. Common agile methods were studied in detail and based on the agile methods and agile principles, a list of agile techniques were listed.
2. From a detailed study of the work of different culture experts, five cultural dimensions were selected based on their relevance to agile method implementation.
3. A relationship was identified between agile techniques and cultural dimensions and culture based agile attributes were collated.

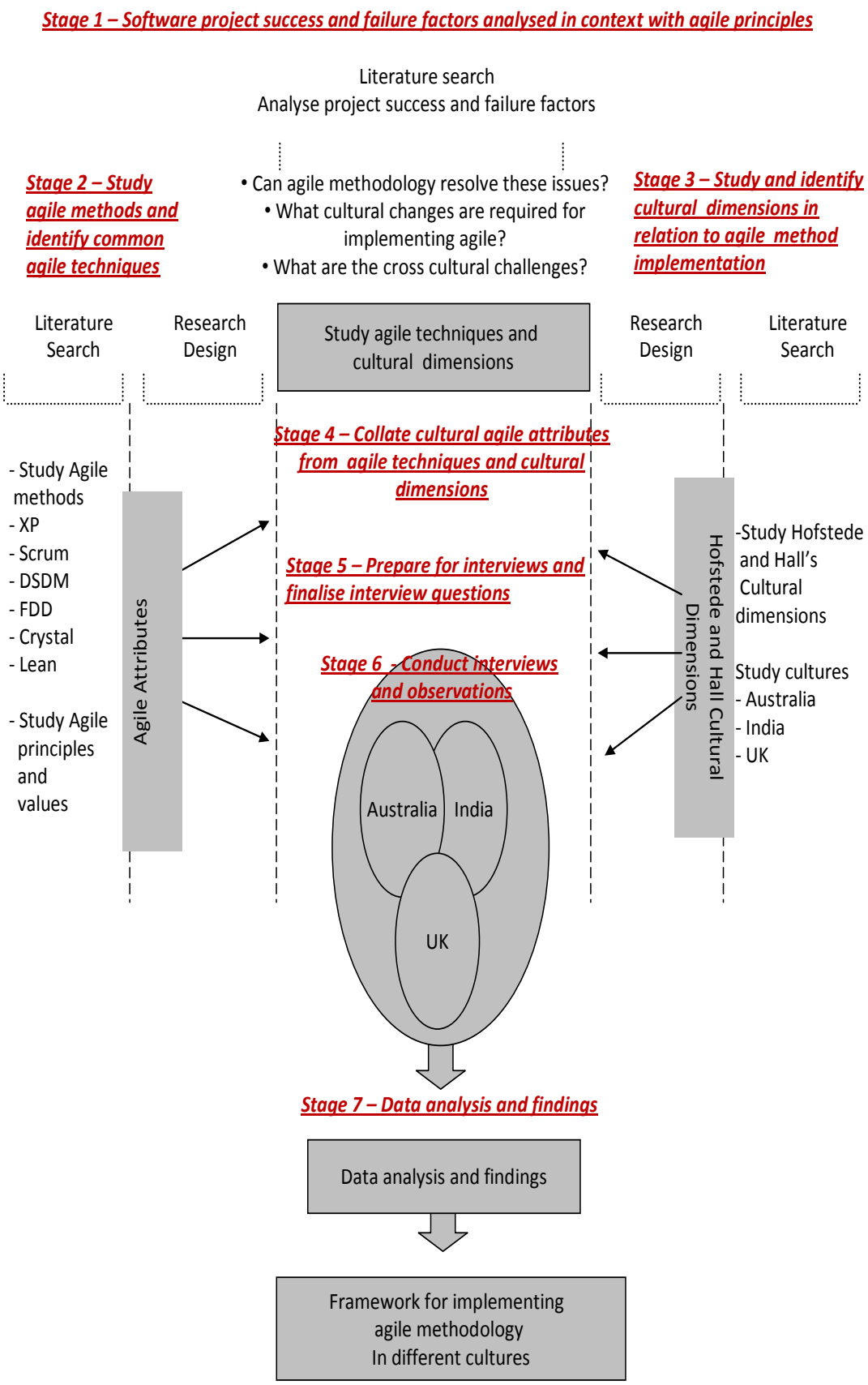


Figure 5-1: The research process.

Figure 5-1 shows the research process and stages involved in this study. The basis for the data collection was the set of cultural agile attributes. Details of each stage are explained in the following sections.

Table 5-1: Explanation of research process stages.

Stages	**Description**	**Reference**
Stage 1	Software project success and failure factors analysed in context with agile principles.	Chapter 2 - Table 2-4 and 2-5
Stage 2	Study agile methods and identify common agile techniques.	Chapter 2 - Table 2-6
Stage 3	Study and identify cultural dimensions in relation to agile method implementation.	Chapter 3 - Table 3-2, 3-3, 3-4, 3-7, 3-8
Stage 4	Collate cultural agile attributes from agile techniques and cultural dimensions.	Chapter 3 - Table 3-8 and 3-9
Stage 5	Prepare for interviews and finalise interview questions.	
Stage 6	Conduct interviews and observations.	
Stage 7	Data analysis and findings.	

Stages 1 to 4 were undertaken as the preliminary work required to develop the research questions. Subsequent stages address the research questions. These stages are summarised to provide a context for the rest of the design.

5.3 Stage 1: Software Project Success and Failure Factors Analysed in Context with Agile Principles

This initial stage identified and analysed common software project success and failure factors to investigate whether agile principles can be matched with software project success and failure factors (refer table 2-3). This table shows a summary of the common software project success and failure factors. This first stage confirmed that agile methods could be used to overcome current software development and project issues. These software development project success and failure factors were then mapped to agile principles (refer table 2-5).

5.4 Stage 2: Study Agile Methods and Identify Common Agile Techniques

The next stage was to study common agile methods, specifically XP, Scrum, DSDM, FDD, Crystal and Lean (Chapter 2). These methods were selected based on the outcome of the literature review. Based on the number of references to these agile methods, a decision was made to select these as the commonly used agile methods. The literature was further examined in the context of agile method processes and procedures, which provided more information in identifying agile techniques in relation to different agile methods. The purpose of this stage was not to compare agile techniques in relation to agile methods, but to identify a number of commonly used agile techniques to help answer the research questions.

The list of agile techniques was used as the basis for the data collection. Subsequently, in reviewing each agile technique, the researcher focused on those techniques specific to culture related attributes. The need for identifying culture related attributes became important and more relevant at this stage.

The researcher made a decision to study cultural dimensions, and, based on these dimensions, to compare the agile techniques and to consolidate the cultural agile attributes.

5.5 Stage 3: Study and Identify Cultural Dimensions in Relation to Agile Method Implementation

This stage identified the cultural dimensions that further shaped the research questions. Those researchers who have studied ‘culture’ were considered for this thesis, Hofstede, Trompenaars, Hall, Kluckhohn and Strodbeck, Schwarts and Globe were

identified as important. Table 3-2 (Chapter Three) shows the cultural dimensions that were identified by these researchers.

Cultural dimensions were studied, keeping agile implementation in mind. The cultural dimensions compiled in Chapter Three were individually studied to analyse if they were relevant to implementing agile methods. The researcher then started reviewing, justifying and selecting only relevant cultural dimensions. Table 3-3 (Chapter Three) identified the cultural dimensions selected and provided a brief justification statement with indicator identifying relevance to the study. Details are provided in Chapter Three as to how the decisions were made.

5.6 Stage 4: Collate Cultural Agile Attributes from Agile Techniques and Cultural Dimensions

A matrix with reference to agile techniques and cultural dimensions was prepared to ensure that all agile techniques had a match to at least one cultural dimension (see Table 3-7). It was noted that there was a one-to-many relationship between cultural dimension and agile techniques.

A list of cultural agile attributes was compiled based on the list of agile techniques (from stage 2) and the cultural dimensions (from stage 3). Extra care was taken to make sure the final list was sufficient to be a foundation for the research questions. To identify a list of cultural agile attributes the researcher went through each single agile technique and identified a list of cultural agile attributes and aggregated to a final list.

To confirm that this list was comprehensive, three agile experts from Australia were selected to provide their views. Correspondence were attempted to liaise with authors of the Agile Manifesto and there was no response. Then organisations which have managed agile development projects and have worked with inter cultural team were considered. From these organisations few experts were selected and communicated and the responses received were formulated.

The selection for agile experts was made bearing the following criteria in mind:

- Good knowledge of agile projects
- Knowledge of various cultures
- Worked in Australia, India or the UK

Further comments from the agile experts were then reviewed in detail. The cultural agile attributes were validated against the responses from experts in agile methods. The feedback provided by the agile experts helped the researcher to confirm the already collated cultural agile attributes. Thus, these cultural agile attributes were the foundation for the interview questions. The next step was to match the cultural agile attributes and agile technique to make sure each cultural agile attribute matched at least one agile technique.

The final step in this stage was to draft interview questions needed for the data collection. The interview questions were drafted based on these cultural agile attributes. Interview questions are shown in appendix D.

5.7 Stage 5: Prepare for Interviews and Finalise Interview Questions

As discussed in the previous section (stage 4), culture related agile attributes were defined based on an analysis of the following:

- Agile principles (based on the Agile Manifesto)
- Agile techniques analysed and compared (stage 2)
- Cultural dimensions based on Hofstede and Hall (stage 3)

The cultural agile attributes collated were then used for the interview questions.

As part of this stage, the following steps were conducted:

a) Identify the cultures that are of interest to the researcher.

b) Prepare a list of stakeholders to be interviewed making sure there is a combination from different work groups from the software engineering community to get a balanced opinion. Identify participants who will be involved.

c) Ensure ethical research standards are followed, including liaising with university ethics research committee and guidelines.

d) Finalise interview questions.

The above steps and the process involved are described in the following section.

5.7.1 National Culture Selection

Studies in Australia, India, and the UK were selected as they have differences as well as similarities. For example, Australia is a young country with a history of western culture going back 200 years, whereas India is an old country with a history going back over 4000 years, and the UK had a history of western culture going back over 3000 years. Australia and the UK are industrialised countries, whereas India is in the process of industrialising. Australia, India and the UK are multi-racial and multi-ethnic countries, but India is considered more of a homogeneous culture. In Australia, India and UK English is a common language. Although the makeup of ethnic groups in Australia, India and UK differs significantly, English is the language of business in the three countries and this helped a lot with data collection as language was not seen as a barrier. Thus the researcher was convinced and believed that these three cultures were diverse and considered important for this study.

There was also limited evidence or empirical research for national cultures like Australia, India, and UK. Hofstede (1980) reported quite large differences in the national culture dimension scores of Australia, India and UK. Therefore, the case for empirically examining national cultural differences and the resultant impact on Australia, India and UK was seen as a new and important study.

5.7.2 Respondents Selection

Considerations were given for participants to represent a cross-section of different job categories in the software development community. For example care was taken to ensure a variety of different participants' roles were involved such as developer, systems analyst, project manager, business representative, tester, configuration manager.

The selection of organisations was done based on review of each organisations profile to confirm that they have been engaged in projects in software development for a minimum of five years. When selecting an organisation, the researcher referenced the organisation profile on the web to confirm the organisation was relevant to this thesis. In some cases the organisations suggested their preferred participants and in other cases if the researcher already had some information of a participant then those participants were requested. With regards to participants, care was taken to select the appropriate participants who were currently working on software development projects. This

information was gathered through the appropriate human resources manager or the information technology manager. Before the participants were selected, the researcher went through background details of the participants to confirm that the selected participants were all able to satisfy the need of this thesis data collection.

The criteria used for participant selection are listed below.

- Participants have been working in software development projects for at least five years and have experience in working with software engineering community.
- Participant's ethnic background was not considered provided he/she has lived in the culture of research for at least five years.
- Gender of the participant was not considered.
- Age was not considered a criterion for selection.
- Experience in agile methods was optional.

Personal email invitations were sent to participants in different organisations and participants selected based on the above criteria. As this study involved different cultures, care was taken to make sure the questions were clear enough for the participants to answer well in different cultures. As the method of data collection was based on semi-structured interviews, observation with some literature study of the culture, the need for participant selection was critical to the study.

5.7.3 Ethical Considerations

Ethical issues are the concerns, dilemmas, and conflicts that arise over the proper way to conduct research (Neuman, 2003). Ethics define what is or is not legitimate to do, or what "moral" research procedure involves. It is difficult to identify or recognise ethical dilemmas that the researcher will face until one is doing the research, but waiting until the middle of a study will be too late (Neuman, 2003). Though this research is culturally oriented, there was no stress, risk or side effects that would affect the participants due to the information gathered. This research was not anticipated to create anxiety producing situations or discomfort. An ethical principle of voluntary participation was followed. No participant was forced to involve in the data collection and they were clearly informed in writing and verbally before every interview

that the participant could withdraw at any time if they wish to. The names of the participants and their organisations were kept confidential.

An interview protocol as described below that sets the rules that guide the administration and implementation of an interview was followed. The protocol was followed for each interview, to ensure consistency between interviews and thus increased the reliability of the findings. The following areas were considered when preparing for the interviews:

- What to say to interviewees when setting up the interview.
- What to say to interviewees when beginning the interview. This includes consent and confidentiality of the interviewee.
- What to do during the interviews including recording on audiotape, taking notes.

A consent statement containing the following was also used:

- a brief description of the purpose and procedure of the research,
- a guarantee of anonymity and the confidentiality of the records,
- the identification of the researcher and supervisors,
- where to receive information about the subjects and questions regarding the study, and,
- a statement that participation was completely voluntary and can be terminated at any time without any obligation.

Research projects addressing human issues of any manner need to obtain prior ethical clearance. Ethical considerations in terms of integrity and confidentiality were addressed for the current study. The main ethical consideration needed by the university's ethics policy for students conducting any form of human research was to ensure that ethics approval had been applied for and granted from the ethics committee to guarantee the integrity and confidentiality of the respondents and their organizations. It was made sure that this research followed and covered all ethical issues to make sure the participant's integrity and confidentiality were maintained. A report to the Human Research Ethics Committee was regularly submitted throughout the research period, in accordance with the Edith Cowan University policy.

5.7.4 Finalise Interview Questions

As this research involved a culture-oriented study, the cultural agile attributes played a very important part in this study. Based on the initial study and work conducted, a set of interview questions were created. The same base set of questions were asked in all interviews in different cultures but based on the nature of the interview discussions further follow up questions were asked as appropriate.

Table 5-2: Match interview questions to cultural agile attributes.

	Cultural Agile Attributes	***Interview questions (from Appendix D)***
1	Trust people more than process	Q2.1
2	Transparency	Q2.4, Q2.7, Q5.2
3	Team collaboration	Q1.1, Q1.2, Q1.3
4	Self-organising team	Q1.6
5	Dedicated team	Q1.7
6	Risk Taking	Q3.1
7	Innovation	Q3.3
8	Authoritative	Q2.3, Q2.4, Q2.6
9	Quick Decision Making	Q2.2, Q2.6
10	Open and honest communication	Q1.5, Q2.4
11	Tolerance for change	Q3.2, Q3.5
12	Meeting deadlines and expectations	Q2.5, Q5.1
13	Proactiveness	Q3.4
14	Time keeping	Q3.5, Q4.1, Q4.2, Q4.3, Q4.4
15	Management support	Q1.4, Q5.4
16	Blame Sharing	Q2.5, Q5.5
17	Negotiation	Q5.3

Table 5-2 shows the mapping of cultural agile attributes to the interview questions and the questions are listed in appendix D. Questions were defined as open ended and care was given to make sure the interview questions covered behavioural questions, opinions, feelings of the interviewee, understanding and background of the environment.

When necessary, translation was done into local terms if known. In some interviews, after the first few interview sessions, it was obvious that the terminologies used were different in different cultures and some terms were commonly used. Depending on where the questions were asked some translation was needed to keep the interviewee on track. For example, ‘offshoring’ was used commonly in Australia but ‘outsourcing’ was used in India. In India ‘madam’ and ‘sir’ were used for respect, but in both Australia and the UK, these terms were not used. ‘Cab’ (Australia and UK) and ‘Taxi’ (India) were other words that were used differently in different cultures. As these

words matter, while interviews were conducted these terms were used to keep the conversation meaningful.

5.8 Stage 6: Conduct Interviews and Observation

The purpose of the interviews was explained to every participant and in some cases to his / her respective managers and human resource area manager. This information was provided at the beginning of each interview and the reason for choosing the type of participants was also explained. A written consent form was obtained from the organisation and the participant before each interview was conducted. Expected duration of the interview, confidentiality of the data collected through interview, and use of the note taking and audio recording were all explained before the interview.

Each culture has its own values and style of communication (Suadamara, Werner, & Hunger, 2010), thus care was taken to handle the interviews in such a way that the participants felt comfortable. The initial phase of the data gathering was conducted based on the list of questions framed. Data were collected based on face-to-face interviews in India and Australia and phone interviews for participants in the UK. The emerging data and response gathered early in the investigation helped to rephrase interview questions. The questions were reviewed and asked either in a different way or modified to suit the situation. Information was verified where necessary. Some questions seemed more sensitive in some cultures. For example, ‘managing time’ was an area that Indians knew they were not very good at. Care was needed when posing a question in relation to ‘time management’ to make sure the participants did not feel offended. The same questions were asked but in a different way to gather as much details as possible. ‘Leadership style’, ‘quick decision making’, ‘management culture’ were other areas where questions were asked with care.

5.8.1 Interviews and Observation - Process

Interviews were audio-recorded and transcribed. Conducting interviews and supporting this with audio techniques gave the researcher additional opportunities to review what was said by participants, the emphasis with which it was said, and in what context it was said. Cross questioning and clarifying was possible with face-to-face interviews. Some memos and notes were taken throughout the data collection process.

In order to become familiar with the data collected and to remember the interview information, immediately after the conclusion of each interview, the researcher listened to each digital recording, making note of the interviews. Prior to listening to each recording the researcher read the observation notes which were made during the interview process and noted down the reasoning behind the observations. For example, when there were phone interruptions, meeting cancellation, delay in meeting and not informing the researcher, the process involved in managing these situations were clearly noted. These observations had a direct impact on some of the cultural agile attributes such as 'meeting deadlines and expectations', 'proactiveness', and 'time keeping'.

The digital recordings were then transcribed and summarised. The researcher then read each transcription and made further notes. After the first reading the researcher continued a second reading of the transcription while listening to the digital recording. The second reading helped to make observations and notations on the tones, emphasis and emotions. Ashworth and Lucas (2000) assert that research of this nature requires some fundamental principles to ensure that the research is grounded in the lived experience of the research participants and not that of the researcher. To enable this, the researcher set aside her own ideas or views in order to gather the participants' own viewpoint and not to be influenced by the researcher's opinion. In this way the researcher detached from her own life world and opened up to the experiences of the research participants (Ashworth & Lucas, 2000).

It is also important to note that in case studies, as in any qualitative exploratory research, when the researchers begin their studies with one or several questions driving inquiry, new key factors emerge during data collection. While not bearing directly on the researcher's guiding questions, these variables may become the basis for new questions asked at the end of the report, thus linking to the possibility of further research. To have a comprehensive set of questions the researcher followed the following steps:

- As the subject matter is current and emerging, the literature was studied constantly to make sure the research programme covered the latest advancement.
- Expert analysis was conducted to validate the list of cultural agile attributes was comprehensive. As these were the basis for the interview questions, care

was taken to make sure these cultural agile attributes covered all aspects to this thesis.

- Interviews were planned to be conducted with a sample size trial in different cultures before the actual interviews were done. Five interviews in Australia, six in India and three in the UK were conducted first as a sample or a proof of concept to confirm that the interview questions were covering the scope of the requirements for this thesis. Further to the proof of concept, while the interviews were done in these three cultures, there were no additional questions or significant changes needed to the interview questions except for in some cultures the questions were needed to be asked with extra probing questions. Thus the trial interviews were also added to the final analysis.

5.8.2 Assumptions

During the interviews, some basic assumptions were made to keep the interviews consistent, simple and useful for this study, namely:

1. For the purpose of this study, when classifying the participants, the terms 'Australian', 'Indian' refers to locale and not ethnic origin. This means that it is interpreted as the participant working in Australian office rather than Australian origin. The objective of this study is to find the cultural difference between the geographically distributed participants with different cultural background rather than participants from specific nationality. For example, if there were Indian, Sri Lankan or other foreign born employees in Australia, they were not considered different to Australian nationals, provided they have lived in Australia for at least 5 years.
2. No difference was made between contract/permanent, full time/part time, male/female as all participants followed the same work practices.
3. No distinction was made between participants from different areas of a specific country. For example, in India, all participants from Chennai, Bangalore, Hyderabad were treated the same and in Australia, Perth, Mandurah and Sydney were treated the same.
4. Size of the organisation was not considered, but data were collected from medium to large organisations. This assumption was considered, as small

organisations may have some different process/practices due to team structure differences.

5. Data and results were analysed for a nation rather than a specific organisation as this study deals with analysing the nature of different national culture rather than an organisational culture.

6. Data were only collected from participants from the software engineering community, i.e. developers, systems analysts, project leaders and team leaders.

5.8.3 Boundaries and Limitations of the Study

This section covers the boundaries and limitations of the study, its context and the participants in the study. Some of the limitations that can be seen in this study and how they were overcome are discussed below:

- The culture studied could have been a bias factor in the data collection as some cultural factors would have stopped participants of being open and honest. For example, in India participants would have been unlikely to openly discuss their issues due to the power distance, hierarchy and future issues that they may need to face with their managers.
    - All of the interviews and discussions were gathered based on a confidential basis.
    - No participant was forced to discuss any areas with which she/he was not comfortable.
    - Most of the interviews (95%) were one-to-one interviews. There were some group interviews when the participants chose that option.
    - It was assured that the interview details will not be discussed with their managers or peers and the name of the participant and organisation will be kept confidential.
- The volume of data makes analysis and interpretation time consuming
    - Data collection was done in parallel with data analysis.
    - More time was allocated for the data analysis as volume of data collected was high.

- Research quality is heavily dependent on the individual skills of the researcher
    - Before data collection was implemented, the researcher spent some time studying and analysing different cultures to understand better how the questions should be framed and asked.
    - Previous studies in these different cultures were read to get a better understanding of what sort of issues would need to be faced. For example, time factor was an issue with Indian culture.
    - The advantage of the researcher's previous knowledge in Australia and India helped to get the data collection and analysis process more organised.
- Some interviews were conducted over the phone (interviews in the UK – due to cost in travelling to the United Kingdom)
    - More time was spent for each interview for United Kingdom. This helped to gather more observational details and additional information that was needed as the interviews were not face to face. Questions like how does the work seating arrangements are, offices and managers working policy (open doors/closed doors), how happy the working environment were all questions that were asked to gather more information.

5.9 Stage 7: Data Analysis and Findings

Data collection and data analysis were conducted concurrently. The simultaneous approach to these processes is one that is recommended for qualitative research (Marshall & Rossman, 1989). Specifically for this study, the researcher coded and analysed the data gathered to the relevant cultural agile attributes. The examples of the data collected and analysed against the cultural agile attributes are presented in appendix B. Participants in this study had limited knowledge of agile methods as not all had worked on projects that used such methods. Thus, face-to-face interviews helped as the terms and real meanings were able to be explained to the participants. The data collection was refined based on the results or outcomes of the data analysis.

As part of data analysis, statements and comments gathered from participants are provided in Chapter Six to help tabulate and categorise the data collected for better understanding. Care was also taken not to identify the name of the participant or organisation. Codes have been used to identify participants such as A1, A2, A3, for

Australian participants, I1, I2, I3 for Indian participants and U1, U2, U3 for participants from the UK. Statements or information that could possibly identify the participants was edited to ensure that confidentiality was maintained.

To address the issue of an appropriate level of analysis in an area of exploratory study, the researcher decided to use content analysis, identifying patterns and then confirming the analysis through evaluating against the research questions (Elo & Kyngas, 2007). During the data collection process there were emerging data that was used to influence and guide the next set of data collection. The data collection is the foundation of the data analysis. According to Miles and Huberman (1994), data analysis consists of three concurrent flows of activity:

1. Data reduction
2. Data display and
3. Conclusion drawing and verification

The next sections below will discuss the above three topics in detail.

5.9.1 Data Reduction

Data reduction was considered as part of data analysis and not a separate activity. Reduction of the data helps to sharpen, sort, focus, discard and organise the data in a way that allows for final conclusion. Data reduction is iterative and can be experienced in the data collection processes and continues until the final report is written (Miles & Huberman, 1994; Patton, 2002). Based on the research problem and questions the data reduction process was applied to get data that were relevant for this study. Based on cultural dimensions and cultural agile attributes some of the data reduction process was conducted based on the data's relationship to this study. This data reduction and segmentation was done within the parameters of qualitative content analysis using a coding process. Some data collected were discarded as they were not relevant because the participants had no exposure or experience to answer those questions. There were some situations where the participants were reluctant or did not want to answer the questions.

5.9.1.1 Content Analysis

Content analysis is a research tool focused on the actual content and internal features of media. It is used to determine the presence of certain words, concepts, phrases, characters, or sentences within texts or sets of texts and to quantify this presence in an objective manner. Initially the focus of content analysis was on quantitative data, but it has evolved into being a tool for qualitative data with patterns (Corbin, 1986). Patton (2002) describes content analysis as 'any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings. For the purpose of this study the thematic option for unit analysis were chosen by the researcher. The words and phrases in the data collection were reviewed and analysed and any recurrences of patterns were noted and studied. This process was continued until data was categorised into more meaningful groups and the data was grouped into different relationships (Miles & Huberman, 1994).

The researcher developed a series of codes and categories for the content analysis as patterns emerged. Patterns were grouped in an iterative process and then coded and categorised. Some data were identified that did not fit into the categories and codes.

5.9.1.2 Coding

Coding helps to impose a systematic approach, to identify gaps and questions, reveals early biases and helps to redefine concepts. "Coding" is the process of identifying patterns and attaching labels (codes) to index them.

Coding is the process of combing the data, ideas and categories and then marking similar passages of text with a code label so that they can easily be retrieved at a later stage for further comparison and analysis. Coding the data makes it easier to search the data, to make comparisons and to identify any patterns that require further investigation (Taylor & Gibbs, 2010).

Taylor and Gibbs (2010) also identified that codes can be based on:

- Themes, Topics
- Ideas, Concepts
- Terms, Phrases
- Keywords

For agile teams to be effective there needs to be a set of cultural values that everyone in a team needs to agree to abide by. The following sections discuss data collection, analysis and arguments. The data collected were transcribed based on cultural agile attributes and coding and were categorised for data analysis. Though the work involved qualitative analysis, the results were analysed and represented based on quantitative and qualitative data. Quantitative data indicates the emphasis of what percentage of people has identified the relationship and how strong the relationship is. Qualitative data indicates detailed statements and quotes which shows the depth of the data

Coding is an important part of data analysis which involves the following steps:

- Interview transcripts were read in detail and any issues of key interests or significance were noted.
- The researcher read the transcripts for a second time and an index of key terms was developed into a list that could become the basis for coding, these key terms being annotated with comments to give more meaning.
- The index of codes was then reviewed based on the research problem and questions.

A list of cultural agile attributes and coding was defined and listed. These are listed in Appendix C.

5.9.2 Data Display

Data display means taking the reduced data and displaying it in an organised, compressed way so that conclusions can be more easily drawn. In other words, data display is an organised presentation of information that helps the researcher with drawing conclusions. As part of the thesis data display was done through paragraphs of text. Too often, qualitative researchers rely on the presentation of key themes supported

by quotes from participants' text as the primary form of analysis and reporting (Bazeley, 2009). According to Miles and Huberman (1994) raw and unreduced text is cumbersome and difficult to analyse due to the following reasons:

- Spread over many pages
- Sequential rather than concomitant and
- Extensive in size and not well ordered

In this study some visual representations of data analysed were shown. These help to understand data better. The notes and pictorial presentation of data are displayed and covered in Chapter Six.

5.9.3 Conclusion Drawing and Verification

Conclusion drawing involves stepping back and analysing data to assess implications for the research question (Miles & Huberman, 1994). As part of this thesis, data is reviewed several times to verify data over and over again to cross-check and to reach a conclusion.

5.10 Summary

This research design chapter discussed the 'how' aspects of the research programme. The seven stages involved in this study were discussed in context of design in this chapter. The research questions are always kept in mind to make sure these seven stages were able to answer the research questions. Following on from this chapter, Chapter Six starts with the concepts involved in 'data analysis' and is discussed on the basis of the same seven stages. Chapter Six explains the data collection and comments from different participants from different cultures.

CHAPTER 6
DATA COLLECTION

6.1 Introduction

This chapter covers two major areas related to data collection. The first section (6.2) outlines the pre-data collection process which was used as the foundation for data collection. This is a critical part of the data collection, as it provided the base for interview questions. The second section (6.3) lists the data gathered during the data collection. The presentation of data collected is shown in relation to the cultural dimensions and the different cultures.

6.2 Cultural Agile Attributes – Foundation for Data Collection

This section discusses the steps involved in gathering the information needed for the foundation for interview questions. Collating the cultural agile attributes, finalising them based on comments from agile experts, matching cultural agile attributes to agile techniques and cultural dimensions and finally defining the cultural agile attributes and coding are discussed.

Internal validity was confirmed through successive iterations evaluating participant responses. The initial participants' responses from the first group were cross-validated with the responses from successive participant groups to confirm the consistency of the data. Any new information or comments provided were taken into consideration for further internal validation. Most of the responses indicated agreement with the details of the coding. The internal validation also helped in adding new information or clarifying existing details. The external validation was provided by review by experts in agile methodology. Most of the comments provided by the expert groups validated the participant responses.

6.2.1 Collate Cultural Agile Attributes

Based on the synthesis and analysis of the literature as detailed in stages 1 – 4 of the research design and discussed in Chapter Two and Three, a list of cultural agile attributes was compiled from the list of agile techniques and the cultural dimensions. Care was taken to ensure the final list was sufficient to be kept as a foundation for the research questions.

Brief outline of process involved in getting to these cultural agile attributes are shown in the following figure 6-1.

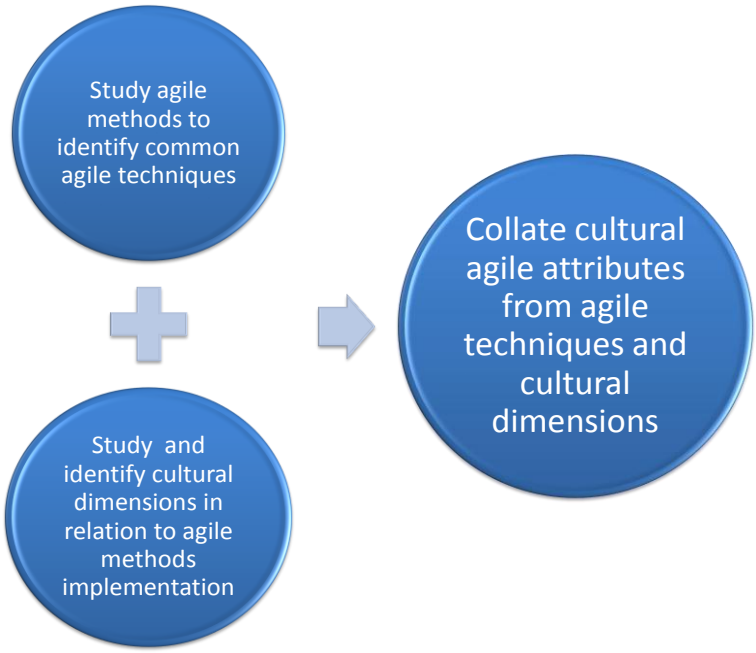


Figure 6-1: Process involved in collating cultural agile attributes.

Table 6-1 shows a list of cultural agile attributes accompanied by brief descriptions.

Table 6-1: Collated cultural agile attribute and description.

No.	***Cultural agile attribute***	**Brief description**
1	*Team collaboration*	Working together and the basis for bringing together the knowledge, experience and skills of team members.
2	*Management Support*	Willingly providing support from Management to the other team

		members.
3	*Open and honest communication*	Discussing project related issues in an open to all manner without hiding any information.
4	*Self organising team*	The team are able to define the deadline and work towards the deadline in an organised manner.
5	*Dedicated team*	Team members to be able to be focused and commit to reaching the expectation and goal or milestone of the projects.
6	*Trust people more than process*	Trust among the team members and trust in management, stake holders, project leader etc. This indirectly helps working together.
7	*Decision making*	Making decision in an appropriate time interval and by the right people.
8	*(Non) Authoritative*	Authority and responsibility for results as a team and individual is required for agile, but overly authoritative nature will delay in implementing agile projects.
9	*Blame sharing*	When projects fail, the blame and responsibility are shared between business and the IT team.
10	*Transparency*	Keep all status open, even if there is bad news. This also includes openness in decision making, honesty, communication etc.
11	*Risk taking*	Taking calculated risks and managing risks to make sure project is progressing well and a culture to be tolerance for risk taking.
12	*Tolerance for change*	Culture to accept change and work to progress the project without any impact.
13	*Innovation*	Taking initiative to manage innovative actions and making sure projects are in the lead to implement requirements.
14	*Time keeping*	Promptness, managing priorities and getting a good balance of work time.
15	*Meeting deadlines and*	Project schedule is taken seriously and considered important.

	expectations	
16	*Negotiation*	Skills required in liaising with other parties of the team to achieve the goal of the projects.
17	*Proactive*	Thinking before the incident occurs and able to plan ahead.

The above cultural agile attributes were maintained as the foundation for research questions.

6.2.2 Validate Cultural Agile Attributes

To confirm that this list was comprehensive, three agile experts were selected to provide their views.

- The first expert was chosen because she/he had good knowledge of agile projects in western culture (Agile expert 1) – Australia.
- The second expert was chosen because she/he had good knowledge of agile projects in Asian culture (Agile expert 2) – worked in India, China.
- The third expert was chosen because of his/her background in agile projects related to education (Agile expert 3). Education was included as it helps to see the same area of interest from a different perception.

List of cultural agile attributes collated were sent by email to these three agile experts with their meaning and their comments and feedback were analysed. The general opinions from the experts were that these cultural agile attributes were seen as consolidated effectively. For example,

- ‘This list seems fairly comprehensive….’ (Agile expert 1).
- ‘I have reviewed the list of attributes and believe that they are comprehensive, and applicable to all organisations that are implementing agile’ (Agile expert 2).
- ‘I like your list, and think it needs some explanation for the respondents to be able to answer effectively’ (Agile expert 3).

Comments from the agile experts were then reviewed in detail. All of the comments provided by the agile experts were seen being able to fit into an existing cultural agile attribute. Comments provided by the agile experts are numbered and listed below and a brief note on how these comments were incorporated in to the existing cultural agile attributes is provided. Table 6-2 explains comments from each agile expert and the reference to the relevant cultural agile attribute.

Table 6-2: Agile expert comments and reference to existing cultural agile attribute.

Agile expert details	***Comments from Agile expert***	***Reference to Cultural agile attribute – from the Researcher*** ***[refer table 6-7]***
Agile expert 1	Team and stakeholders need to be comfortable with the idea that everything can or will be clarified as the project progresses…. allowing the ability to adapt to a change in business or technical project constraint / goal.	[12] *Tolerance for change.* Culture to accept change and work to progress the project without any impact.
	We have meetings within iterations and even if there isn't any good news to share the meetings will need to be promptly adhered to.	[15] *Time keeping*. Promptness, managing priorities and getting a good balance of work time.
	Rigour / discipline – team sticks to its practice and core disciplines regardless of any pressure to drop them or move them.	[16] *Meeting deadline and expectations*. Project schedule is taken seriously and considered important.
Agile expert 2	Nil.	
Agile expert 3	Trust – should cover of the team by management and of team members towards each other, add this to the detailed description.	[6] *Trust people more than process.* Trust among the team members and trust in management, stake holders, project leader etc. This indirectly helps working together.

The feedback provided by the agile experts helped to further clarify the meaning of the already collated cultural agile attributes. Thus, these cultural agile attributes were kept as foundation for the interview questions.

6.2.3 Match Cultural Agile Attributes

The next step was to match the cultural agile attributes and agile technique to make sure all cultural agile attributes had at least one agile technique to match. Table 6-3 provides a matrix of cultural agile attributes and agile techniques.

Table 6-3: Matrix representation of agile attributes and agile techniques.

Cultural Agile Attributes / Agile Techniques	Team Collaboration	Management support	Open and honest communication	Self-organising team	Dedicated team	Trust people more than process	Quick decision making	Authoritative	Blame sharing	Transparency	Risk taking	Tolerance for change	Innovation	Time keeping	Meeting deadlines and expectations	Negotiation	Proactive
	Individualism / Collectivism					**Power distance index**					**Uncertainty avoidance index**			**Time**	**Context**		
Daily builds of complete system				✓	✓									✓	✓		
Iterative development	✓					✓	✓	✓		✓							
Iteration of fixed length	✓					✓	✓			✓				✓			
Incremental development							✓										
Customer on-site			✓												✓		
Frequent delivery	✓		✓	✓	✓		✓	✓		✓				✓		✓	
Whole team works same location						✓				✓						✓	
Dedicate meeting place			✓	✓	✓	✓	✓			✓					✓		
Daily team meetings	✓		✓	✓			✓								✓		✓
Testing is integrated			✓				✓			✓		✓		✓			
Project management emphasis			✓				✓			✓				✓	✓		
Communication	✓		✓	✓	✓	✓	✓	✓		✓							
Collaboration	✓	✓							✓							✓	
Coordination			✓											✓			
Knowledge sharing	✓		✓			✓				✓							
Working with uncertainty			✓				✓	✓	✓			✓		✓		✓	✓
Empowered to make decisions							✓	✓		✓	✓		✓				✓
Courage to make mistakes			✓						✓		✓		✓				✓
Requirements as prototypes rather than text	✓	✓	✓			✓	✓			✓		✓					
40 Hours week	✓		✓	✓	✓									✓		✓	
Pair programming	✓		✓	✓	✓	✓		✓		✓				✓			✓
Refactoring																	
Small software product releases	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Collective ownership of code	✓		✓			✓			✓	✓						✓	✓
Champion role			✓			✓	✓	✓		✓			✓				✓

As the next step, these collated cultural agile attributes were matched with cultural dimensions to confirm that all cultural agile attributes could be mapped to a cultural dimension. Table 6-4 matches the cultural agile attributes to cultural dimensions and indicates that the cultural agile attributes can be matched to cultural dimension.

Table 6-4: Impact of cultural dimensions in cultural agile attributes.

	Cultural Agile Attributes	**Individualism /collectivism**	**Power distance index**	**Uncertainty avoidance Index**	**Time**	**Communication pattern**
1	Team collaboration	✓				
2	Management support	✓				
3	Open and honest communication	✓				
4	Self-organising team	✓				
5	Dedicated team	✓				
6	Trust people more than process		✓			
7	Quick Decision Making		✓			
8	Authoritative		✓			
9	Blame Sharing		✓			
10	Transparency		✓			
11	Risk Taking			✓		
12	Tolerance for change			✓		
13	Innovation			✓		
14	Time keeping				✓	
15	Meeting deadlines and expectations					✓
16	Negotiation					✓
17	Proactiveness					✓

The final step in this stage was to draft interview questions needed for the data collection. The interview questions were drafted based on these cultural agile attributes. List of interview questions are shown in appendix D. Table 5-2 shows the match between interview questions and the cultural agile attributes.

6.2.4 Cultural Agile Attributes and Coding

For the purpose of the interviews the list of cultural agile attributes were used the foundation. During interviews there were other terms used which was sub categories of cultural agile attributes and these were categorised as coding and are shown below in table 6-5. For example, for the cultural agile attribute ‘team collaboration’, during interviews, participants discussed under different sub categories such as ‘team work’, ‘group/culture awareness’ and ‘hand holding’ and these are used as coding.

Table 6-5: Cultural dimensions mapped to cultural agile attributes and coding.

Culture dimensions	Cultural agile attributes	Coding
Individualism/Collectivism	Team collaboration	Team work
		Group / culture awareness
		Hand holding
	Management support	Management support
	Open and honest communication	Openness
	Self organising team	Self organising
	Dedicated team	Work / life balance
		Commitment
Power distance index	Trust people more than process	Trust and respect
	Decision making	Quick decision making
		Able to make decision
	Authoritative	Hierarchy
		Escalation
	Blame sharing	Taking responsibility
	Transparency	Transparency
		Outspoken
Uncertainty avoidance index	Rask taking	Risk taking
	Tolerance for change	Unstructured situation
		Tolerance for change
		Reacting to change
	Innovation	Innovation
Time	Time keeping	Timeliness / promptness
		Focused to complete
		Prioritisation
		Breaks and personal time
		Separation of work / personal
Context	Meeting deadline and expectations	False commitment
		Easy going
	Negotiation	Negotiation
		Emotional
	Proactive	Proactive

The data collected is covered in detail in the remainder of this chapter. The discussions are presented in following sections based on sections of cultural dimensions.

6.3 Data Collection – Interviews

A detailed information regarding data collected during the interviews is provided in the following sections. This section studied the data based on interviews conducted in relation to the research question to gather cultural changes required in different cultures Australia, India and the UK. Each section below analysed data based on five cultural dimensions that were chosen from Chapter Three.

Cultural dimensions studied:

1. Individualism / collectivism

2. Power distance index

3. Uncertainty avoidance index

4. Time

5. Context

Cultural agile attributes and coding were used as a base for the data presentation. The notations and interpretations used are shown in this section.

As discussed in previous chapters, this study involves finding what cultural changes are required in different cultures to help implement agile methods and to understand intercultural challenges in implementing agile methods. Thus there is a possibility that a specific culture may reflect a negative, positive or neutral influence on some identified cultural agile attribute that helps implement agile methods.

This chapter looks at the data collected as a first review and presents data in a microscopic way of individual cultures in relation to the cultural dimensions.

The following symbols were used to attribute meaning to the outcomes:

(-) indicates that the attribute has negative influence in the culture in relation to agile implementation

(+) indicates that the attribute has positive influence in the culture in relation to agile implementation

(+/-) indicates that the attribute has neutral influence in the culture in relation to agile implementation

() indicates that the attribute was not mentioned during the data collection in that particular culture, but were mentioned by other culture(s).

A progress matrix is shown throughout this section to keep the reader on track and to highlight what sections have been covered and what is left. An empty cell indicates that it is not covered yet and '✓' indicates that it is covered.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism			
Power distance index			
Uncertainty avoidance index			
Time			
Context			

6.3.1 Data Collection – Individualism / Collectivism

Data collected in relevance to Individualism / collectivism is covered in this section.

6.3.1.1 Australia

Data collection revealed that Australian culture is an Individualistic culture. Australians were seen as informal and prefer equality in interactions. From information gathered from participants it was discussed that Australians pride themselves on their directness and show little concern or get effected for what others think of themselves. Australian culture has no class difference. A good work life balance was seen in Australia. A relaxed, laid back culture was seen very clearly in Australian culture which also has a connection to not taking responsibility. Team work and group / culture awareness were areas that Australia will need to be more focused in relation to implementing agile methods.

(-) Team Collaboration – Teamwork: The data collection information indicate the fact that though working together were seen as part of the culture, there was a limit to what the team extends to help other team members. Discussions revealed that in Australian culture in general, it was expected for team members to manage their own needs. Comments such as below were mentioned during the interview:

- *'we prefer to work independently to get things done' (participant A1)*
- *'We do not tend to help someone else's problem' (participant A2),*
- *'our culture is very independent' (participant A5),*

The view or information gathered with regards to 'teamwork', was that team members work well together, but preferred to make decision, or do their own thing individually. An agile technique such as 'pair programming' will work in a culture where team members will need to not just work in a team, but work very closely on one computer helping each other. It was clear that the interview participants from Australia were aware of the fact that teamwork can be better managed in their culture. '*…communicate with each other makes a lot of difference in success of a project and this is an area that we have to focus a bit more* (participant A20)', '*we work well in a team, but don't communicate among the teams to get the project going at a high level*'(participant A18) indicated that the understanding and need for teamwork was clearly acknowledged by participants. 'Personal time' and 'freedom' were discussed in context of team work.

There were good example statements that were gathered during data collection in relation to 'working as a team'. Some examples include:

- *Team management is the biggest task in managing projects. Teams in Australia like to work in isolation and like their personal space. We need to start working in pairs and learn to work in a collective manner (Participant 22).*
- *Team – only focusing on their own work and not understanding the bigger picture (participant A26).*
- *We do communicate with other areas but then the information does not get filled out below when management makes decision (participant A27).*

It was interesting to see how the importance of team work was recognised and acknowledged by most participants and the majority of the participants also stressed the fact this aspect of the culture needs improvement in Australia.

(-) Team Collaboration - Group / Culture Awareness: Australian culture is a very cheerful, fun loving culture and the expectation for all team members to be similar was discussed during the interviews. *'Help was offered only if asked'* (participant A2) was a good example to show the reflection of the culture. Agile methods require more

group awareness and working together. Agile methods implementation required the teams to be intertwined. As Australia has heterogeneous culture, this group awareness is very critical. It was also identified that there were no issues with working in different cultures but the awareness/expectation to work in a similar way was highlighted in the data collection (participant A12). The statement *'We need to start to learn how to work together and have the same goal….'* (participant A10) clearly indicated that working together in a multicultural society was not an issue, but as every team member is strong in their own views and would like to act the way they want things to happen, handling intercultural relationship was seen difficult.

Some statements like, *'You read a book in your own pace….. that gives you enjoyment, I don't think I would like to go on someone else's speed…. their view etc. (participant 22)'*clearly shows the attitude and preference for individualistic nature rather than working together. There were some strong statements like, '*I like to drink beer… this helps potential getting together…*' (participant A22) and they identified that sometimes because of different cultures if a team member did not want to accompany to the pub, that can hinder the close working culture.

> *'Two Developers working together as pair programming will be very difficult as one will be interested in one area and the other in another area. Keeping both focused – I think it will be very difficult. Getting along well - also to progress in the same pace will also be difficult'(participant A22).*

The participants also valued the fact that diverse culture is a positive aspect to team building. '*It's a good healthy thing to have diverse culture provided it is managed well*' was mentioned by participant A18. Though the importance is seen, the reality is that coping with it is not being handled well in Australia.

The above statements and discussions surely show the individualistic nature of the culture and the desire to work independently.

( ) Team Collaboration – Hand Holding: This aspect was not discussed by the Australian participants. It was then very clear that the expectation for team to work and take initiative was the norm in the culture.

( ) Management Support – Management Support: It was identified that more management support and collaboration is needed in most areas (participant A7, A21). Though many participants were reluctant or didn't have much to say about the support management provided, it was clear that there were areas where surely more

management support was needed. As part of the data collection there were no definite indication of a relationship between management support and Australian culture.

(+) Open and Honest Communication - Openness: Australians have a direct style when dealing with problems. When things were needed to be sorted out, they were openly discussed and managed. From the discussions we had during the data collection, it was clear that the team had a clear, open and honest communication. Participants mentioned that there were no bad or wrong ideas, and willingness to listen to suggestions from everyone was seen. The participants also seemed more relaxing and openness was seen.

We had majority of the participants confirming the openness of the Australian working members with the following statements:

- *Most members in my team are open in discussing any issues (participant A1).*
- *Most members talk openly to find the area of fault and fix it (participant A2).*
- *Australians have the tendency to keep things open and honest (participant A3).*
- *... openly discuss and help each other in progressing towards the same goal.. (participant A12).*
- *Outspoken, not shy to say their view (participant A27).*

There were some discussions about some participants feeling that openness is not seen all the time and we need to know the organisation culture first before starting to discuss (participant A6). But in general it was agreed that Australian culture encourages openness.

( ) Self Organising Team - Self Organising: The team also seemed very well self organised and were geared up to do work independently. The culture was for the management to direct the team and not to dictate the details of 'what' the solution is or the process of how to create it. During the data collection the participants also indicated the fact that they were responsible for not only leading and organising themselves to achieve goals, but also to monitor and adapt behaviour to correct/improve their own performances. It was also seen that the team only went to the team lead for direction. Some statements from participants which shows the culture in Australia where the team members are self organised are given below:

- *Team that gelled together; self organised – wasn't too much red tape (participant A2).*
- *We have a good bunch of self disciplined team members who can work independently and cooperatively (participant A3).*
- *... can manage tasks and are capable of organising themselves (participant A6).*

An 'agile team' is supposed to be a self organised team that is guided by the agile values and agile principles (by the Agile Manifesto). Agile methods require the team to be of an adoptive culture where the team dynamically adjusts as needed across roles and responsibilities in order to manage the projects.

( ) Dedicated Team - Work/life Balance: Australians 'work to live' rather than 'live to work'. With work conditions geared to this eventuality including tea breaks, rostered days off etc. Australians live more for today than for tomorrow. Australians spend a fair bit of time in holidays, time with family and friends, with community connections etc. Some agile methods insist on 40 hour week working culture. XP, an agile method identified the fact that when people work long hours over extended period of time, the outcome is a diminished return. Keeping this in mind, XP recommends limiting work hours to 40 per week and not more than that. Agile helps you to be self disciplined and to work focused to complete tasks.

(-) Dedicated Team – Commitment: It was also seen that Australian culture are more likely to make the right decision with a lack of assertiveness to push through a decision. Most participants mentioned that commitment 'can be improved' (participant A5, A6, A7, A11, etc.). During the data collection it was identified that the participants knew that the commitment can be better. There was also an indication of pointing fingers to the others to pass on the responsibility to others. During interviews, participants mentioned statements like, '*I think we can improve on dedication* (participant A7)', '*Commitment and coordination can be improved* (participant A11)', '*Commitment is good but involvement is not 100% there* (participant A7)'. These statements clearly show that participation and involvement can be better seen in Australian culture.

Agile method implementation requires:

- regular plan at different levels
- regular meetings and commitments made based on a sustainable pace
- regular target and progress reviews
- make quick decision and follow based on purpose

While collecting data, there were also discussions regarding taking responsibility. Though this attribute is discussed further, as part of the commitment, it was felt that the reason why commitment was not seen in Australian culture was because of not taking responsibility in the actions (participant A2). Majority of the participants felt that the dedication and commitment level of team members can be more.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓		
Power distance index			
Uncertainty avoidance index			
Time			
Context			

6.3.1.2 India

From the data collected, the participants indicated that team work and group / culture awareness is seen very clearly in Indian culture. Though they indicated that openness is seen at team level, at the management level and team lead level, they decision were made at a higher level and the openness were not clearly seen to the others. The culture was clearly seen as a dependent culture, where the team members were not expected to make any decisions. The team also seemed to be lacking skills in self organisation, as they were spoon-fed or a paternal/maternal culture was seen. The data collection also shows evidence of expectation for the agency/organisation to provide facilities for the workers. Indians were more family oriented and the boss was treated as a father figure and as a guiding mentor.

(+) Team Collaboration - Teamwork: Teamwork was identified or was spoken by almost every participant and the data collection revealed that the Indian participants knew that they were very team oriented and were proud of their working culture (Participant I1, I3, I5, I7, I10 etc.). It was very clear that the participants felt the closeness of the team, and the following statements clearly show their reflections:

- *We feel very comfortable working in a team than individual. We work very well together (participant I10).*
- *Everyone works together (participant I7).*
- *It is a team work – most of the members work well together – shared information (participant I11).*
- *Success – only one – that is team work (participant I17).*

There were also additional team building exercises seen in organisations such as, weekend getaway and family gathering. Going for coffee was also called a team building exercise and we made use of that time to build relationships (participant I15, I17). There were also professional help provided to improve working in a team such as team members given opportunity to do a presentation. There were several participants who mentioned that they were happily available to help another team member to finish their work, in case the team member was sick or was unable to attend work (participant I7, I10, I15). The Indian teams also encouraged to get support from overseas leaders to provide enough exposure and experience. 'Train the Trainer' approach from overseas was also provided to clients. Statements like 'we tend to work together as a team than individual', 'most of the team members love working together and to share information', 'very friendly and good work culture' indicates that the team ethics are good in India. It is very clear that agile promotes teamwork and it is central to the agile development team.

During the discussions there were some participants who mentioned that they work for the manager/people and not for the organisation. This shows how Indian culture respects people, team and manager (participant I18, I22). The discussions about politics exist wherever people are were also mentioned by few participants (participant I32, I34, I36). This shows clearly that politics are unavoidable but how we manage them is important so that the team culture can be strong. The managers look at their team as a family and believe 'trust' and 'empathy' is needed. The team members look at their managers as a paternal/maternal figure and prefer to work as a family. The team also

expects the organisation to provide basic needs and to be supportive when they are in need of any help. The participants indicated that the reason they work is mainly for the people and not for the company or process or skills.

(+/-) Team Collaboration - Group / Culture Awareness: As Indians work a lot with overseas clients, the participants indicated a lot on how they can work better with different cultures. Communication was raised as one of the areas which can mislead to intercultural misconception, which includes both English language and IT language (participant I1, I5). There was also another area that was identified by the participants which is global market, outsourcing and physical location of the customers (participant 35, 34, 22, 20)

Indians have a tendency to adopt and adjust to any culture. They had several statements which showed their knowledge of how to deal with different cultural environments. Some participants also mentioned and confident about their capacity and adaptability to do any task; they also mentioned that the team are like "Tendulkar" (Indian cricketer) in their own field. This indicated the fact that they value the knowledge and skills of the other team members (participant 33, 25, 20). During the interview there were several indications of how the Indian team love to work with other cultures and to learn the other cultures. They also mentioned that 'even if there is a friction, positive energy can be transferred to the team and this can make things work better' (participant 34).

When analysing in India, there were mixed arguments for and against group and culture awareness. Though the intercultural issues along with global market and outsourcing were generating negative impacts on this feature, Indians are learning by experience how to deal with different cultures and are able to deal with situations pretty well.

(+) Team Collaboration - Hand Holding: In India team members work in a paternal/maternal way. In India members were very ambitious and career oriented. The expectation of opportunities and career advancement were positive in work environment (participant I2, I14, I36). Team building activities with guidance and help were always provided for the team members and it is expected that the organisation will help staff in their career path (participant I4). For the benefit of learning their personal skills they were taught and given opportunity to give presentations to team members (participant I4, I11, I30). Participant I9 also mentioned about how fresh graduates were provided with help and opportunities to get up-to-date and to get used to work environment.

‘In India it is more personal level and in US it is professional level’ (participant I15) is a statement that shows how important it is in India to be team oriented. Participant 33 also mentioned that he believed, ‘each person has got something in them – diamond in them’.

()Management Support – Management Support: Not discussed

(-) Open and Honest Communication – Openness: The culture to share information openly was there in some situations, sometimes even just as a coffee break (participant I19, I35). Though it was stated that among team members the openness was seen, among the higher management, this was definitely not seen. The participants also identified that due to the hierarchy, the open communication, decision making, and motivation to work were seen affected (participant I4, I7). Indians have a tendency to sort things out in an indirect way – to avoid conflicts and misunderstanding. The openness was clearly seen with communication, but when it comes to decision making, the hierarchy had an influence on this and the open and honest decision making was not seen in an Indian culture. ‘*I don’t like to make him feel bad in front of others*’ was a clear statement which indicated that by nature, the Indians preferred to resolve any issues privately. Many participants also identified that the reason for openness not seen in the Indian culture was ‘*the fear of what the others would think’* and the mental block had stopped them from talking openly in meetings. Agile methods insist and require open and honest communication. Agile methods require you to trust and openly discuss issues to make the right decision.

When details were being discussed with DBA, a team member felt bad discussing his views openly (participant I16). But as part of the culture, and due to hierarchy the openness doesn’t really occur. Another reason for not discussing was because the team members felt shy to openly discuss (participant I19). During the interviews it was obvious that some of the managers genuinely want the team to openly discuss their issues (participant I33). One of the managers mentioned ‘*I always tell them, talk – talk, that’s the only way...*’ (Participant I33). Though the team managers have been encouraging to speak openly, this was not seen in Indian culture.

() Self organising Team – Self Organising: Not discussed

(-) Dedicated Team - Work Life Balance: Work life balance was discussed few times by the participants during the interview and they really hoped that their lives could be better managed (participant I16, I21). Though the team were happy to provide that extra commitment, the participants indicated their frustration on work life balance. They also compared themselves with other cultures like Australians to see how the work/life balance was well balanced (participant I10, I24). Being a collectivist country Indians have the tendency to be very close to the family. Most indicated that they preferred to stay in India rather than getting a job overseas due to family commitments (participant I4).

It was obvious that most participants didn't even mention these criteria as it was not even an expectation in Indian culture to have a good balance of work/life. The importance of career has made the workers to go that extra mile to get a good job sacrificing the work/life balance.

(+) Dedicated Team – Commitment: Though commitment was not mentioned explicitly by majority of the participants, the commitment was clearly seen during the interview (participant I1). The statements below were discussed as part of team work:

- *'If someone has to go on leave, we finish their work' (participant I10 – Teamwork).*
- *'I work for the team and not for my organisation'.*
- *'My aim is to make sure my team is not stressed and they didn't have to come three weekends to finish to the deadline'.*

Indian culture is a very dependent culture, with the collectivism seen clearly throughout the culture. In the software development team specifically in agile development team, the need for self managing, taking responsibility and making decision is needed. But in Indian culture the team seem to prefer a 'hand holding' nature or process for any major tasks. They prefer to make a group decision so that the blame or stress was not on just that one person.

One good example that was discussed by participant I21 states that he has seen even the tea attendant coming at 3 am to come and provide tea to help the IT support team to work. When asked for the reason behind dedication, the answer we got through the interview was that it was simply due their enthusiasm.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	
Power distance index			
Uncertainty avoidance index			
Time			
Context			

6.3.1.3 United Kingdom

Data were collected over the phone and the interviews were conducted the same way as other cultures. The phone interviews revealed lots of detailed information about culture in UK. Teamwork and group / culture awareness was seen globally in most organisations. The value of teamwork and working together were seen often and in most places with most teams. The commitment factor was also clearly seen in most interview participants. They also deal with situations in an open and direct manner. The team members also seem very motivated and self organised. The team members knew what they wanted and were really focused and capable of working independently and in a good team culture. Though the culture was not to overly feel as a family oriented environment, the team felt the need to help and move on with tasks. Though work / life balance was expected to be working well, in reality the software development team felt the pressure and stress to complete work before or after working hours. The UK culture was seen extremely formal.

(+) Team Collaboration – Teamwork: Teamwork was seen in UK and sharing and helping each other were also clearly seen. Working together was discussed almost during all interviews and the participants seemed really enjoying working in a team. Most of them also indicated that they sometimes work in pairs.

- *As we have been working together – we have now become more understanding (Participant U1).*
- *I think the relationship is perfect – it couldn't be better (participant U3).*
- *Even if everyone is happy we still go around and make sure the communication and relationship is growing (participant U5).*
- *... all the projects, we work very well together (participant U6).*

- *We are fully committed to the project – and the business is as well (participant U8).*
- *God team management – also technical ability (participant U9).*
- *Relationship is generally good – levels are managed well so that the hierarchy – advice and support is good (participant U17).*
- *We work very close to each other – team relationship is really good – I play multiple roles and at the same time I always believe it is a team effort and I don't have the time and knowledge to do everything – I depend on other people – you can't expect everyone to be the same – some like to learn new stuff – people management is harder than managing projects – the whole project will fail if we cannot communicate very well. Very flexible, capable of working even complex tasks. (participant U9).*
- *There is different ways of tackling things – how we want things to be done. We are more than a development team – we try to think as business – we tent to force them to the same way (participant U8).*

Some agile methods insist on pair programming and the UK culture seems suited for this team culture. During the interviews the participants also spoke about being friendly and helpful and they also expressed that working together made them happy. Obviously these sort of statements gives the impression that UK is a culture where working together as a team can be easily incorporated.

(+/-) Team Collaboration - Group / Culture Awareness: UK also sees a heterogeneous culture, but the difference was that they realise the cultural difference and were aware of the diversity. The cultural differences were manageable and the linguistic difference was also seen in most areas (participant U1). Conflict resolution and communication strategy seemed to be working well in UK. The participants discussed their view on how they were very results oriented and they somehow like to finish the projects (participant U5). The interviews indicated the fact that the participants knew the cultural differences and they were willing to work according to the diversity. The participants mentioned about the team selection, junior and senior, from variety of areas such as Portugal, Spain, France and Germany.

( ) Team Collaboration –Hand Holding: Not discussed

(+) Management Support - Management Support: Among all the cultures that were studied, in United Kingdom the participants openly admitted and mentioned the support they receive from management. Though this may not be a cultural factor, it was interesting to know that in UK the expectation was that the management support will be provided. The other 2 cultures didn't mention much on this.

- *Participant U1 mentioned that IT has become part of business within the last 10 years and if something goes wrong, the responsibility is shared.*
- *'Most of them are very supporting' (participant U2).*
- *'Any time they are available – week days or weekends' (participant U3).*
- *Commitment from management is seen most times (participant U8).*
- *'…value of IT is seen very high' (participant U14).*

From interview and discussions with participants it was clear that management in UK firms were very committed and provided support most times.

(+) Open and Honest Communication - Openness: The offices were mostly open plan and this helped the teams to be open in discussing any issue then and there. The manager's offices were always opened and the team had all the opportunity to go to the office and discuss when needed. The passion for what they do was clearly communicated and the participants mentioned that they like to say what they feel. Participant U1 mentioned that whoever comes up with a good idea were accepted by everyone.

- *'…upfront say what they can and can't do… (participant U2).*
- *'…freedom is also given to talk and explain their views' (participant U6).*
- *'My husband is Irish – he is very argumentative – and I am as well. It's not good to keep quiet if you have an issue – should be able to openly discuss – most in UK do that' (participant U9).*
- *In UK culturally we are a very open society (participant U10).*

Based on the culture discussion most participants felt that open and honest communication was seen in UK

(+) Self Organising Team - Self Organising: Not too many participants discussed regarding being self organised. But out of the participants who discussed their

views all of them felt that they were self organised. The discussions were based on the fact that members were expected to make decisions and work independently (participant U5). In the culture there was no hand holding or spoon feeding. The indication was also that the participants were hard working and they go beyond duties to complete their tasks (participant U15).

Statement like, '…*but ultimately we have our own responsibilities, because we have to take ownership or should take the consequences*' indicated their attitude towards being self organised and self disciplined to do any task. During the interview the view of people moving on to take on more responsibility and greater roles were discussed. Reward and restructure the groups were also seen to create productive teams.

( ) Dedicated Team – Work / Life Balance: Not discussed

(+) Dedicated Team – Commitment: '*Everyone in the team is very dedicated*' and '*if someone has a problem we help each other*' (participant U3) were mentioned which indicated the dedication of the team members.

The following statements also can be added to confirm the dedication the UK team members had:

- *'Most of them finish an hour later than usual (participant U5).*
- *'Nature of work is such that they love to continue and also cannot stop half way through (participant U5).*
- *'Fully committed – apart from work we are also friends (participant U8).*
- *'If something needs to be delivered tomorrow then the team will be working extra hours to finish the work' (participant U8).*

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index			
Uncertainty avoidance index			
Time			
Context			

6.3.2 Data Collection – Power Distance Index

This section discussed changes required to power distance index related cultural agile attributes. From data collection it was seen that Australian culture needed to see some positive changes in areas such as transparency, taking responsibility, hierarchy management, and quick decision making. From Indian culture perspective, there seemed to be the same sort of changes and more needed such as transparency, taking responsibility, able to escalate, hierarchy management, able to make decision, quick decision making ability, and trust and respect. Again from this cultural dimension perspective, United Kingdom seemed well balanced.

6.3.2.1 Australia

Trust and respect was seen in most cases in Australian culture. Though decision making has been done in a planned manner, quick decision making has not been seen in most software development projects. The authority or willingness by team members to be able to make decisions was seen very well in Australian culture. Issues related to hierarchy were not seen much, but when dealing with higher management level, these hierarchies have been noticed and have affected projects. There have been some mixed data collected in the area of 'escalation', some have identified the fact that the project risks and issues are being escalated, but in other cases, there have been some cases where escalation was not done. Australians due to their relaxed culture don't feel the need in taking responsibility. Transparency was also seen in some areas only and participants have identified that at higher management level, transparency was not that great.

(+) Trust People More than Process – Trust and Respect: Trust, respect and judging people was generally seen and experienced in Australian culture (participant A1). The data collection highlighted the fact that due to the confidence in the team, the trust was automatically seen (participant A5). It was also mentioned that '*Australian culture expectation was that the developers are expected to pull their knowledge into practice....*' (participant A7). Further participant A7 continued '*I very much trust them to follow procedure and help continue the project well / better, this is pretty common and how it works*'. Australian culture also believed in equality and respects individuals with dignity (participant A20). The data collection also revealed that most times the

management or team leads have confidence in the team and get support for their decision (participant A11, A10, A9, and A29). The decisions made by others were generally accepted and agreed with individual decisions. The management also believed and trust the team that they will make the right decision for at that point in time (participant A22).

Overall there were good examples and input to confirm that the culture respects people as they are and their views were always welcome and trusted. When making decisions, the team members were able to make the right decision as the trust and respect was seen among the team members.

(-) Decision Making – Quick Decision Making: This was an interesting discussion and it gave an insight of how different criteria can reflect influence on quick decision making. Though Australians have a proactive culture (participant A1), quick decision making was not seen. From data collected quick decision making was not seen in an Australian culture for two reasons:

a) The relaxed culture.

b) Too much authority given for all to make decisions and thus delay in the decision.

By nature Australians have the relaxed culture that can make project delay (participant A22). '*We are considered pretty slack – always slow… can get things done tomorrow attitude*' (participant A22). The other factor is that due to the reason that everyone was allowed to share and give ideas, many times, the discussions went on forever and the team meets again and again to make sure everyone's view was discussed and agreed (participant A4, A8). This sometimes delays the project. The data collection also revealed that in the office, meetings drag on endlessly since so much attention was given to the 'right to fully express one's personal opinion'. The final decision was not made until everyone present had their say. The meeting decisions sometimes gets changed or delayed because a group of team members had different opinion. Participant A29 also mentioned about there were lack of consultation sometimes when making decisions and consequently this had negative side effects (participant A29).

(+) Decision Making - Able to Make Decision: From data collected, it was seen that the participants identified that most team members have ideas of their own and the expectation was that for team members to raise their views openly (participant A1, A20, A23). According to the data collection, most team members were making open

and honest decision. Most participants conveyed during their interview that decisions were normally made by the right team at the right level. The final responsibility and decision making was done by the manager. In some cases there were situations when project board make decisions without understanding the real picture (participant A2, A18) and this should be avoided. The other area that was discussed in Australian interviews was 'making correct decisions at the correct level' and 'access to the right people at the right time' (participant A5, A17, A23). '*Culture is to make their own decision – but the structure sometimes stops them*' (participant A23). '*Right people at the right level making the decision were also an issue for this project'* was indicated by participant A5 and the reasoning behind this discussion explains how important it is for the decisions to be made by the right people.

(-) Authoritative – Hierarchy: The data collection revealed that some projects have red tape and the loud person gets his project approved (participant A2). It was seen that at the very high level the hierarchy was seen. Though according to Hofstede, PDI was not very high for Australian culture, in reality in a software development team, negative influence was seen in relation to hierarchy. '*In government you don't argue with your boss..... to make things happen better*' (participant A6) indicated that in Australia hierarchy does have implications on projects even though in general, the culture was seen with equal rights and everyone is treated equally. A participant explains it clearly as,

> *'Team members are expected and allowed to make decision – but there is a pyramid type of a culture and is very different'.*

The participants also discussed that in some cases the hierarchy was subtle – and were seen prominently when moving into higher levels at work (participant A20). Participant A21 also mentioned an example where a Systems Analyst from Philippines was hesitant to make decisions as he thought it was not his job to make decision and the Australian counterpart was convincing that the decisions should be made by Systems Analyst because the culture was for technical team player also to make decision. This culture was not seen in Philippines culture.

(+/-) Authoritative – Escalation: From data collected, there were mixed views on 'escalation'. Some revealed the fact that project managers do not always say the truth to the managers and do not escalate issues on time. They also added the fact that project managers should be open and honest and escalate the state of the project without hiding. Some team members also do not communicate or reveal the real truth to the team leader

regarding the fact of the project. There were few participants who believed that the issues were getting escalated on time and to the right people and the others felt that this was not happening on time and to the right people (participant A2, A3, A11, A14). 'No surprises attitude' and escalating issues early were discussed by participants A8 and A20. It was discussed that in some cases project managers should tell the problems to the board and discuss in early stage of the project to avoid any concerns. When problems gets escalated and shared then there is an opportunity to try and do the best option that exists.

(-) Blame Sharing - Taking Responsibility: According to the participants of the interview, the data collection indicated that, 'passing the responsibility to avoid problems was commonly seen in Australia' (participant A12, A5 and A25). The relaxed working culture also influenced the fact to avoid taking responsibilities. The participants mentioned that the team are hardworking but the processes in place restricts in taking responsibility (participant A1, A3, A5, A25). It was also very clear during the data collection that by not taking responsibilities there were project issues that were noticed that could have been avoided (participant A4, A5). In general the nature of the culture was such that there was a tendency to be relaxed and this has led to not taking responsibility.

(-) Transparency – Transparency: Though transparency was acknowledged as seen in different areas in the work culture, most participants revealed that the transparency was not that well seen at the higher levels of the organisation (participant A1, A2, A17). Details were not well communicated and to different areas of the organisations for specific reasons to keep things secretive (participant A3). Some team members were also annoyed at the fact that they travel in the plane and come with some brilliant ideas and give false promises to clients (participant A4, A8, A21). These were not transferred back to the team members. There were times when not all relevant people were informed or made involved in decisions. It was acknowledged that just for formality reasons it looks like the details were passed down, but in reality transparency is not seen in Australian culture.

(+) Transparency – Outspoken: If in case some tasks were allocated and if time and resources were not available, an open discussion was always seen (participant A5, A7, A1, A2, A3, A9, A10 and more). Almost all participants agreed that in most cases an open and honest conversation took place.

- *'...we communicate openly and manage conflicts pretty well' (participant A1).*
- *'They are outspoken and any project related issues are openly discussed and managed' (participant A2).*
- *'in general teams expect that they have been told all information without anything being hidden' (participant A3).*
- *'...everyone at work is expected to talk openly and honestly' (participant A9).*
- *'In many cases I have seen the team discuss all sorts of issues openly. We don't unnecessarily hide views from others' (participant A13).*
- *'When there is a conflict, we try to resolve by talking and discussing openly' (participant A26).*

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓		
Uncertainty avoidance index			
Time			
Context			

6.3.2.2 India

Trust and respect were seen a lot in family and friends. But within the work culture this was seen as negative influence. Due to hierarchical structure decisions are not made quickly. With regards to decision making, the team members do not have the initiative and to some extend authority to make decisions. From young the decisions were always made by parents/elders/boss, this culture has made the resistance to make decisions. This culture was also seen due to the respect factor, where it was believed that the older/higher authoritative person should make the decision. Hierarchy is very strong in India and this has had lots of negative impact on processes. There is also indication that escalation is not always done well in India. The tendency to avoid any conflict is seen here. By nature, Indians like to take responsibility and sometimes even

more than what is expected. The culture was seen as an 'empowered' culture. Transparency was not seen very well, as much as possible the details were hidden unless you were required to know. In India not all people speak openly in meetings. The fear of being misjudged and saying the wrong things has made most Indians to keep things to themselves in meetings. Indians are ambitious, and some times over ambitious.

(-) Trust People More than Process - Trust and Respect: It was interesting to see how participants when asked about 'trust' were mostly discussing about trust among different cultures. Indians prefer doing business with those they know and relationships are built based upon mutual trust and respect for others. Indians prefer to be trusted and like to know that they are valued and trusted. But by nature, they don't trust others and the team members (participant I9, I20, I25, I31, I32). Even in the interviews, I could see as part of the observation at the beginning of the interviews participants were not really discussing details in depth, but later when slowly the trust was built, I was able to gather details of all areas in depth and willingly. They like to build the trust and relationship slow and steady. In some interviews, I could see this clearly. Beginning of the interviews was really cold and then slowly the participant became warm, open and informative.

The trust factor was further cleared based on statements like,

- *'...we have to tell them a different deadline…. To make sure we finish on time' (participant I20).*
- *'I need to view the email before it is sent'(participant I20).*
- *Working from home was not generally agreed due to the trust factor (participant I21).*

Some of the managers mentioned that they trust the team members and would like the team to take initiative (participant I19). It was also noticed that 'the trust factor' was improving slowly in Indian culture (participant I21, I35). Some of the multi-national companies were trying to implement the culture of trust in India as well (participant I35). '*I have worked in other companies and I feel this agency is a good team culture with openness and team dynamics. I chose this culture....*' (participant I35) shows that it is gradually changing, but not seen in most companies yet.

(-) Decision Making - Quick Decision Making: Due to the strong hierarchy, the decision making process has become tedious. Due to the fact that the managers were expected to make the decisions, the timeliness sometimes gets delayed (participant I16,

I25). It was a practice that the team members were not needed, or not allowed to make any decisions. The dependent nature of Indian culture on higher authorities delay the decision making process and the impact can be huge for agile development projects.

- *'Hierarchy is very strong – the manager always makes the decision' (participant I12).*
- *'Sometimes it is difficult to get approval or quick decision making' (participant I16).*
- *'Because of the hierarchy and nature of the culture, we tend to take a long time to make decisions (participant I25).*
- *'With projects, we see a lot of delays due to decisions are not being able to be made quickly. One of the reasons is that the hierarchical structure delays the process' (participant I29).*

The authoritative nature and hierarchy have created the decision process a slow process in India.

(-) Decision Making - Able to Make Decision: Indians also have by nature a resistance to make decisions. They are worried that the decision may be wrong or unsuccessful. In India team members don't have the same level of responsibility, obligation or decision making authority as some other cultures (participant I9, I18). When working with different cultures this can be a major issue for a project failure, especially with an agile method related project. '*I can't do or make decisions beyond a certain level'* (participant I18). Team members also try not to make any critical decision and keep that for the higher management to decide (participant I25). There will be delay seen due to the process of higher management decision making.

Participant I13 explained clearly of the teacher/student relationship and said how from school days parents always guided the kids to what was right and wrong and was never given a chance to think by them independently. This nature of characteristics grew to work environment as well. The culture of being told what to do, when to do, how to do was seen and this effect has made it difficult to be able to make decisions on their own (participant I19, I31, I33). Participant I29 mentioned '*We always depend on the manager to make the final decision as this is the culture*'. Continuing from that participant I31 also felt that the team should be allowed to make decisions on their own. From management point of view they feel that the team members are not matured enough (participant I37). In India the promotions occur every year or two and the

developer very soon becomes the project lead. Due to this reason the maturity and experience were perceived not to be seen and thus the management felt the reasoning behind the self decision making.

(-) Authoritative – Hierarchy: It is a general understanding that India has a strong hierarchical structure at business. Less powerful members accept and respect superiors or heads. Almost all interview participants mentioned the fact that Indians have a strong hierarchical team (participant I2, I3, I11, I13, I18, I32, and I37). Participant I3 mentioned that management control, getting approval and communication will all need to go through hierarchy. There was also a feeling that some of the team members actually preferred to be able to go through the manager for approval and this was seen through the statements by participant I4, I5.

- *'Power is a huge factor here, they expect promotions every 3 years' (participant I2).*
- *'We rarely see the bigger picture as we are not expected to know them...' (participant I5).*
- *'... team members have to follow the time and instructions defined by the team lead' (participant I7).*
- *'Fear of boss is there in this culture – even if we work a lot together – we have this boss-subordinate relationship There is also a paternal/maternal relationship' (participant I9).*
- *'... but the basic underlying culture is to make sure that you satisfy the boss...' (participant I13).*
- *'...we try to get contact with big boss – it doesn't really work that way – we don't get to speak to the big boss – no openness' (participant I15).*
- *'Most of them are afraid to talk to their manager', 'Most of them think it's not worth saying anything – because they believe it is not going to be heard anyway' (participant I16).*
- *'... people work because of the manager, not just money' (participant I21).*

One more interesting statement was '*when someone talks back or anything like that we know that he is going to leave to another company'* (participant I15). This shows that the team members only speak up when they know that they will no longer be working in that company. While they work at the organisation they try to be in good

terms with the boss. This surely and clearly shows the hierarchical nature in Indian work culture. The participants also mentioned some examples of how in other cultures they have no manager/subordinate difference and they preferred that culture (participant I12). The processes of getting managerial approval before doing any controlled migration were discussed. The nature of communication was also mentioned with regards to hierarchical structures. The participants also identified the fact that they distance themselves from higher management due to the hierarchy.

(-) Authoritative – Escalation: The escalation process is seen in India but not to the fullest. The participants thought they sometimes feel bad to escalate the 'bad' news. Some of the good example statements gathered during interview from participants are listed below:

- *'When we have issues we rarely escalate major issue at the right time' (participant I1).*
- *'...most time we are not very out spoken and expressive' (participant I2).*
- *'In most cases, the tendency to hide and not escalate any project critical issues is seen commonly in Indian culture' (participant I25).*
- *'A process of raising the risks immediately during a project should be practiced in India. We tend to keep things hiding until the end and then realise that things have blown out' (participant I30).*
- *'When things go wrong, we need to highlight these issues immediately so that actions can take place to avoid and overcome the problems. But the project managers keep things till the last minute to highlight crucial issues to the project members' (participant I33).*
- *'....if it is issues, risks or any aspects of projects, the communication should be done and keep on top of the problem' (participant I34).*
- *'...when the PM comes to know there could be a delay, a successful PM will take the action on time and identify a fall back option, he would have informed regarding the quality, and inform stake holders, but if the PM is not experienced he will not be able to handle this well' (participant I37).*

The information came across as people were reluctant to reveal the truth and to be open. They also mentioned that the project team should know when to escalate the problems and how to manage or raise the issues.

(-) Blame Sharing - Taking Responsibility: Most individual participants agreed that they should take responsibility for their actions. With regards to projects, the team members were not expected to take responsibility when something goes wrong. The responsibility lies with the project manager. '*The issue here is individuals need to start taking responsibility*' (participant I3). Participant I13 mentioned about time zone and time difference between clients and taking responsibility sometimes becomes harder. '*When you say that you will get back to someone, at a certain time, and you are not able to make it, you have to send a mail or call and communicate to them the details*' (participant I21). Simple responsibilities like communication was also lacking in India. There were intertwined reasons for this. Lack of time management, planning ahead and communication were few that could have impacted on 'taking responsibility'.

There were few participants who mentioned that they do take responsibility from their part of the work (participant I30, I31). But in general this is an area which needs improvement. Though the Indians have the fear of boss, there was also a paternal/maternal relationship and empowering was seen in most areas. Caring and guiding bosses were mentioned by many participants and they also discussed about how the manager hand holds them in the right direction. This could be one of the reasons for not taking responsibility. They also identified that their bosses always ask them to open up in meetings and provide their ideas.

(-) Transparency – Transparency: Transparency was rarely seen in Indian culture. Though among the team members there was a good understanding and information were transparent, at the higher level, the transparency was not seen at all.

- *'A bit more openness and transparency is required in Indian culture' (participant I29).*
- *'We tend to keep things undercover for no reason, talking and discussing openly will always help with good communication and project success' (participant I30).*
- *'An ideal culture will be when there is transparency in work place where the team members all work well together and gelled together to achieve the same goal. This is rarely seen in India' (participant I32).*
- *'they are too excited or passionate about the work they do – but don't feel like collaborating' (participant I35).*

- *'All people involved should have a common understanding' (participant I36).*

The participant's response to this cultural agile attribute indicated that when there was a bad news related to projects, Indians either don't respond at all, or only mention good things, or refer to someone else to respond. The interviews reflected the fact that the Indian culture had almost all cultural agile attributes under power distance index with negative influence. But the good side of this is that most participants were aware of the fact that they had to improve in these areas to make their projects success.

(-) Transparency – Outspoken: Even in meetings there is no direct, outspoken or open communication. The reasons have been because of worry of being considered wrong (participant I3, I4, I16). The participants have identified that their mentors have always told to speak up in meetings and to raise their views any time they feel. But due to the culture, they identified that though they would love to change, it will take some time. When a task is assigned and if the time available is not sufficient the Indian members rarely openly acknowledge that the time was not sufficient to complete the given task. As much as possible Indians like to keep the relationship positive and not to hurt anyone. To keep this relationship going, they rarely openly speak their views.

- *'...but when it comes to boss/client, then the tendency to speak out vanishes' (participant I1).*
- *'...we still feel bad to discuss conflicts openly. We prefer to keep it to ourselves' (participant I2).*
- *'Yah we are told to be outspoken in meetings to discuss openly. But I think because of the fear of being misunderstood or to avoid any conflicting issues, we tend to not speak openly' (participant I3).*
- *'...team members are given the opportunity to speak out, but they don't want to talk or express their views' (participant I9).*
- *'The main reason is we feel bad to say something and hurt the other person' (participant I11).*

Participant I7 also mentioned another issue with regards to females, '*they find it harder to be open as in some cases they are categorised as arrogant*'. In addition to being misunderstood wrong, there was another reason why they don't speak openly, 'shyness' (participant I19).

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	
Uncertainty avoidance index			
Time			
Context			

6.3.2.3 United Kingdom

In United Kingdom bosses were mostly democratic. They are very direct when dealing with issues. In UK, trust and respect was seen among team members. They were able to make quick decisions and the structure or environment did not stop that. Team members were also able to make decisions on their own and willingness to take responsibility was also seen. The hierarchical structure were discussed in two different ways, some felt that the formal, strong hierarchy exists in UK and the others felt that the hierarchy was quiet flat and processes were in place to get things done soon. The culture was quiet formal. When compared to Australia, UK was more formal and Australians can be pictured as more relaxed. With work hours and commitment, the expectation was much more in UK when compared to Australia.

(+) Trust People More than Process – Trust and Respect: There was trust and respect seen throughout the culture. The general culture was to respect everyone as individual and believe in their ideas and recommendations.

- *'I think it is in every organisation and I think it is the general culture' (participant U1).*
- *'Trust is the same in both places – we have trust among the team and management… we like working well together and keep things open so that the project can go well…' (participant U2).*
- *'...lot of communication and trust is always built and maintained' (participant U5).*
- *'As a team we work together, we respect each other. I think from business point of view, they too allow team members to make decisions and work with respect and trust' (participant U10).*

- *'Flexible, adaptable' (participant U15).*

From the interviews it was clear that trust and respect were seen among team members, management and customer. They also mentioned that the preference was to build the trust from very early on. They compared themselves with US and said that in US they like to cover themselves, they were reluctant to make decisions and the culture was rigid and blaming culture was seen in US. They believed that the UK culture was more on trying to work together with trust and respect.

(+) Decision Making - Quick Decision Making: The participants identified that the roles and responsibilities were very clear and that made the process of any action more formal and streamlined (participant U16). Due to that everyone knew their limits and the decisions were made quickly. They also mentioned that when something went wrong or if it needed group decision, then they made the decisions together. Participant U3 indicated '*It depends on the decision level – big decisions are taken by management – but other software related decisions – we can make them'* and this shows that there was a clear process in place with the level of decision making. '*The team work pretty agile and able to make quick decisions, but sometimes the issues with hierarchy stops from progressing quick decision making as there was a wait for management approval*' (participant U6). Most participants identified that decision making were done quickly and the higher management get involved to made decision. When the team felt the right decision has been made, then they work together to achieve the final goal.

From management point of view, they also mentioned that it was an open environment and that they were available most times to answer questions. '*Some questions were answered in the fly – we were always available to answer any question'* (participant U8).

(+) Decision Making - Able to Make Decision: The team discussed the fact that they were encouraged and expected to make decisions proactively. The team members were also given enough authority to make decisions (participant U1, U2, U3, U10). Again the participants discussed about how the organisations have a clear process so that the limit for decision making was known to all (participant U4, U10). The participants said they prefer to make independent decisions based on their view and then to discuss to make group decisions. Most of the team members identified themselves as very independent, who were capable of self thinking and preferred to make individual

decisions. The participants also agreed that they were always encouraged to make decisions.

(+) Authoritative – Hierarchy: From data gathered it seems that the software development teams were fairly flat structured with clear level of decision making, approval, and reporting practices (participant U1, U6).

- *'Most decisions are made as much as possible as a team (participant U1).*
- *'We have different levels of management – but when it comes to approval, we normally do them based on a formal process' (participant U7).*
- *'Here the roles and responsibilities are very clear – and I know what my tasks are what my duties are – also know what is expected from you as well' (participant U9).*

The indication was that the team knew what they can/can't do, who should approve and how the process should be followed. They also concluded that because there was respect among the team, the power distance was not an issue and the details were always discussed well. Some even clearly indicated that though they have hierarchy, it was not to the extent that it stops normal working and managing projects.

(+) Authoritative – Escalation:

(+) Blame Sharing - Taking Responsibility: The decisions were made independently and the responsibility was also taken by individuals. If anyone makes a mistake, no one gets crucified, the blame was normally taken by the whole team and this makes the team not to panic if something goes wrong and also allows taking responsibility.

- *'In most cases, we do take responsibilities of what we do. When project goes in the wrong direction, we as a team sit and work out the best approach and always take responsibility of our action' (participant U2).*
- *'...if anyone makes a mistake – no one crucify them – the blame is taken by the department – no one needs to panic about this' (participant U5).*
- *'...when things don't go according to plan, then we have a plan B and take responsibilities to complete certain tasks' (participant U7).*
- *'...We as a team always take responsibility for our actions, most managers take responsibility of their tasks and project managers too' (participant U14).*

In general the whole team manage to take responsibility of their actions and manage their consequences.

(+) Transparency – Transparency: At the lower level among the team members there seems to be a good transparency and working together culture was seen (participant U6, U8). Some areas identified that at the management level, the transparency was not seen very clearly. But in most areas transparency was seen.

- *'...we are very close to the business and we understand well – and also understand the whole big picture' (participant U3).*
- *'...most of the details are transparent – everyone feels part of the team – but there are few areas which can be more transparent – or some management issues can be more transparent' (participant U4).*

The goal, the direction and decisions were not communicated well to the others. Thus there were both positive and negative impacts due to transparency

(-) Transparency – Outspoken: The culture was naturally outspoken and when dealing with any sensitive issues, they diplomatically discuss. '*While at work, we are expected to speak up any issues openly...*' (participant U9). But when the manager was part of the meeting or discussion, then there was a tendency to 'not talk too much' was seen (participant U1). Again more participants identified similar conditions of being reserved in front of higher management which were listed below:

- *'but with higher authorities we tend to be reserved' (participant U2).*
- *'But I have seen occasions when we are with our boss, we tend not open up that well' (participant U3).*
- *'works very well with peers, but when it comes to authority and powerful person entering the room, this doesn't work that well' (participant U4).*

Participant U14 in addition to agreeing to the above argument, also compared with US as 'But I feel in US, when the managers are sitting in the meetings, the team members speak more to show their input'. Just one of the participants U15 also mentioned that in some cases team members also keep work to themselves to get credit for their work.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index			
Time			
Context			

6.3.3 Data Collection – Uncertainty Avoidance Index

Changes required in 'uncertainty avoidance index' cultural attributes were discussed in this section. Again United Kingdom seemed to be managing well in relation to this cultural dimension and related cultural agile attributes. In this particular cultural dimension Indian culture was seen as balanced well. Australia needed some changes in managing unstructured situation and taking risks. Overall, this dimension was seen well managed in all three cultures.

6.3.3.1 Australia

Though Australian culture was a very forward looking culture, when it comes to taking risk, they were seen as conservative. But Australians have good tolerance to change. They accept and agree that changes were part of life and understood that it cannot be avoided. But as part of the data collection, there were mixed outcome and some indicated that there were tolerance for change and some believed that there was no tolerance. They also like to be innovative and willingness to try different ways was also seen. Due to the fact that Australians have a relaxed culture and like to take things as it goes, the tendency to be proactive in handling situation was seen as limited. They were able to manage unstructured situations and knew how to overcome any issues. Though they were aware of constant changing, the Australians had a problem to react quickly to change.

(-) Risk Taking - Risk Taking: Risk taking was seen in some areas (A11) and not seen in other areas (participant A5, A6, A9, A12, A13, A17, and A28) in Australia. They also mentioned that though Australians like to take risks and try out new things, in software development community this was not seen much. They like to follow

conservative approaches when it comes to software development. Some also identified that though taking risks was not common, but in case if something goes wrong, it was accepted that it was ok and the blame culture was not seen. There were 2 different views on risk taking.

- *'People are ready to take risk, there are some motherhood sort of people as well, but in general many actually take risks and try out new things' (participant A1).*
- *'Team members don't like to take risk unnecessarily. In general, many like to take risks and try out new things, but in software development community, this is not seen much' (Participant A2).*
- *'Taking risk is not common but, it is the culture to try new things and if something goes wrong, it is accepted that – it is ok' (participant A7).*

In general, it was seen that the risks were not taken in too many areas. 'We tend not to take risk. Just go with bleeding edge if we have to – but not trying to take risks' (participant A23. Agile method requires risk taking with trust to progress better.

(-) Tolerance for Change - Unstructured Situation: The data collection revealed the fact Australians normally do not work well to situations where things gets changed all the time. The nature of reality where we can't always keep things according to what we plan was not very well understood by Australian participants. They agree that there will be lots of requirements to even come across towards the end of a software development life cycle due to changing business, and this will need to be positively managed.

- *'When there are unstructured situations, we tend not to cope well' (participant A5).*
- *'We like to know what's happening ahead. We don't like surprises' (participant A13).*
- *When a situation is not planned and things are done in random, this is something we don't like – we tend to keep things simple and try and be open and structured when it comes to work situations (participant A19).*

There were some participants who believed that the Australian culture was to be ok with unstructured situations (participant A27) but majority of them thought the other

way around. ‘But the fact that software requirements always changes and accepting changes even at the end of a life cycle is something that we will all accept and work accordingly’ (participant A27). Participant A29 mentioned that when it comes to work environment, the situations were expected to be planned and structured, so that if anything goes wrong, the projects can be managed effectively.

(+/-) Tolerance for Change - Tolerance for Change: From the interviews what we gathered were mixed arguments for this cultural agile attribute. People were quite ready to take on change and were ready to accept it (participant A2) and there were others who thought change was not managed well (participant A12, A20). On the whole people were seen as happy to take on change. The team was fully aware of the issues and were happy to deal with it when things went wrong.

The interviews clearly indicated the fact that some actually understood that change was normal and part of software development (participant A3, A4). There were others who believed if we plan well then the change can be managed better (participant A6). IT industry was such a complex environment where ‘tasks wanting someone else to do something before someone else starts the next task’ (participant A4). On a counter argument, ‘That’s the argument for not planning. Although you can’t be certain of what/how the projects are going to be but you can have a fair idea and at least plan for the worst case scenario and then you are now capable of managing the worst case’ (participant A4). Participant A8 mentioned, that there should be no surprises and ‘it is expected that the team is fully aware of the issues and escalate them early’. The general attitude was ‘we prefer to go ahead with planned schedule. But when things do gets changed, we don’t mind having an alternate optional plan’ (participant A10).

They also mentioned that though tolerance for change was there in the culture, there are some who believe that the tolerance is not always seen and the Australians don’t like change. When things don’t go according to plans, and when sudden changes are requested, the tendency to welcome these changes are seen in Australian culture. Thus, on this cultural agile attribute there were mixed arguments.

(-) Tolerance for Change – Reacting to Change: Australians find it hard to adjust or react to change. Participant A26 mentioned ‘we try to keep things aside and like to take life easy. But when something goes wrong, we should be able to act fast’. This attribute and the previous ‘Tolerance to change’ have similar arguments. Australians by nature were tolerant and accepting the fact that change was normal, but when it comes to reacting or adjusting to change, they were seen as not able to manage

well. During the interview, a participant mentioned that ‘Americans are very good at managing deadline – Australians are slow and relaxed and Europeans deliver’. The relaxed nature of Australians sometimes makes people to take a long time to react to changes.

(+) Innovation – Innovation: Most times innovation and trying new ideas were encouraged and seen in Australian culture (participant A1, A3, A9, A17, A20, A28, and A29). But sometimes they were unable to be implemented due to cost factor (participant A3, A23). People from Australia are very innovative and always willing to help implement new ideas. ‘It is the culture within the profession to try new things (participant A7). Being in software development industry it was also expected to try innovative ideas (participant A14, A19). Participant A11 mentioned that some time, there was a need to be a push to try innovative ideas like ’15 minutes stand-up meeting’.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓		
Time			
Context			

6.3.3.2 India

Indians by nature like to take risks and most in the software development team are young and this adds the possibility to take more risks. Due to the culture of tolerance and belief that things happen for a reason, tolerance for change is well seen throughout the culture. Indians are very innovative, they like to try new ideas and look at improving based on different concepts.

(+) Risk Taking - Risk Taking: Risk taking was commonly seen in Indian culture (participant I2, I3, I5, I9). The attitude here was ‘*we should not be afraid to fail, you will have bad times, but we should take risk to move on*’. The risk taking attitude was clearly seen throughout the interviews during the data collection in India. They also mentioned that as the software development community in India are mostly young, the

tendency to take risk has been really high. '*We like to take risks, we understand work environment can never go smooth and in reality specially in IT field, the projects don't go ahead as scheduled and we tend to take a short cut or risk to manage these shortcomings*' (participant I16).

- *'Risk taking is an integral part of business, we know how to manage risks well' (participant I19).*
- *'...but projects don't follow as planned and in those situations, we need to take steps that involve risks' (participant I20).*
- *'In India, we live in a situation where there are lots of uncertainties and we need to survive by taking risks – manageable risks' (participant I22).*
- *'Projects are full of surprises and as we deal with foreign clients we have many occasions where we need to take risk to manage projects better. I think in India we manage our risks well' (participant I25).*
- *'...we are in a society where we can't expect all days to flow well, we will have some unexpected situations and to manage them, we will need to take risks' (participant I31).*

From the data gathered it seemed that the Indians tend to take higher risks than the westerners.

(+) Tolerance for Change – Unstructured Situation: The culture was clearly used to unstructured situation (participant I2). Uncertainty is part of life and as part of culture and societal conditions they believe nothing can be planned for a long term. A good example will be the statement by participant I4, '*At work, situations always changes and sometimes we see the project plan changes, resources leave, external factors influence and all these create the working environment a difficult place to work'*. The tendency to go with the flow and to see what happens was seen in India. Due to the religious reasons the belief that 'things happen for a reason' was commonly seen and discussed in India and also accepted as normal.

A real life situation was briefly described by participant I13.

> *Roads will be blocked without notice and those sorts of uncertainties are common here. This is one of the reasons why we are not on time. And now we understand that we should at-least call and tell them that we are going to be late. In Western culture you will be informed a month before*

regarding road blocks and also there will be other reroutes etc to help the passengers.

Another example is listed below by participant I15:

It is very common to delay things or postponing. Normally we have a meeting and have action items and then it stops there, nothing gets followed up. Uncertainty is part of life and as part of culture and societal conditions we believe nothing can be planned for a long term. We like to go with the flow and see what happens.

(+) Tolerance for Change – Tolerance for Change: This was discussed by two good examples by the interview participants.

- *'Western actor needed the script in advance to plan before he agreed. We have a lot of appetite for uncertainty. We are more tolerant to change. An American company will go through a process for change – but not an Indian company' (participant I1).*
- *'I was just told that I had to leave to Bangalore tomorrow morning and now how do I change my other meetings? The others have to just wait. People change their minds and priority changes and high impact tasks do come all the time. We have to simply accept that and work around it. This happens all the time' (participant I34).*

This clearly indicated the nature of accepting last minute change (participant I3, I9, I7). They also mentioned that '*Indians like to go with the flow and have the gut feeling that things will get done when it is supposed to be done*' (participant I10). The Indian participants relayed some day-to-day patterns that bring their nature of accepting tolerance (participant I14, I16). Road closures that were not notified in advance were shown as an example. 'It can be done the next day' attitude is seen here. But if anything urgent, then the team are also ready to help (participant I11). They discussed the mindset for accepting change due to their life pattern (participant I24). 'We *can't plan anything as things do change and that is part of life*' is a clear statement of the culture. One interview participant said, '*We have to just take the pain killer and go on*'. This shows the tolerance for change.

(+) Tolerance for Change - Reacting to Change: When things suddenly get changed, the reaction to cope with it was very critical, especially in agile development.

Managing deadlines, being open and honest of what can/cannot be done, speed at which things needs to be done are all important in coping with reacting to change. Indians are able to manage this pretty well (participant I8).

Some statements during the interviews are listed here:

- *'We react to change very well, we see changes happening all the time in daily life and at work and most of us here are able to work well with change' (participant I21).*
- *'I think we do pretty well with changed situations. We know change is normal and work accordingly (participant I24).*

(+/-) Innovation – Innovation: Innovation was not discussed much. But some participants who addressed this revealed the fact that there were mixed arguments about innovation. Indians like to try new things and are very innovative. 'Life is not steady' attitude is seen in Indian culture and being culturally like to take risks, they are very innovative (participant I1, I21, I30, I36). 'We like trying new innovative process. 'In most cases we try, but sometimes we can't implement due to cost and time' (participant I4).

An issue that was discussed was 'we do like to be innovative, but in reality we rarely get an opportunity to try and be innovative' (participant I14). Due to the tight project schedule and pressure trying innovative ideas rarely gets done. The other reason or issue that was identified by participant I25 is 'fear of going wrong'. In general, the participants identified mixed discussions regarding innovation.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	
Time			
Context			

6.3.3.3 United Kingdom

(+/-) Risk Taking - Risk Taking: The data collection revealed that people from UK have a mixture of team members where some take risk and some do not. Sometimes calculated risks were taken with proper testing and to help move forward. They like to follow what has been tested and tried already. Some comments by participants were listed below who have said risks are being taken in UK:

- *'...we tried to reduce taking risk – but we do take when we need to' (participant U3).*
- *'...we do take calculated risks where you have to – good understanding of what is being done – we do take small risks to go forward' (participant U5).*
- *'I think so – because of the nature of the development – RAD – we have to take risk but of course under control – we are always fully backed up and generally don't like to take risks unless it is needed' (participant U8).*
- *'Risks are commonly seen in IT culture and we normally manage them well' (participant U14).*

Comments by participants were listed below who have said risks were not being taken in UK:

- *'...reasonable risk, but not much...' (participant U2).*
- *'...We don't like to take risks, I will be very vary to take risks' (participant U4).*
- *'I don't think so – only 5% will take risks and – they prefer someone else to take the risk and try when they are confident' (participant U6).*
- *'We don't like to take too much risk – we like to follow what has been tried already. We like to do things in a traditional way – we look at competitiveness – what requirements are. Don't like to break rules' (participant U9).*
- *'We don't like taking risks' (participant U15).*
- *'In most situation we don't tend to take risks as IT is an area where risks should be avoided' (participant U16).*

(+) Tolerance for Change – Unstructured Situations: In UK this situation was managed well with a backup plan (participant U4). Participant U5 mentioned that 'team members manage the unstructured changes well'. '*We are in business and the requirements changes, external environment changes; resources come and leave, etc. This was common and we understand that this was usual*' (participant U9). UK culture was open to change and the reality of change was normal as believed by all. Unknown and surprising changes were accepted and tolerated. The other European countries surrounding UK have different nature to this factor and when doing business these factors should always kept in mind.

(+) Tolerance for Change – Tolerance for Change: The participants in UK reflected positive reaction to change. There were statements which clearly show that there was tolerance for change.

- *'Unknown and surprising changes are accepted and tolerated' (participant U3).*
- *'[Late changes] - of course we can handle that – it just needs to be looked at how good the change is for the project - It will be common sense decision – anything for good software' (participant U8).*
- *'...the late changes and unexpected changes are managed well' (participant U10).*
- *'Yah we are very tolerant to change – we know this is reality and business is always changing' (participant U14).*

The interview participants discussed the fact that change was normal especially in IT industry and the work culture was such that there was tolerance for change.

(+) Tolerance for Change – Reacting to Change: There were sometimes organisational politics that can make life difficult in implementing or reacting to change. In most areas decision making has to be more consensual and have to spend more time making sure everyone is on the same side or else getting acceptance of the decisions are quite hard.

Participant U5 mentioned '*During projects we always get into a situation where something unexpected arises. We as a team work well to manage them quickly as possible and make sure the projects move on well'* and this statement indicates that the team were well organised to work together and react accordingly to change. In the IT industry the reality was such that there were always changes expected in business. In most cases changes were managed pretty well (participant U16). Further to that

discussion participant U6 also mentioned, '*In business environment, we always get into situations where unexpected delays occur. We then will need to work accordingly to cope with the changes – we are in IT and this is the reality*'. These discussions confirmed the fact that the participants agreed that there was changes that needed good management. But participant U9 also explained how these sudden changes are not always managed well and there are situations when things can't always go right. '*I don't think we work well to change. Sometimes we can't avoid them, but we try our best to manage well, but we don't succeed always*' (participant U9).

(+) Innovation – Innovation: Innovation is something that is seen in most areas in UK. Trying to implement new ideas and test some creative tasks are clearly seen here. In UK things are very idea driven. People are looking for more creative approaches to their work (participant U4, U3, U8, U15). Participant U1 concluded *'...for the industry we are in we are in the leading edge*'. Participant U15 identified that in some cases innovative ideas don't get implemented due to money and time factors.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time			
Context			

6.3.4 Data Collection – Time

According to Edward Hall, there were two sets of people based on time perception:

- Monochronic culture who view time as an important, almost tangible phenomenon; they are generally oriented towards planning and scheduling.
- Polychronic culture who believe that everything will happen 'when it is time'.

Changes required in ‘time’ related cultural agile attributes were discussed in this section. In this cultural dimension, from data collection Indian culture seemed the need to change in some attributes such as separation of work and personal, breaks and personal time, focused, and timelines / promptness. Almost all participants felt the need for Indians to improve on ‘timeliness’. Australian culture was mostly suitable except for managing breaks and personal time. Again United Kingdom seemed to be managing well in relation to this cultural dimension and related cultural agile attributes.

6.3.4.1 Australia

Australians were able to manage time quite well. When tasks were required to be completed on time, when meetings need to be organised, and when decisions have to be made, Australians were able to handle this pretty well. Prioritisation was another area that Australians were managing well. Based on how much work was there and when it needs to be completed, prioritisation was regularly done by most people. While on work, they were focused and also were aware and able to clearly separate work and personal life. Australians have regular breaks and they were very fun loving people. They like to work in a relaxed and enjoyable atmosphere and do not like too much stress. If the tasks were unable to be completed, the discussions were made at early stage and clearly explained what can be done and when.

It was interesting to see not too many participants answered the interview questions related to Time and they didn’t feel that this was a major issue or even an issue in the culture. Some could not think of much to add to ‘Time’ related questions.

(+) Time Keeping - Timeliness / Promptness: During the interviews it was clear that in most cases the team commits to the time and always deliver on time (participant A1). When a deadline was given, the team tries their best to finish on scheduled time (participant A3, A12). Participant A3 also continued, ‘*If not during regular meetings, these will be discussed well in advance to make sure all stakeholders know the statuses*’. Open and honest communication was made if things were not happening according to schedule. The meetings were on time, and if attendees were unable to make it they inform well in advance and all who attend will be there on time (participant A6). Most meetings start and finish on time (participant A9). The Australian

culture was very much time focused and always prefers and expects to maintain the time and promptness.

(+) Time Keeping – Focused: As part of the work culture, there was always focus in whatever was done (participant A1, A11). During meetings phone calls were not attended (participant A2) and we were committed to the work we were allocated. It was interesting to note that not too many commented on this. It was possibly an indication that 'being focused' was a norm and it is expected as part of the work culture.

(+) Time Keeping – Prioritisation: The basic requirement of prioritising was part of work culture. When there were many tasks to be completed, they all get prioritised and actioned. In some culture they have the tendency to over commit and give false promises. In Australia, we make sure we plan ourselves and commit accordingly (participant A10).

- *'Though we are not perfect with regards to prioritisation, as part of the culture we are expected to follow and keep the prioritisation' (participant A2).*
- *'In most cases, we are able to handle multiple tasks, we sometimes still fail to gather requirements and prioritise and manage tasks well' (participant A3).*
- *'Trying to get things on time, competing with resources etc have been the hardest.' (participant A4).*
- *'Prioritised work gets allocated to team members. Based on estimations, the tasks are assessed to make sure that there is enough time. Then based on priority it is allocated to team members' (participant A7).*

(-) Time Keeping - Breaks and Personal Time: The work culture was very relaxed and there are many breaks and personal times seen. The work environment was flexible and there was always availability for personal time. If in case, emergency family time was required, they were mostly taken as leave and then the work time was managed and the work load was covered later. The team members were normally expected to manage their own times.

- *'We also like to take breaks and work in a relaxed atmosphere. We do take project deadlines seriously but also believe to work with regular breaks' (participant A2).*
- *'Though we have small intervals for personal break times, we cover them with extra work during the day' (participant A4).*
- *'The tendencies to take frequent breaks are seen....' (participant A11).*
- *'If in case we need some urgent work for the family, then we work less on that day and work extra hard the other day to catch-up with work' (participant A12).*

The interviews revealed that the culture was to have regular breaks and this was the preference for the team members. During the interviews, there was issues discussed indicating that 'happenings outside their life will also have an effect on the project' (participant A20).

( ) Time Keeping - Separation of Work / Personal: Australians have a clear separation between work and personal life (participant A5). The work / personal balance were managed very well and in most organisations the expectation to provide these flexibilities for their staff was seen. This helped the team to work peacefully focusing on work, when their family needs were well managed. '*Family importance is always seen here; we make sure work life and family life are separate and the balance is managed pretty well*' (participant A14).

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓		
Context			

6.3.4.2 India

This was the area that Indian software engineering culture will need to really change in order to manage software development projects better. Managing time was an important factor that influences estimation, prioritisation, delivery, focus, and family life balance. All these factors directly or indirectly influence software development, especially agile software development. The culture was such that time was not considered a serious matter. Due to that the team members had the tendency to give false promises and managed time very badly. Over estimation, over commitment, overwork have shown major impacts on projects.

(-) Time keeping - Timeliness / Promptness: Not keeping up time and giving false promises were common areas that India should be focusing on to make the software development projects success. When the working hours were calculated, it seemed that Indians spend more hours at work, but it doesn't mean they have been productive though. That is where the time management comes into place. Most times we blame the external factors for not being able to deliver on time. But the reality was that if something needs to be delivered by 10th, then the seriousness starts only from 8th (participant I2, I4). This showed the lack of time consciousness in India. It was not just delivering on time was an issue, but attending meetings on time were also discussed as an issue, some do not even turn up and do not send their apologies or inform the meeting organiser. The participants indicated that *'sometimes the attendee(s) do not even turn up for more than 15 to 20 minutes and then the others just leave the room cancelling the meeting*'. The data collection revealed that almost everyone who was interviewed identified that time management was an issue for India (participant I4 and most others). They also acknowledged that they were trying to change even if it was very hard (participant I12, I30).

Good example statements by the participants were listed below:

- *'Managing time is a big problem in India' (participant I1).*
- *'...also have issues with time management, we can't deliver on time' (participant I2).*
- *'This is the area we lack as Indians...' (participant I5).*
- *'become slack at the beginning of any task and when under pressure we work pretty well' (participant I7).*

- *'timeliness in meetings with different parties is a major challenge' (participant I8).*
- *'...when it gets cancelled – we don't get to know' (participant I10).*
- *'...we normally don't do much from morning 9 – 2 and then from 2 until 7 pm, we work really hard...' (participant I11).*
- *'Power – hierarchy – making decisions will also be an issue' (participant I17).*
- *'Customer will understand if you explain to them that there is a 1 week delay' (participant I24).*
- *'we like to postpone events until the last minute' (participant I32).*

A good example statement by participant I21 was given below which shows how time was managed in India:

> *The same way as you did today when you were late, you said I am running late due to so and so issue, can we postponed this event. Helps to maintain not just project management, but personal relationship... it matters. If I am going to be late for dinner, call my wife and tell her that I am going to be late. These simple things don't happen here.*

There were plenty of statements and examples to show how in Indian culture time management – especially promptness was lacking.

(+) Time Keeping – Focused to Complete: Not discussed

(+) Time Keeping – Prioritisation: Indians were able to cope with handling multiple things at the same time (participant I9). The problem was that as part of the culture, Indians were unable to say 'no' to anything. So, they end up getting tasks after tasks and ultimately due to over allocation, there was stress and overtime. But when it came to prioritising Indians somehow manage to cover the tasks and complete on time. Though the extra work hours and pressure was added on to the team members, the prioritisation was managed well. The business was changing all the time, so does the priorities (participant I5, I12).

> *Time is the main factor that we will need to be looking at from Indian culture, we like to give false promises then somehow try to finish on time, and always fail. The main reason is we try to do multiple things at the same time (participant I9).*

When it comes to crunch time, when projects are reaching its deadline, when we are under pressure, we manage quiet well. The reason being the process in place to manage these quick changes is managed better in India (participant I21).

Participant I16 mentioned that in India team members like to work under pressure. This was an interesting concept where Indians postpone work till the last minute. But with all these issues, Indian participants believed they were able to prioritise tasks pretty well and the below statements were good examples:

- *'We do prioritise our work and we have regular meetings to organise tasks' (participant I7).*
- *'...and most team members try to work based on priorities' (participant I11).*
- *'...capable to working based on priorities,...' (participant I15).*
- *'Good prioritisation is seen in India...' (participant I16).*
- *'Good prioritisation is seen in India' (participant A17).*
- *'Priorities are set my project leads and we tend to follow them' (participant I18).*
- *'Process to prioritise is well documented and implemented.' (participant I31).*
- *'...team to prioritise their work and follow them accordingly' (participant I32).*
- *'Work always gets prioritised and we manage our work well' (participant I35).*
- *'Work gets prioritised and gets done accordingly' (participant I36).*

(-) Time Keeping - Breaks and Personal Time: Many participants did not discuss this aspect. One of the reasons may be they rarely had breaks during work hours or did not want to openly admit their break times. Participant I9 mentioned, '*We do get break times but not that often. We get time to go to the coffee shop – but most of the time with the team – related to work*' which indicated that the break time they have was taken to discuss work matters. Another statement regarding the above discussion by participant I11 was, '*We do get some personal time, but rarely get in between our work*

time. During work, we do sometimes try to finish personal banking, family matter. But we also stay back extra time and do additional work to finish off urgent project work'.

In India there were areas allocated for relaxation and these were much better than other western countries. '*We have good lunch area and we like to get some break off work. Some offices do have tennis, entertainment breaks*' (participant I19). Work environment was made to look good to help staff spend more time at work. But this is introduced in recent times only.

(-) Time Keeping - Separation of Work / Personal: In Indian culture they bury their time, work weekends and late hours. One of the participant mentioned that '*mobile is a deadly weapon*' (participant I37) and you cannot isolate yourself from work as you were always contactable. Due to global market and time difference between US/UK and other countries, the team members were expected to come and work late nights. These frustrations were seen during the interviews.

- *'There is no work/life balance' (participant I1).*
- *'...we get so carried away and don't realise that time has exceeded our work time; we tend to come on weekends to finish off pending work' (participant I2).*
- *'...we spend a lot of time at work, forgetting home' (participant I4).*
- *'I rarely get to be at home with family when I need or want to.' (participant I14).*
- *'When I think about a balance between work and personal, I should admit that in India, we don't get a good balance' (participant I15).*
- *'We need to learn to stop work on time and go home to the family' (participant I17).*
- *'it is a fact that we don't spend enough time at home with family and friends' (participant I18).*

An interesting statement from one of the participants indicated how a family / life balance can be achieved. '*It is seen commonly in India that we spend a lot of time at work. But this does not mean we spend productively. We should learn to work 8 hours and then go back and spend time with family and get back to work with full or more energy the next day*' (participant I24). Participant I29 mentioned the work hours were sometimes 10 – 12 hours a day, '*Most of us work 10 – 12 hours a day. Some even sleep*

at work. We have all facilities at work and do not feel bad about that. Food is provided, transport provided, but we don't realise our family time is not being utilised well'.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓	✓	
Context			

6.3.4.3 United Kingdom

(+) Time Keeping – Timeliness/Promptness: The general understanding from the interviews was that in UK there was good time management and most participants admitted that they keep the timeliness and promptness. 'We do deliver on time and as much as possible we keep the promptness' (participant U1). '*...we attend to meetings and discussions and we always keep the time on schedule*' (participant U5). Participant U8 spoke about the frequent delivery and importance of the schedule, *'...it has trickle effect if one release does not go through*'. Working proactively was also mentioned during the interviews, '*We work proactively and also maintain time, sometimes if we cant make releases, then we plan ahead and change the delivery date*' (participant U9).

(+) Time Keeping – Focused: Participant U1 mentioned that while at work, most team members were focused and like to complete tasks effectively. The other participants who agreed with U1 include U6, U7.

(+) Time Keeping – Prioritisation: Participant U3 clearly indicated the level of prioritisation with a statement, '*Jobs get allocated and prioritised and we are pretty organised when it comes to prioritisation and scheduling*'. Interview with participant U5 explained the process with prioritisation and impact as, '*During projects, we are*

assigned tasks that are estimated by others – sometimes team leads, sometime an expected date of completion is set. Then we work extra hours to complete – sometimes we communicate back to reprioritise the tasks as the work overload can become tedious'.

(+) Time Keeping – Breaks and Personal Time: The general indication from the interviews revealed that in UK there are no too many breaks. Work commitment was considered very high and expectation to complete on time and schedule was a critical requirement in most organisations.

- *'We don't get too many breaks' (participant U2).*
- *'Break and personal time are just enough for staff to get a good balance between work and personal life. We are flexible enough to have that balance' (participant U3).*
- *'There are regular breaks that we can take if we need to. There is no restriction on that. But we try not to unless we really need to' (participant U4).*
- *'We have a good balance of breaks and work. The work environment allows us to take off when there is a family need – this helps us to work better' (participant U6).*
- *'Yah of course, we do get good quality time for personal needs' (participant U9).*
- *'Our balance of work and personal time is good, we tend to take less breaks compared to other western countries. We have lots of personal time, after work hours' (participant U14).*

( ) Time Keeping – Separation of Work / Personal: This criterion was not discussed too much during the interviews. Participant U4 mentioned, '*We are good friends outside work area as well. During work, even if we are friends, we are very professional. Then we spend a lot of time together as a team outside work hours*'.

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓	✓	✓
Context			

6.3.5 Data Collection – Context

This aspect of 'Context' has become more and more influential in software development teams after the global market trend. Geographical distance was not a factor anymore in software development projects as people from different countries and cultures work together as the same team for the same project. Agile methods require good communication for successful implementation.

Changes required in 'context' related cultural agile attributes were discussed in this section. In this cultural dimension, Australia was seen as well balanced and the only attribute that Australians needed to be looking at was 'easy going'. Indian culture should be taking more interest in keeping the following few attributes in mind: proactive, emotional, outspoken, easy going, and false commitment. This was a cultural dimension that UK needed more attention to cultural agile attributes such as 'emotional' and 'outspoken'.

6.3.5.1 Australia

Australia was an easy going country with people who like to openly discuss and prefer a relaxed atmosphere. They communicate in a fun way and most meetings were conducted in a professional but in less stressful manner. The initial friendly conversation mostly started with a general question like the weather, life and only then they got into business. Most times they agreed to only what they could do; false promises were rarely seen here. When others make false promises that was taken badly as well. 'Hand holding' was not seen here and thus when there was a need sometimes there was no help available readily. Most negotiations were communicated and managed in a professional manner.

( ) Meeting Deadlines and Expectations – False Commitment: Not discussed

(-) Meeting Deadlines and Expectations - Easy Going: The team culture in Australia was very easy going and relaxed (participant A1, A2). Even when things needed to be done urgently, the work environment was still a stress free situation (participant A3). The relaxed mentality also had negative impact on projects (participant A3). Most times, things got sorted out by discussion. Some participants identified that with Australian team you cannot be rigid and the atmosphere should be very easy going (participant A4). Another participant identified as 'no pressure attitude', when things went wrong, the attitude was to be calm and resolve (participant A5, A6, A8, A25, A29). Sometimes it was so relaxing, that it can be categorised as slack (participant A9). If an issue was raised at 4:55 pm then it does not get done until the next day (participant A22). Thus easy going can have positive and negative impact in Australian culture. '*Sometimes it gives positive effects like we tend to think and take life in a calmer way. But sometimes it does turn out negative as we are too relaxed that we don't take responsibility to make quick decisions*' (participant A29).

Interesting example statements from the participants include:

- *'No weekend or extra work unless it is required' (participant A9).*
- *'When during lunch, we read books even if we have a priority issue to be tested with critical date schedules' (participant A9).*
- *'...we don't go out of the way to meet the deadlines' (participant A12).*
- *'...passing on the responsibilities to others in the team...' (participant A14).*
- *'...considered pretty slack...', '...can get things done tomorrow attitude...' (participant A22).*

(+) Negotiation – Negotiation: Conflicts were managed in a professional manner. There were processes set in place, and ways to communicate the do's and don'ts were documented. The tendency of most would be to talk it out and resolve the conflict immediately. When negotiations were done, they were always done in a fair manner as much as possible. Most projects have good communication strategy and when negotiations were needed a flow of communication through the hierarchy was seen.

- *'When we need to liaise with business and user community normally we are able to work together and negotiate final project decisions' (participant A2).*
- *'Respecting others view and openly discussing any conflicts is very common here,...' (participant A18).*

(+) Negotiation – Emotional: As part of the culture in Australia rarely emotional decisions are made (participant A3, A4). '*Most decisions we make are based on what is right at that point in time. We do feel for people, but when we make decisions we look more for 'what is right?*' (participant A8). '*Some time, it looks like we are emotionally bound due to the fact that we respect personal views, but when it comes to decision making for department, we tend to go without any emotional influence*' (participant A12). Participant A13 also spoke about conflict of interest, '*No emotional decisions are allowed at work place, there are even conflict of interest policies and procedures that cover these*'. In general Australians rarely make decisions emotionally. They like to use their head over heart and prefer to negotiate in a fair manner (participant A25).

(+) Proactive – Proactive: We do like to think ahead but sometimes, as we are laid back, we tend to not act fast (participant A1). But, in most of the situations, we act proactively to situations (participant A4, A6, A7, A10, A13, A26). '*We tend to pre-plan and organise ourselves pretty well ahead of the need. We also like team members to see outside the box*' (participant A6). '*We are required to act proactive and we need to take initiatives to be in the lead*' (participant A14).

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓	✓	✓
Context	✓		

6.3.5.2 India

When compared to some western cultures, India was seen as formal. They have formal clothing, more serious life style inside work environment. Indians do not like to express 'no', be it verbally or non-verbally. Rather than disappoint you by saying something is not ready, they would offer you the response that they think you want to hear. This behaviour should not be considered dishonest. In Indian culture it would be terribly rude if he did not attempt to give a person what was asked for. Since they do not like to give negative answers, a vague or non-specific answer was often given which indicated that they were reluctant to commit. Hand holding is seen most times.

(-) Meeting Deadlines and Expectations – False Commitment: This was an interesting criterion that was seen in Indian culture. Participant I1 reflects the reality about this as, '*We like to give false promises, we try hard to impress customers and due to that sometimes lose credibility as things are not done in the right way*'. False promises were mentioned by almost all of the participants. They all agreed the fact that Indians have the tendency to say 'Yes' to all that are requested. It is actually a culture where they were taught not to say 'No'. They agreed that due to these false promises they tend to use credibility and lose customers. Team members were given the chance to speak their views, but in general most do not like to say a word during meetings. The communication strategy here does not work very well. Indians think they are making everyone happy, by not denying anything and not saying 'No'. Again, just to avoid conflicts they try to agree to what was required. They also mentioned that when a query was asked, and if the answer was 'No', the Indian staff will not say 'No' rather would try to accommodate the requirement or do something different. These were not purposely done, but as a culture the consequences were not thought of. There were plenty of examples and statements to iterate the fact that Indians give false promises to convince the customer and to avoid any bad feelings.

- *'...whatever they ask we like to do to make the client happy' (participant I4).*
- *'...We don't like to make anyone feel bad' (participant I5).*
- *'We don't like to say "No"' (participant A11).*
- *'Most western cultures are aware that Indians have a tendency to promise even if it cannot be completed. This has become the norm for Indians. We are trying to change, but very difficult' (participant A16).*

- ***'**We do promise clients of a deadline date that we think the client will be happy with. In most cases, we do this to please the client as we hate to make anyone sad' (participant I22).*
- ***'...**our marketing team sometimes give false promises...' (participant I31).*

An interesting conversation with I13 during the interview was listed below. This shows how Indians were brought up and how from childhood these characteristics are ingrained on to you.

> *In Western culture you are expected to say what you feel like, but here we never say "no'. We like to say ahmmmmmmm and just 'may be'. We don't have the culture or brought up to just say yes or adjust your answer, but never say 'No' Even at school, if we haven't done our homework, we will get a smack and to avoid that we say some excuse of being sick etc. to avoid the consequences. We will try to convince the teacher. When at work, we now try to do the same, give false excuses to get out of any serious consequences. We tend to lie to get out of the problem; we don't feel good facing the situation.*

Participant I32 and few other participants have mentioned that this was slowly changing in India, but majority of the Indians still have this habit and will take a long time to change the culture.

(-) Meeting Deadlines and Expectations – Easy Going: Some participants said that they love the western culture where the meetings were more fun and there was casual day (participant A12). The general understanding was that western countries have more relaxed working culture. They feel that in India they were not very relaxed or very easy going. They love the Friday pub, working from home, work / life balance, and informal work clothes. The Indians showed interest to change their culture to similar environment.

This on one side, the other discussion the participants had indicated that Indians like to work under pressure and they work better under pressure (participant I16). '*We like to work in a team and our daily routine is set. I think we tend to keep work to the last minute. We could manage time better and this reflects us as easy going as well*' (participant I17). An interesting argument mentioned by participant I25 is, '*I wouldn't call us as easy going, we don't relax during work hours, but we do delay our projects*

and keep actions till the end and sometimes this has made drastic impacts on projects'. These above statements show the nature of Indian culture where time management is not up to the highest level. Participant I36 also mentioned, '*We also tend to delay tasks until the last moment. We have false confidence in ourselves and don't plan well to finish tasks and priorities on time*'. Another participant I37 discussed the same view, '*We are not lazy, but we take things for granted. As our lives are full of surprises, we tend to not take anything seriously. This sometimes affects the projects as we keep postponing*'. The above reasons clearly show the negative influence on the criterion 'Easy going'.

(+) Negotiation – Negotiations: Indians feel that they were good at negotiating and communicating to get the benefits on both sides (participant I3). '*Our negotiation skills were pretty good, when we want some value to the project, we try to negotiate well, to get going*' (participant I11). They were also proud that the reason they were high in market was because of their negotiation skills. Sometimes, the false promises also come in this area where just to avoid conflicts they try to agree to what was required. There were others who mentioned that 'convincing the customers' was easily done by Indian team members. They also feel that they mostly do things in a very smooth manner.

(-) Negotiation – Emotional: Participant I1 mentioned '*We tend to bring emotions into work sometimes. When we know our friends are in the decision making, then I feel we tend to bring emotions to it*'. Participant I5 discussed the issues as, '*We are a collective culture and we value people more. Due to this reason, we can take decisions emotionally. When it comes to personal issues, we do think of their personal situations and work accordingly*'. India being a collective culture, the tendency to feel for people/manager was seen. '*We tend to get worked up with the people around us. When it comes to work commitment, we work for the person than for the company and it does emotionally bind us to the people around us*' (participant I25).

(-) Proactive – Proactive: '*We don't plan ourselves proactively. We react to situations better, but our proactive nature needs lots of improvement*' (participant I2). Discussion with participant I3 indicated, '*In India they prefer to work ahead and plan in a proactive manner, but as there are loads of projects to be managed, there is a tendency to work in a reactive manner as there is no time for planning ahead*'. Another participant also mentioned the tight project schedule, '*Working here we don't get time to*

start thinking proactively; we get multiple projects at the same time and the tendency to think of new ideas is very rare' (participant I7).

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓	✓	✓
Context	✓	✓	

6.3.5.3 United Kingdom

In UK the culture was very easy going and relaxed. When team members speak to each other they tend to talk about weather, weekend and general topics. And only then get to the work related topics. Discussion take place in a very open way and most team members were outspoken and like to discuss issues openly. Negotiation skills were also seen well in UK. With regards to taking responsibility, people in UK take accountability of their own actions.

( ) Meeting Deadlines and Expectations – False Commitment: Not discussed

(+) Meeting Deadlines and Expectations - Easy Going: Though in UK work culture was easy going and relaxed, when compared to Australians, the Australians were easier going.

- *'We are very focused and determined in achieving target dates' (participant U1).*
- *'We tend to be solution oriented' (participant U4).*
- *'No here we don't take work easy, we are very serious about what we are doing' (participant U6).*
- *'We tend to keep our focus on work' (participant U9).*

From the above statements it was clear that work culture in UK was focused and solution oriented. Participant U10 also added the fact that '*they are not just focused, but also take pride of their work' including 'working extra hours to complete scheduled tasks*'. Though the nature of the culture was relaxed, when it comes to work, they prefer to complete projects on time (participant U14). These arguments indicate that working culture in UK was not easy going.

(+) Negotiations – Emotional: As there was heterogeneous culture, there was a need to negotiate and understand different needs. People in UK were well trained to speak in a manner with good negotiation skills. Emotional decisions were rarely made in UK.

- *'We don't take emotional decisions; we tend to keep all decisions follow a process and based on authority / approval' (participant U3).*
- *'When it comes to work, we don't bring friends and/or family into the picture. We tend to be fair and don't like to make emotional decisions (participant U6).*
- *'We rarely take emotional decisions. When at work, we are very professional. When we are outside work hours, we help our friends with their problems' (participant U10).*

(+) Proactive – Proactive: Most participants agreed that the culture works in a proactive manner and the work culture expects and sets process in place work in a proactive manner.

- *'We tend to plan ahead and think ahead to see what can make the work load better' (participant U6).*
- *'In most cases we work together making decisions, planning ahead, thinking outside the box. Though we try our best to be proactive, sometimes we cannot, as changes occurs so sudden that they are unexpected. We need to then react to the situation rather than act proactive' (participant U14).*
- *'We try to best of our ability to work in a proactive manner – this is what will help us to be in the leading edge' (participant U16).*

PROGRESS MATRIX			
Cultural Dimensions	**Australia**	**India**	**United Kingdom**
Individualism / collectivism	✓	✓	✓
Power distance index	✓	✓	✓
Uncertainty avoidance index	✓	✓	✓
Time	✓	✓	✓
Context	✓	✓	✓

6.4 Summary

Data collected during interviews are compiled and listed in this chapter based on cultural dimensions and different cultures. Data analysis is done in two parses. Data are studied in two-fold, first a qualitative and microscopic study was conducted where every cultural dimension are studied individually for the three different cultures. The following chapter reviews data as a second analysis and provides a quantitative representation with a holistic presentation.

CHAPTER 7
DATA ANALYSIS AND DISCUSSION

7.1 Introduction

This chapter will summarise and interpret the findings in relation to the problem presented in Chapter One and literature presented in Chapters Two and Three. The summary also includes the research methodology discussed in Chapter Four, research design used in Chapter Five and data collection compiled in Chapter Six. Keeping only cultural difference in mind, this study can help to find ways to tailor agile methods and practices to fit within a culture. Understanding some of the truly unique aspects of different environments and finding ways of letting others understand is an effective way or the first step in good software project management. Throughout the data analysis for this study, it gradually became clear and evident that there is a relationship between agile software development methods and culture.

7.2 Research Programme and Current Stage

Refer to figure 7-1 reflecting the research background. This figure shows the stages involved in this research programme. This chapter explains the final stage of the research programme, 'Stage 7 – Data analysis and findings'. Based on the data collected during interviews, data are analysed and presented in this chapter.

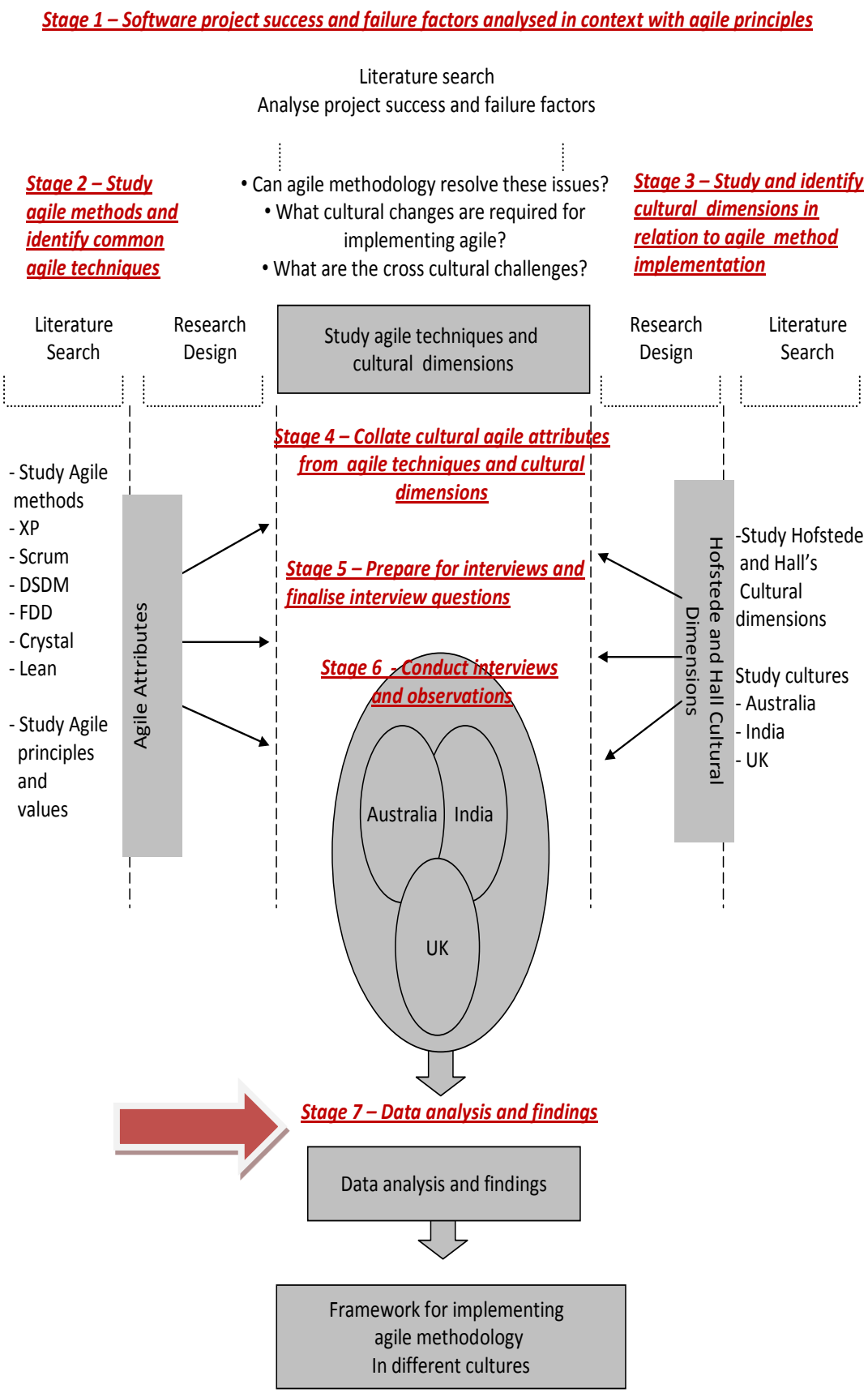


Figure 7-1: Background to the research.

Agile culture has been discussed by many researchers in recent years (Cho, 2009; Ingalls & Frever, 2009; Maples, 2009; Rehman, et al., 2010) and this research programme provides a theoretical framework that helps in implementing agile methods in different cultures. Agile methods emphasise adaptation and collaboration with different stake holders such as developers, analysts, business, project managers etc. (Xiaohua, Zhi, & Ming, 2008) and agile team has an open communication concept (Doshi & Doshi, 2009). As part of this research programme, the basic values required for implementing agile methods is kept in mind and agile techniques and cultural agile attributes were identified that helped in answering research questions.

7.3 Notations and Interpretations Used for Data Analysis

Colours are used in tables for different influences as shown below.

Negative influence
Positive influence
Mixed influence
No comments

A few examples are shown below to explain this notation further:

"(+) Hierarchy" does not mean that the culture has strong hierarchy; it means that the culture has positive influence due to hierarchy.

"(-) Easy going" means that this feature has negative influence in the culture. In Australia (-) for attribute 'easy going' has influenced delayed decision making and has also influenced in not taking responsibility.

"(+) hand holding" is an interesting attribute. India is reflected as (+) for hand holding and this does not mean that hand holding is seen in India, in turn (+) indicates that hand holding attribute has positive influence in India in relation to agile methods implementation.

7.4 Data Analysis

This study involved collecting data from different participants from software development community to gather details around cultural understanding related to agile implementation. Raw data transcribed from the interviews are listed and categorised in Appendix B. In this research programme, organisations in Australia, India and the United Kingdom were studied.

The validation and interpretation were determined based on the pattern which emerged from the data analysis. Questions such as 'what patterns are emerging from data?', 'are there any deviations from the pattern?', 'any more new information emerging from the pattern?' were always asked throughout the data validation process.

7.4.1 Research Question 1: Cross-cultural Challenges in Adopting and Implementing Agile Methods

The study of culture based on cultural agile attributes related to agile implementation helped in understanding what cultural challenges exists in different cultures. The following section discussed the challenges based on five cultural dimensions studied based on agile values (defined by the Agile Manifesto, 2001).

Four agile values defined by the Agile Manifesto: (these agile values are matched with the following section)

1. Individuals and interactions over processes and tools [Agile value 1].
2. Working software over comprehensive documentation [Agile value 2].
3. Customer collaboration over contract negotiation [Agile value 3].
4. Responding to change over following a plan [Agile value 4].

The following sections show charts to reflect data analysis. Each chart shown below has an x axis of % of participants.% of participants shown reflects the percentage of participants who have provided positive / negative response regarding the cultural agile attribute. Y axis shows the cultural dimensions, cultural agile attributes and coding as displayed in table 6-5 (from Chapter Six).

7.4.1.1 Individualism / Collectivism

Working within and among cultures in context of agile methods implementation is discussed here in relation to individualism / collectivism.

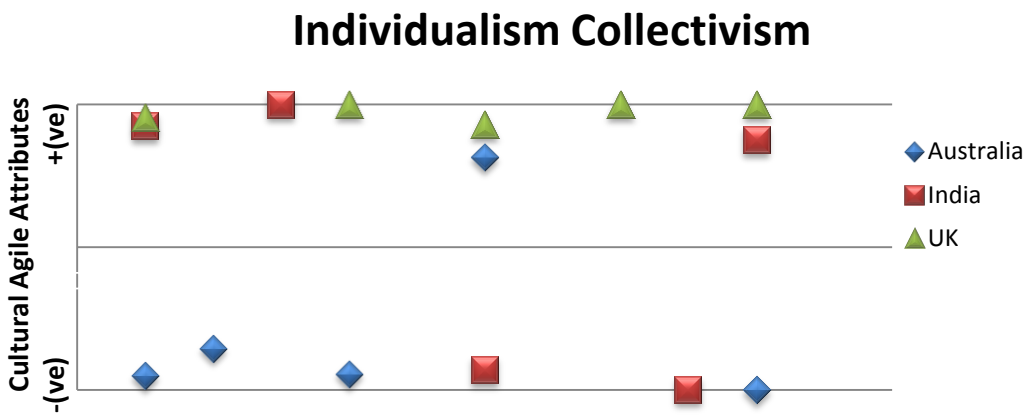


Figure 7-2: Cultural changes in relation to Individualism / Collectivism.

From data collected, the working culture in Australia appears individualist whilst India and the UK would be described as collectivist. Figure 7-2 suggests that this team work and group awareness has direct impact on some agile techniques such as 'pair programming', 'daily team meeting', and 'incremental delivery'. In Australia, staff are expected to take care of their own career and manage themselves, but in India and the UK there were team members who worked intertwined. [*Agile value 1*]

"Hand holding" is a cultural agile attribute that was discussed only in India and as part of Indian culture the manager is seen as a paternal / maternal figure guiding with work tasks and decision making. Understanding of this difference and work culture will help in dealing in managing agile projects better [*Agile value1*]

In Australia and the UK 'openness' was reflected as observed and was discussed as a positive influence to agile method implementation. But in India 'openness' was discussed as 'not seen'. When working among different cultures in which one culture has 'openness' and the other does not, then making decisions, fast delivery, working together and many other will be affected [*Agile value 3*]

There were data gathered which indicated that in Australian culture participants felt that the 'relaxed mentality' in Australia might have negative influence to agile methods implementation. Thus when planning for delivery, the other cultures should understand that in Australia the work/time/commitment may influence delivery. This was also reflected as 'lack of commitment' in the Australian culture [*Agile value 4*]

7.4.1.2 Power Distance Index

The next cultural dimension studied is power distance index. From figure 7-3 it can be seen in Indian culture this dimension is reflected as a negative influence on agile methods implementation. The challenges between cultures will have a huge effect in relation to the cultural dimensions when the teams are geographically dispersed.

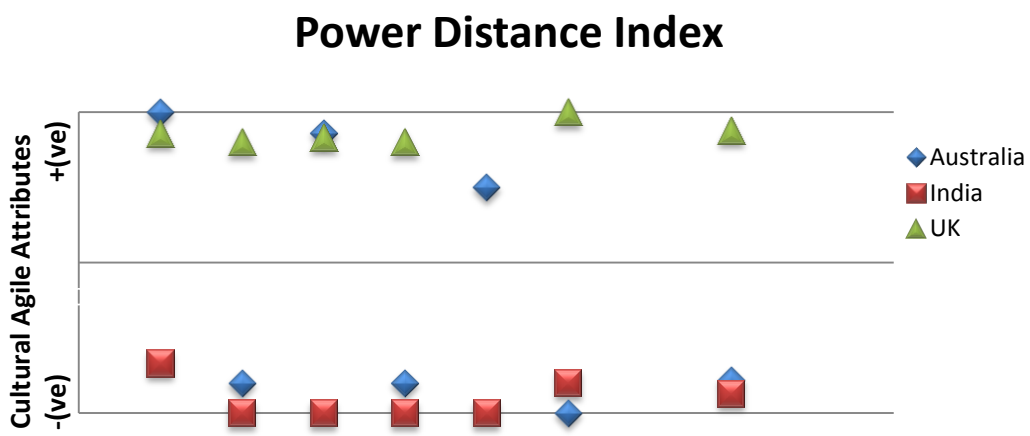


Figure 7-3: Cultural changes in relation to Power Distance Index.

'Trust people more than process' is an important cultural agile attribute that can provide cultural challenges if not managed well. Trust can affect delivery date, time management, knowledge sharing, collective ownership and many more. In India 'trust' gets built up over time, but in both Australia and the UK 'trust' is a matter of professionalism. Working among different cultures can influence agile method implementation and challenges will need to be managed on basis of 'trust' [*Agile value 3*]

Decision making is a critical task in agile methodology implementation, and there is a need for quick decision making and the team must be allowed / authorised to

make their decisions. Quick decision making was lacking in India (due to hierarchy) and Australia (due to relaxed mentality and not accepting responsibility) and this has an effect on delivery of the project. There was also a lack of decision making ability seen in India. In India the participants identified that they were not allowed to make any decisions due to hierarchy and management control [*Agile value 4*].

Hierarchy and escalation were discussed under the cultural agile attribute 'authoritative'. Hierarchy was seen in India and to some extent in Australia and escalation was seen as a negative impact in India. If issues were not escalated immediately to the higher management, the lack of control in managing projects can become an issue. This is critical in agile methodology implementation and it relies on quick incremental delivery. When other cultures deal with India, this awareness will help manage the projects better. [*Agile value 4*]

80% of the interview respondents directly or indirectly reflected that transparency was seen in the UK. In contrast, in both India and Australia the respondents felt lack of transparency. With regards to being outspoken, Australian culture was seen as having positive impact and both UK and India had negative impact. Transparency is needed in agile methods related projects as quick decision making and working with customers can be handled better with a transparent culture. [*Agile value 3*]

7.4.1.3 Uncertainty Avoidance Index

The third cultural dimension studied is uncertainty avoidance index.

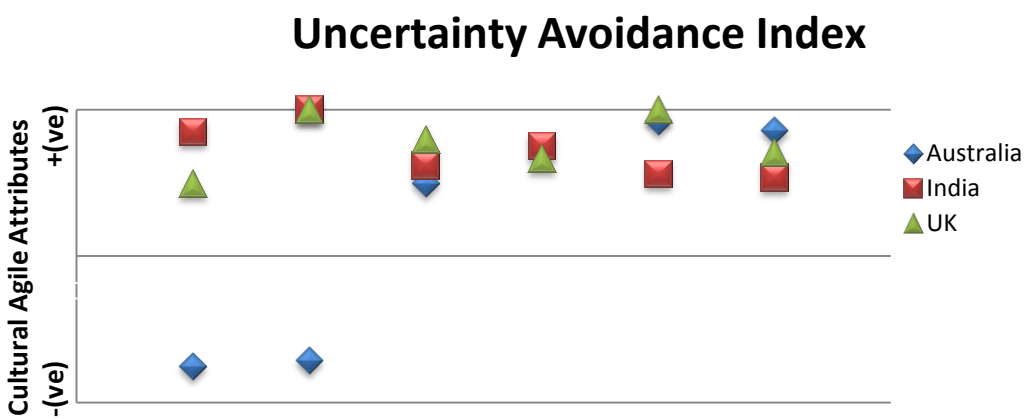


Figure 7-4: Cultural changes in relation to Uncertainty Avoidance Index.

As shown in figure 7-4, most agile cultural attributes were observed to have a positive impact in all three cultures. Unstructured situations are common in agile projects and to accept and manage this situation is critical to projects. In Australian culture, this was seen as 'needing some attention' [*Agile value 4*]. But in general all cultures that were studied had positive influences in relation to this cultural dimension.

7.4.1.4 Time

The fourth cultural dimension studied is Time.

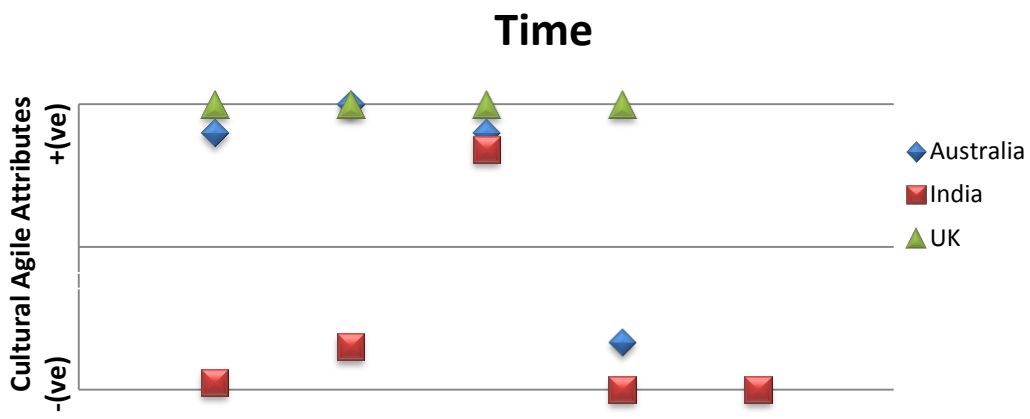


Figure 7-5: Cultural changes in relation to Time.

Cultural influence based on time is shown in figure 7-5. This cultural dimension is critical to agile methodology implementation. Quick and incremental delivery is part of agile methodology therefore time management is important to implement agile methods successfully. Agreeing to a time of delivery and managing time towards the deadline to deliver on time is critical to any agile related project as the delivery is incremental and a delay in one delivery cycle can delay the whole project. The tendency of Indians to keep postponing tasks to the last minute was discussed during interviews and this was seen as a bottleneck for managing agile related projects. When dealing with Indian customers, focus and promptness is critical [*Agile value 4*]

7.4.1.5 Context

The last cultural dimension studied is Context.

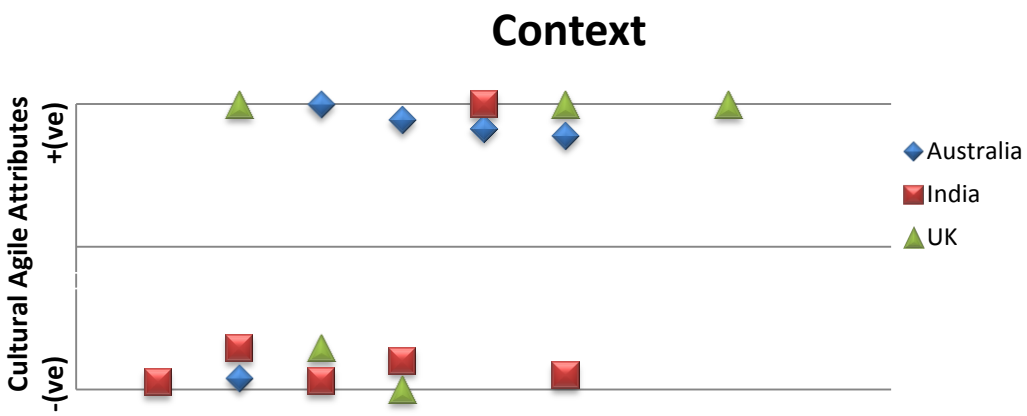


Figure 7-6: Cultural changes in relation to Context.

Figure 7-6 reflects the cultural influence based on dimension 'context'. An interesting cultural agile attribute 'false commitment' was seen in India. Understanding and dealing with this cultural agile attribute by other cultures is critical. A false promise to complete on a specific day can delay planning, delivery and future modules. Understanding the culture and setting a process to manage promised delivery data is critical. Managing this well will provide a better project delivery [*Agile value 3*].

"Easy going" is a cultural agile attribute that in both India and Australia has a negative impact. Australia has a relaxed mentality and Indians have less focus and time management issue that in turn allows them to postpone or keep tasks unattended until the last minute [*Agile value 4*].

Emotional decisions were identified as negative influence and discussed by participants from UK and India. This is an attribute that can create wrong decision and in turn delay the projects [*Agile value 1*].

7.4.1.6 Cross-cultural challenges

Figure 6-6 shows a combination of all the five dimensions and the influences and the different cultural challenges that will need to be managed when implementing agile methods in multicultural teams. The complexity can be seen based on the negative and positive values reflected by different cultures. Based on the interviews with participants, an understanding of cross-cultural challenges seen across different software development teams are shown in figure 7-7 in context to agile methods implementation.

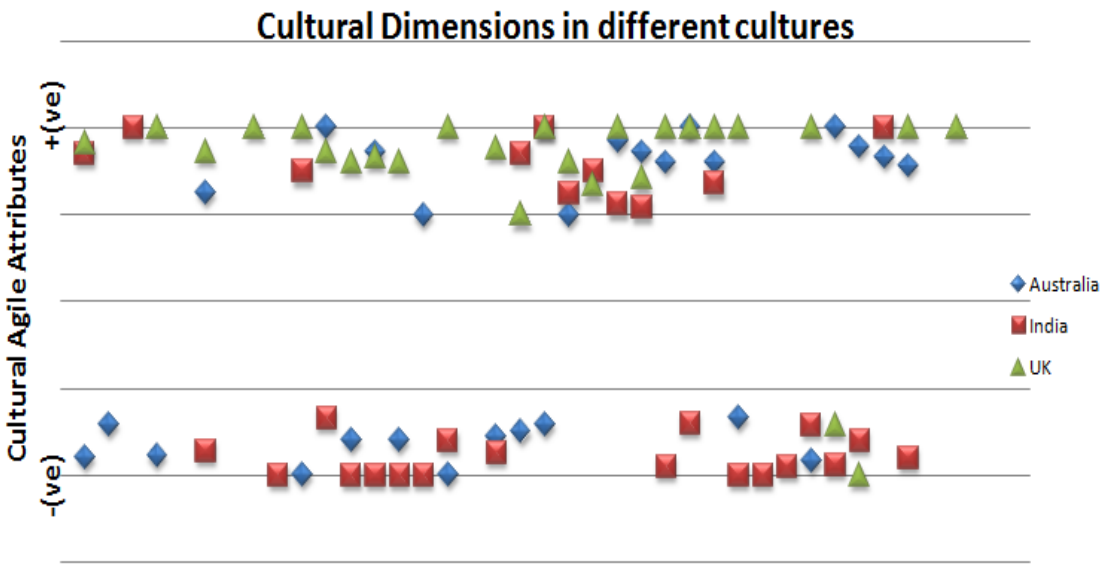


Figure 7-7: Cross-cultural challenges in adopting agile methods.

In addition to the pictorial representation of figure 7-7, table 7-1 shows quantitatively. For the purpose of this study, the weighting of all cultural agile attributes are kept the same. The total value is averaged and the negative and positive feedback is shown in table 7-1. Based on interviews, the response participants provided are added with consideration given to negative and positive feedback. For example, for cultural agile attribute 'trust and respect', 100% participants viewed this attribute as positive in Australia, 67% felt negative in India, and 86% felt positive in the UK. Total values of all the cultural agile attributes for power distance index are added and an average value is shown in table 7-1. 'N' represents number of participants in each culture.

Table 7-1: Total and average for Power Distance Index.

Cultural agile attribute	**Australia (N = 29)**	**India (N = 37)**	**UK (N = 17)**
Trust and respect	100	-67	86
Quick decision making	-80	-100	80
Able to make decision	86	-100	83
Hierarchy	-80	-100	80
Escalation	50	-100	
Taking responsibility	-100	-80	100
Transparency	-78	-87	88
Total	**-102**	**-634**	**517**
Average	**-15**	**-91**	**86**

The cultural dimensions and values from respondent's views through the interviews show the cultural challenges that are faced by the different cultures. Similar steps were used to get the values for the other cultural dimensions and are shown in table 7-2. The average taken from table 7-1 for power distance index is reflected in table 7-2 as '-15, -91, and 86' for Australia, India and the UK. The values that reflect negative impact are highlighted.

Table 7-2: Cultural complexity - cultural dimensions and values.

Cultural Dimension	**Australia**	**India**	**UK**
Individualism / collectivism	-57	15	95
Power distance Index	-15	-91	86
Uncertainty Avoidance index	16	72	78
Time	48	-59	100
Context	52	-55	26

The negative indication and the values show the cultural challenges faced by different cultures in relation to agile methods implementation. Again considering power distance index as an example, the average for different cultures Australia (-15 rounded to 0), India (-91 rounded to -100) and the UK (86 rounded to 100) can reflect an interesting argument.

Australia (0)

India (-100)

UK (86)

From the values it can be argued that Australians with neutral value ‘0’ will be able to work better with both India (-100) and UK (86). At the same time, we can also argue that working between India (-100) and the UK (86) will be comparatively difficult due to the difference. Thus positioning of cultures based on these quantitative values can explain which countries are better placed to work with other countries based on different cultural dimensions.

7.4.2 Research Question 2: Cultural Changes for a Successful Agile Implementation

Based on the trends revealed from the previous section, it appears that to implement agile methods, there are specific cultural attributes that have positive / negative / neutral influence in different cultures. The following sections discuss different cultures and changes required to implement agile methods in individual cultures.

7.4.2.1 Australia

The data analysis revealed cultural agile attributes and influence seen in Australian culture in relation to implementing agile methods. Table 7-3 provides a list of cultural agile attributes and coding used.

In Australia, an individualistic culture was commonly identified and team collaboration and group culture awareness were areas where attention was needed in relation to agile method implementation. This nature in Australian society reflected independence, self-contained and calculative relationship with the participants. Open and honest communication was seen in Australian culture and Australians always took pride in what they did and felt. This feature will help in openly discussing issues in daily meetings when implementing agile methods. Though the team was able to communicate well, dedication was an area that was identified that had negative influence in Australian culture. The relaxed mentality seen in Australian culture was discussed as lack of dedication by the interview participants. Australian culture was recognised as friendly and independent.

Table 7-3: Cultural changes needed in Australia to implement agile methods.

Culture dimensions	Cultural agile attributes	Coding	Australia
Individualism/Collectivism	Team collaboration	Team work	Negative influence
		Group / culture	Negative influence
		Hand holding	No comments
	Management support	Management support	Negative influence
	Open and honest	Openness	Positive influence
	Self organising team	Self organising	No comments
	Dedicated team	Work / life balance	No comments
		Commitment	Negative influence
Power distance index	Trust people more than process	Trust and respect	Positive influence
	Decision making	Quick decision making	Negative influence
		Able to make decision	Positive influence
	Authoritative	Hierarchy	Negative influence
		Escalation	Mixed influence
	Blame sharing	Taking responsibility	Negative influence
	Transparency	Transparency	Negative influence
		Outspoken	Positive influence
Uncertainty avoidance index	Risk taking	Risk taking	Negative influence
	Tolerance for change	Unstructured situation	Negative influence
		Tolerance for change	Mixed influence
		Reacting to change	Negative influence
	Innovation	Innovation	Positive influence
Time	Time keeping	Timeliness / promptness	Positive influence
		Focused to complete	Positive influence
		Prioritisation	Positive influence
		Breaks and personal	Positive influence
		Separation of work /	No comments
Context	Meeting deadline and	False commitment	No comments
		Easy going	Negative influence
	Negotiation	Negotiation	Positive influence
		Emotional	Positive influence
	Proactive	Proactive	Positive influence

In Australia the Power Distance Index is identified as low and lower power distance countries value equality, with a preference toward democratic processes. Hofstede identified that personnel in low power distance countries view superiors as being similar to them and accessible. This feature helped in projects where the team members were allowed to make decisions on their own to the best of their ability and without fear of being scrutinised. Trust and respect was also seen due to the low power distance in Australia. Though power distance was low in Australia transparency was identified as not seen in all areas. In the software engineering community hierarchy was

still seen as strong and the project management governance had some roles and responsibilities with management influence were still seen in Australia. The attribute of 'quick decision making' was an interesting factor that had negative influence and the discussions identified due to the low power distance all team members in a project wanted to be part of decision making as they felt that it was their privilege to be part of decision making process. This attitude appeared to have some delay in making quick decisions. The interviews for data collection also revealed that in Australia, taking responsibility was not seen willingly. The tendency to relax and pass the responsibility to someone else might have a negative influence in adopting agile methods.

In Australia, the culture was to work proactively and to be innovative, the 'risk taking' factor was not seen. They were seen as very relaxed and liked to try only when they knew it will work. In agile implementation, taking a few risks to get things going is needed and in the Australian culture this factor will need some attention. Partially it was agreed by the participants that the 'tolerance to change' was seen in Australia, but when it comes to 'reacting to change' the Australians did not react well. In an agile culture, there are situations when requirements are handled even at a very last stage and the expectation to manage change towards end of a release is required for agile adoption.

Australians work well with time and promptness and timeliness was seen in most areas. Work gets prioritised and allocated accordingly and managed keeping project schedule in mind. Agile methods expect quick response and prompt changes and Australians seem to be managing this pretty well. Breaks and personal time was one area that needed attention in Australian culture. Relaxing and getting regular breaks were mentioned during the interviews and with agile, in many cases quick response is required.

In Australia, a relaxed atmosphere with an 'easy going' nature was identified. Communication is always friendly and Australians like to be friendly. Stress free work culture is expected to be seen in the team in most cases. Due to this, a tendency for delaying and postponing tasks may occur. This is not good for agile method implementation. Transparency is expected and seen in most areas in Australia. This leads to open and honest communication. Negotiations are always taken on the basis of right and responsibilities rather than emotion.

7.4.2.2 India

Table 7-4 covers the cultural agile attributes and coding and shows the influences seen in India in relation to implementing agile methods.

Table 7-4: Cultural changes needed in India to implement agile methods.

Culture dimensions	Cultural agile attributes	Coding	India
Individualism/Collectivism	Team collaboration	Team work	Positive influence
		Group / culture	Mixed influence
		Hand holding	Positive influence
	Management support	Management support	No comments
	Open and honest	Openness	Negative influence
	Self organising team	Self organising	No comments
	Dedicated team	Work / life balance	Negative influence
		Commitment	Positive influence
Power distance index	Trust people more than process	Trust and respect	Negative influence
	Decision making	Quick decision making	Negative influence
		Able to make decision	Negative influence
	Authoritative	Hierarchy	Negative influence
		Escalation	Negative influence
	Blame sharing	Taking responsibility	Negative influence
	Transparency	Transparency	Negative influence
		Outspoken	Negative influence
Uncertainty avoidance index	Risk taking	Risk taking	Positive influence
	Tolerance for change	Unstructured situation	Positive influence
		Tolerance for change	Positive influence
		Reacting to change	Positive influence
	Innovation	Innovation	Mixed influence
Time	Time keeping	Timeliness / promptness	Negative influence
		Focused to complete	Positive influence
		Prioritisation	Positive influence
		Breaks and personal time	Negative influence
		Separation of work /	Negative influence
Context	Meeting deadline and	False commitment	Negative influence
		Easy going	Negative influence
	Negotiation	Negotiation	Positive influence
		Emotional	Negative influence
	Proactive	Proactive	Negative influence

In India a collective work force was clearly identified with frequent communication among co-workers. It is also seen that commitment to the organisation including helping the team for group harmony, cooperation within groups, and serving the groups are seen very clearly in the Indian culture. The data collected also shows that interpersonal helping and sharing exists in India. Personal relations are very important in India, and this was clearly seen through the interviews. The factor of 'personal touch'

has been reported by many managers and team members from India. Indians are said to be high on need for personalised relationships (Sinha, 2000). As postulated by Sinha, this factor shows that leadership in India involves the manager taking an interest in the whole person; that is, in both personal as well as official aspects of the subordinate's life.

In contrast to other cultures studied, in India, it was clearly noticed that the manager was like a paternal/maternal role and expected to help or support when in need. This was clearly heard during interviews in statements like "He is always there for the team", "Asks for updates so that he can help us in whatever way he possibly can", and "we can always go to him if we are in trouble or need him". This culture was also confirmed by Singh (2007). There was also an argument that the manager was benevolent and nurturing towards the subordinate only when the subordinate performed in accordance with the job requirements (Sinha, 2000). Though the collective working relationship is seen, it was also noted that the manager was supportive when the team actually performs the way the manager wants. Unique internal labour markets exist in Indian organisations based on social relations, political contacts, caste, religion, and economic power (Dorfman & Howell, 1988). This was confirmed during the interviews and a high level of high power structure was seen. Though the power distance is still high in India, it has been slightly relaxed in some areas and a slow change in power distance can be identified. In India making decision was mostly done by the manager because of hierarchy. Team members were not expected to contribute towards the final decision. Most critical decisions were made by the manager. Statements such as "Encourages me to solve problems independently", "shows tremendous amount of faith in the ability of the subordinates" show that subordinates expect their managers to empower them. From one side the team members are expecting the support from the manager and the manager in turn is showing some empowering attitudes towards the team members. Because of the paternal/maternal approach, the final decisions are expected to be made by the manager not made collectively.

'Tolerance for change' was easily adoptable in India due to the general nature of Indian culture. India seemed to be in a better position with regards to this cultural dimension when compared to Australia and the UK. Indian culture is accustomed to ambiguity and unpredictability. They have a greater tolerance for uncertainty and change. When the researcher was in India it was experienced that people in India were relatively comfortable with events being unpredictable. Agile culture is unpredictable

and requires quick change and work according to situations; this feature will be better seen in India as the culture adapts to changing environment. Indians were willingly trying innovative processes to make sure the projects were completed successfully. Indian team members were flexible and were open to change. They were not just open to new ideas and ways of doing things, but also willing to help others adopt such strategies.

In India, time management was not seen as effective. Timeliness / promptness had a negative influence in India. Issues such as 'keeping tasks to last minute' and 'not attending meetings on time' were discussed during the interviews. There were situations that were discussed which clearly indicated that Indians need to watch their time management. Indian culture also needed to balance personal and work time. Reasons such as working outside work hours due to time difference between India/US and working overtime were discussed.

In India, meeting deadlines and expectations had negative influence. By nature Indians have a tendency not to disagree or 'say no'. Therefore, there were many situations where false commitments were given during projects and expectations were not able to be met. In accordance with communication, transparency is also not seen much in Indian culture. Even during meetings, there was sometimes no direct, honest communication. This nature in India can work negative in adopting agile methods. Also, in many cases there were situations when emotional decisions were made when negotiating for the project.

7.4.2.3 United Kingdom

Table 7-5 shows the cultural agile attributes that have negative/positive/neutral influence in implementing agile methods in the UK. When compared to the other cultures studied, the UK seemed very positive in relation to cultural agile attributes.

Table 7-5: Cultural changes needed in UK to implement agile methods.

Culture dimensions	Cultural agile attributes	Coding	United Kingdom
Individualism/Collectivism	Team collaboration	Team work	Positive influence
		Group / culture	Mixed influence
		Hand holding	No comments
	Management support	Management support	Positive influence
	Open and honest	Openness	Positive influence
	Self organising team	Self organising	Positive influence
	Dedicated team	Work / life balance	No comments
		Commitment	Positive influence
Power distance index	Trust people more than process	Trust and respect	Positive influence
	Decision making	Quick decision making	Positive influence
		Able to make decision	Positive influence
	Authoritative	Hierarchy	Positive influence
		Escalation	Positive influence
	Blame sharing	Taking responsibility	Positive influence
	Transparency	Transparency	Positive influence
		Outspoken	Negative influence
Uncertainty avoidance index	Risk taking	Risk taking	Mixed influence
	Tolerance for change	Unstructured situation	Positive influence
		Tolerance for change	Positive influence
		Reacting to change	Positive influence
	Innovation	Innovation	Positive influence
Time	Time keeping	Timeliness / promptness	Positive influence
		Focused to complete	Positive influence
		Prioritisation	Positive influence
		Breaks and personal time	Positive influence
		Separation of work /	No comments
Context	Meeting deadline and	False commitment	No comments
		Easy going	Positive influence
	Negotiation	Negotiation	No comments
		Emotional	Positive influence
	Proactive	Proactive	Positive influence

In the United Kingdom, the culture seemed to be friendly and team oriented. The interviews also revealed that team members were mostly focused. Similar to Australia, in UK the tendency to keep communication open and honest was seen. The dedication and focus in getting project going was seen better when compared to India and Australia.

With regards to the United Kingdom as far as power distance goes, all attributes had positive influence. In UK power distance is low and people accepted inequalities.

Management structures were flat and involving others in decision making, trust and respect, and escalating when needed were seen in most organisations. Unlike Australia, in UK team members didn't hesitate to take responsibilities. This will help better in relation to agile adoption. Another positive attribute that was seen in UK is 'quick decision making'. Though members had authority or responsibility to be part of decision making process, the steps or attitude didn't delay the decision making time. The area which had negative influence in relation to communication is 'Transparency – outspoken'. When sensitive issues were discussed, and a Manager is in the meeting there was a tendency to hide the truth as discussed during interviews. This will affect agile implementation, as agile method expects, open and honest communication. Overall, UK seemed exhibiting positive attributes required for agile adoption.

In the United Kingdom, 'Uncertainty avoidance index' cultural dimension seemed providing positive influence. There were many processes in place to manage the uncertainty. Tolerance for uncertainty was clearly seen and accepted in UK and most participants felt that taking risks and open to change were commonly seen in the culture.

In contrast to India, at UK, time management was seen as having positive influence. Most participants felt that similar to Australia, in UK time was considered important and projects were managed accordingly.

In the United Kingdom, communication strategy seemed to be positive, except in some cases there were situations when transparency was not seen. The UK is similar to Australia where deadlines and expectations are met.

Table 7-6 summarises influences seen in different cultures in relation to the adoption of agile methods. This table shows the difference in cultures. The cultural influence shown based on cultural agile attributes reflect the complexity involved in implementing agile methods in different cultures and specifically among the cultures. With global software development and the current need to work among different cultures, the outcome of this study may be of use when implementing agile methods.

Table 7-6: Cultural dimensions, cultural agile attributes and coding.

Culture dimensions	Cultural agile attributes	Coding	Australia	India	United Kingdom
Individualism/Collectivism	Team collaboration	Team work	Negative influence	Positive influence	Positive influence
		Group / culture awareness	Negative influence	Mixed influence	Mixed influence
		Hand holding	No comments	Positive influence	No comments
	Management support	Management support	Negative influence	No comments	Positive influence
	Open and honest communication	Openness	Positive influence	Negative influence	Positive influence
	Self organising team	Self organising	No comments	No comments	Positive influence
	Dedicated team	Work / life balance	No comments	Negative influence	No comments
		Commitment	Negative influence	Positive influence	Positive influence
Power distance index	Trust people more than process	Trust and respect	Positive influence	Negative influence	Positive influence
	Decision making	Quick decision making	Negative influence	Negative influence	Positive influence
		Able to make decision	Positive influence	Negative influence	Positive influence
	Authoritative	Hierarchy	Negative influence	Negative influence	Positive influence
		Escalation	Mixed influence	Negative influence	Positive influence
	Blame sharing	Taking responsibility	Negative influence	Negative influence	Positive influence
	Transparency	Transparency	Negative influence	Negative influence	Positive influence
		Outspoken	Positive influence	Negative influence	Negative influence
Uncertainty avoidance index	Rask taking	Risk taking	Negative influence	Positive influence	Mixed influence
	Tolerance for change	Unstructured situation	Negative influence	Positive influence	Positive influence
		Tolerance for change	Mixed influence	Positive influence	Positive influence
		Reacting to change	Negative influence	Positive influence	Positive influence
	Innovation	Innovation	Positive influence	Mixed influence	Positive influence
Time	Time keeping	Timeliness / promptness	Positive influence	Negative influence	Positive influence
		Focused to complete	Positive influence	Positive influence	Positive influence
		Prioritisation	Positive influence	Positive influence	Positive influence
		Breaks and personal time	Positive influence	Negative influence	Positive influence
		Separation of work / personal	No comments	Negative influence	No comments
Context	Meeting deadline and	False commitment	No comments	Negative influence	No comments
		Easy going	Negative influence	Negative influence	Positive influence
	Negotiation	Negotiation	Positive influence	Positive influence	No comments
		Emotional	Positive influence	Negative influence	Positive influence
	Proactive	Proactive	Positive influence	Negative influence	Positive influence

7.5 Research Outcomes and Discussion

The major outcomes/findings from this thesis are discussed in this section. The three main outcomes are:

i) This thesis suggests how managing projects can be made easier with selecting and choosing specific agile techniques that are suitable for a cultural situation or project environment. A combination or a hybrid model of agile techniques helps in making the project a workable solution that reflects the culture better.

ii) This study helped in understanding some of the challenges involved in implementing agile methods in different cultures and thus the cultural influences and changes needed to implement agile methods for a higher software project success is discussed.

iii) The influence of users' perspectives and cultural values were seen as a great effect on agile methods adoption. This thesis helped in understanding and providing information on what cultural agile attributes have negative/positive influence in implementing agile methods.

Each of the above outcomes are discussed in the next sections.

7.5.1 Hybrid Model with Agile Techniques

Chapter Two discussed different agile methods and the techniques used in these methods. Based on the literature study a table with agile techniques was compiled from study of agile methods. This work helped in identifying common agile techniques used by agile methods and specific techniques for a particular agile method. For example the technique specific to XP is '40 hour week' and to DSDM is 'dedicated meeting place'. Scrum and FDD are characterised with technique 'champion role' and Scrum and DSDM are characterised with technique 'daily team meetings'. There are other techniques that are common to all the agile methods such as 'iterative development', 'frequent delivery', 'communication' and others listed in table 7-7 which are good examples of common agile techniques.

A study was previously done comparing XP and Scrum using a framework based on the Agile Manifesto (Visconti & Cook, 2004). Amalgamating two or more methods give a solid basis for a good project management. There are further practical

reasons for combining methods. XP lacks support for project management (Abrahamsson, et al., 2003), Scrum lacks specific practices for managing iterative and incremental projects. A combination of XP and Scrum (Visconti & Cook, 2004), XP and Crystal methods (Cockburn, 2002), XP and ASD (Highsmith, 2002b) are few of the proposed method combination that have been considered in the past. When compared to other agile methods, only XP offers concrete guidance over whole software development lifecycle (Abrahamsson, et al., 2003) and because of this XP is the method most often proposed in combination with other agile methods. Recommendations to combine different agile methods or techniques from one method to another method have come from a need to address these weaknesses. Hence a project manager can select a specific method with one or more combination of agile techniques that best suited to the software development project and culture.

Table 7-7 Agile techniques compared with agile methods.

Technique	***XP***	***Scrum***	***DSDM***	***FDD***	***Crystal***	***Lean***
Iterative development	✓	✓	✓	✓	✓	✓
Iteration of fixed length			✓		✓	
Incremental development	✓	✓	✓	✓	✓	✓
Customer on-site	✓					
Frequent delivery	✓	✓	✓	✓	✓	✓
Whole team works same location	✓	✓			✓	✓
Dedicate meeting place		✓				
Daily team meetings	✓	✓	✓	✓		
Testing is integrated	✓		✓		✓	
PM emphasis		✓				
Communication	✓	✓	✓	✓	✓	✓
Collaboration	✓	✓	✓	✓	✓	✓
Coordination	✓	✓	✓	✓	✓	✓
Knowledge sharing	✓	✓	✓	✓	✓	✓
Working with uncertainty	✓	✓			✓	✓
Empowered to make decisions			✓			✓
Courage to make mistakes			✓			
Requirements as prototypes rather than text			✓			
40 Hours week	✓					
Pair programming	✓				✓	
Refactoring	✓					✓
Collective ownership of code	✓				✓	
Champion role		✓		✓		

Table 7-7 shows there are agile techniques common to agile methods.

Table 7-8 shows the matches between agile techniques and cultural agile attributes. As in the previous sections, red (negative), amber (neutral) and green (positive) colours are used to show the influence that cultural agile attributes have in specific agile techniques. In a similar manner, table 7-9 and 7-10 shows the agile techniques and influences of cultural agile attributes for India and the United Kingdom respectively.

Table 7-8: Agile techniques and cultural influences in Australia.

Cultural Agile Attributes	Team Collaboration	Management support	Open and honest communication	Self-organising team	Dedicated team	Trust people more than process	Quick decision making	Authoritative	Blame sharing	Transparency	Risk taking	Tolerance for change	Innovation	Time keeping	Meeting deadlines and expectations	Negotiation	Proactive
Agile Techniques	Individualism / Collectivism					Power distance index					Uncertainty avoidance index			Time	Context		
Daily builds of complete system				✓	✓									✓	✓		
Iterative development	✓					✓	✓	✓		✓							
Iteration of fixed length	✓					✓	✓			✓				✓			
Incremental development							✓										
Customer on-site			✓												✓		
Frequent delivery	✓		✓	✓	✓		✓	✓		✓				✓		✓	
Whole team works same location						✓				✓						✓	
Dedicate meeting place			✓	✓	✓	✓	✓			✓					✓		
Daily team meetings	✓		✓	✓			✓								✓		✓
Testing is integrated			✓				✓			✓		✓		✓			
Project management emphasis			✓				✓			✓				✓	✓		
Communication	✓		✓	✓	✓	✓	✓	✓		✓							
Collaboration	✓	✓							✓							✓	
Coordination			✓											✓			
Knowledge sharing	✓		✓			✓				✓							
Working with uncertainty			✓				✓	✓	✓			✓		✓		✓	✓
Empowered to make decisions							✓	✓		✓	✓		✓				✓
Courage to make mistakes			✓						✓		✓		✓				✓
Requirements as prototypes rather than text	✓	✓	✓			✓	✓			✓		✓					
40 Hours week	✓		✓	✓	✓									✓		✓	
Pair programming	✓		✓	✓	✓	✓		✓		✓				✓			✓
Refactoring																	
Small software product releases	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Collective ownership of code	✓		✓			✓			✓	✓						✓	✓
Champion role			✓			✓	✓	✓		✓			✓				✓

Table 7-9: Agile techniques and cultural influences in India.

Cultural Agile Attributes / Agile Techniques	Team Collaboration	Management support	Open and honest communication	Self-organising team	Dedicated team	Trust people more than process	Quick decision making	Authoritative	Blame sharing	Transparency	Risk taking	Tolerance for change	Innovation	Time keeping	Meeting deadlines and expectations	Negotiation	Proactive
	Individualism / Collectivism					Power distance index					Uncertainty avoidance index			Time	Context		
Daily builds of complete system				✓	✓									✓	✓		
Iterative development	✓					✓	✓	✓		✓							
Iteration of fixed length	✓					✓	✓			✓				✓			
Incremental development							✓										
Customer on-site			✓												✓		
Frequent delivery	✓		✓	✓	✓		✓	✓		✓				✓		✓	
Whole team works same location						✓				✓						✓	
Dedicate meeting place			✓	✓	✓	✓	✓			✓					✓		
Daily team meetings	✓		✓	✓			✓								✓		✓
Testing is integrated			✓				✓			✓		✓		✓			
Project management emphasis			✓				✓			✓				✓	✓		
Communication	✓		✓	✓	✓	✓	✓	✓		✓							
Collaboration	✓	✓							✓							✓	
Coordination			✓											✓			
Knowledge sharing	✓		✓			✓				✓							
Working with uncertainty			✓				✓	✓	✓			✓		✓		✓	✓
Empowered to make decisions							✓	✓		✓	✓		✓				✓
Courage to make mistakes			✓						✓		✓		✓				✓
Requirements as prototypes rather than text	✓	✓	✓			✓	✓			✓		✓					
40 Hours week	✓		✓	✓	✓									✓		✓	
Pair programming	✓		✓	✓	✓	✓		✓		✓				✓			✓
Refactoring																	
Small software product releases	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Collective ownership of code	✓		✓			✓			✓	✓						✓	✓
Champion role			✓			✓	✓	✓		✓			✓				✓

Table 7-10: Agile techniques and cultural influences in the United Kingdom.

Cultural Agile Attributes / Agile Techniques	Team Collaboration	Management support	Open and honest communication	Self-organising team	Dedicated team	Trust people more than process	Quick decision making	Authoritative	Blame sharing	Transparency	Risk taking	Tolerance for change	Innovation	Time keeping	Meeting deadlines and expectations	Negotiation	Proactive
	Individualism / Collectivism					Power distance index					Uncertainty avoidance index			Time	Context		
Daily builds of complete system				✓	✓									✓	✓		
Iterative development	✓					✓	✓	✓		✓							
Iteration of fixed length	✓					✓	✓			✓				✓			
Incremental development							✓										
Customer on-site			✓												✓		
Frequent delivery	✓		✓	✓	✓		✓	✓		✓				✓		✓	
Whole team works same location						✓				✓						✓	
Dedicate meeting place			✓	✓	✓	✓	✓			✓					✓		
Daily team meetings	✓		✓	✓			✓								✓		✓
Testing is integrated			✓				✓			✓		✓		✓			
Project management emphasis			✓				✓			✓				✓	✓		
Communication	✓		✓	✓	✓	✓	✓	✓		✓							
Collaboration	✓	✓							✓							✓	
Coordination			✓											✓			
Knowledge sharing	✓		✓			✓				✓							
Working with uncertainty			✓				✓	✓	✓			✓		✓		✓	✓
Empowered to make decisions							✓	✓		✓	✓		✓				✓
Courage to make mistakes			✓						✓		✓		✓				✓
Requirements as prototypes rather than text	✓	✓	✓			✓	✓			✓		✓					
40 Hours week	✓		✓	✓	✓									✓		✓	
Pair programming	✓		✓	✓	✓	✓		✓		✓				✓			✓
Refactoring																	
Small software product releases	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Collective ownership of code	✓		✓			✓			✓	✓						✓	✓
Champion role			✓			✓	✓	✓		✓			✓				✓

This table helps practitioners and researchers to identify what techniques should be used for which culture. Agile method authors state that the culture in which agile method is embedded could have an impact on agile implementation. This study relies on cultural compatibility or fit that can help implement an agile method with selected agile techniques. This study also helps in understanding what cultural agile attributes different cultures should be focusing on to help implement different agile techniques.

The example that was considered for Australia was 'frequent delivery'. Considering the same example in India, to implement agile technique 'frequent delivery', the cultural agile attributes that Indians have to be conscious of are: Transparency, dedicated team, authoritative, decision making, open and honest communication, and time keeping. In the United Kingdom to implement 'frequent delivery', the cultural agile attributes that needs focus is 'transparency'.

From tables 7-8, 7-9 and 7-10 the United Kingdom culture seemed to be more suitable for agile implementation with less cultural changes needed and India and Australia need some cultural changes when compared to the United Kingdom.

7.5.2 Cross-cultural Challenges in Implementing and Adopting Agile Methodology?

When dealing with implementing agile methods in different cultures, the understanding of negative and positive influence of cultural agile attributes for different cultures will help in managing intercultural software development projects.

Figure 7-8 and 7-9 shows the scale of positive and negative influences in relation to cultrual agile attributes. These figures shows the cross-cultural challenges faced by different cultures in implementing agile methods. Understanding of these differences will help in managing agile method related projects.

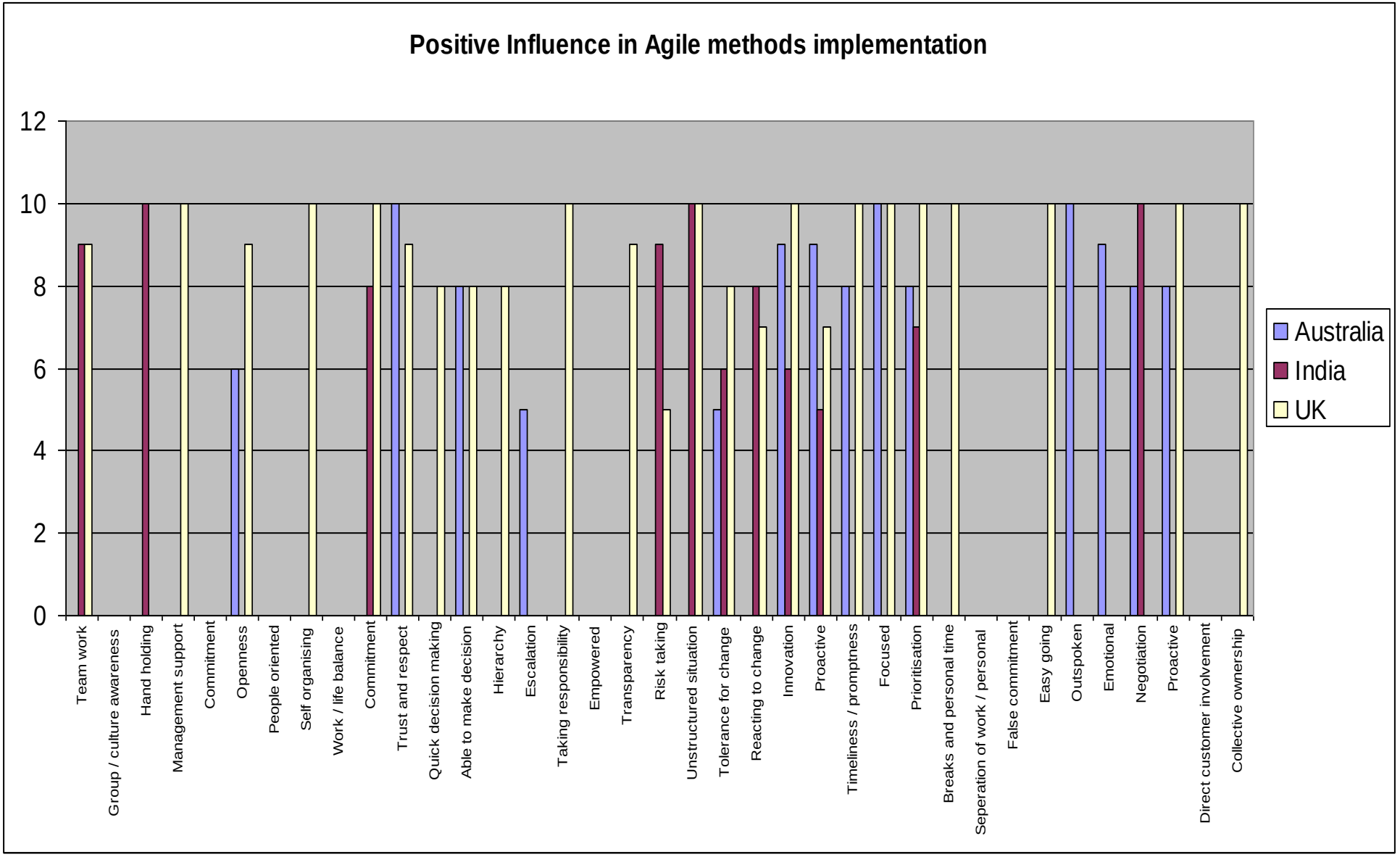


Figure 7-8: Cultural influence in implementing agile (positive influence).

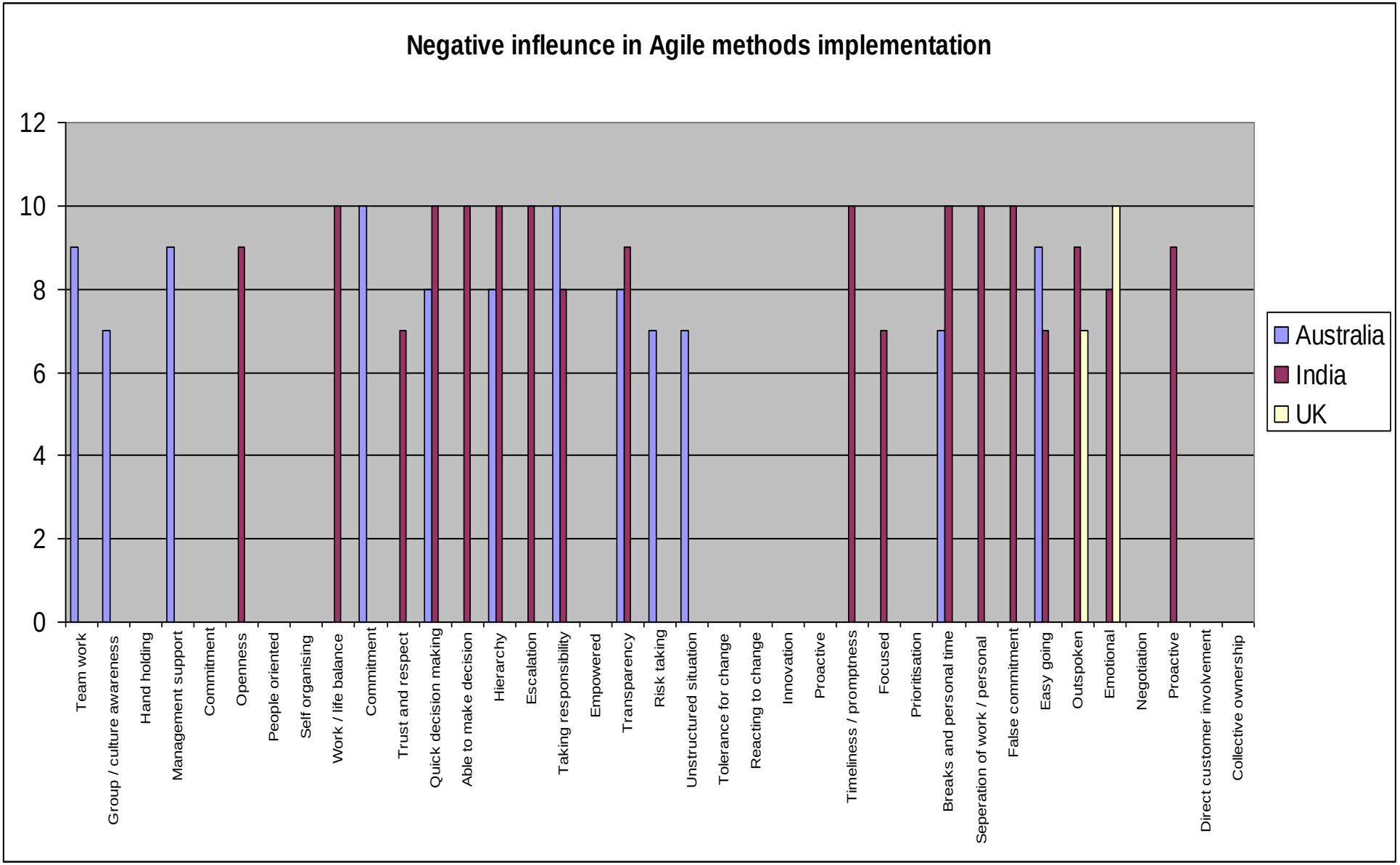


Figure 7-9: Cultural influence in implementing agile (negative influence).

From figure 7-8 and 7-9 is it clear that different cultures have different influences on cultural agile attributes. To help implement agile method in specific cultures, understanding of different cultures and specifically the cultural agile attribute and their influence will support the working together and gives a perspective to different cultures.

7.5.3 Cultural Influence and Agile Adoption

According to Sidky and Arthur (2007), two key principles essential for agile are human centric, which refers to the reliance on people and the interaction between them, and technical excellence, which implies the use of procedures and methodology that produce and maintain the highest quality of code and project management. This thesis focused on both cultural aspects and methodology aspects to manage projects based on good agile techniques and cultural agile attributes.

Following are some important criteria to be kept in mind that provide negative and positive influence in implementing agile in the following cultures. Specific cultural agile attributes that have positive and negative influences are listed under different cultures. These were the final outcome from this research programme. The data collection and compilation of data based on cultural agile attributes are shown based on cultural influences. This list may be useful for different cultures when implementing agile methods.

Positive and negative influences seen in Australian cultures based on cultural agile attributes are listed below. Following that influences seen in India and the UK are shown.

1. Australia

(-) Team work	(+) Openness
(-) Team commitment	(+) Trust and respect
(-) Quick decision making	(+) Outspoken
(-) Reacting to change	(+) Time keeping
(-) Easy going	(+) Negotiation
	(+) Emotional

2. India

(-) Openness	(+) Team collaboration
(-) Work life balance	(+) Hand holding
(-) Trust and respect	(+) Team commitment
(-) False commitment	(+) Tolerance for change
(-) Quick decision making	(+) Reacting to change
(-) Able to make decisions	(+) Prioritisation
(-) Hierarchy	(+) Negotiation
(-) Escalation	
(-) Transparency	
(-) Timeliness / promptness	
(-) Emotional	

3. United Kingdom

(-) Outspoken	(+) Team collaboration
	(+) Open / honest communication
	(+) Trust and respect
	(+) Decision making
	(+) Hierarchy
	(+) Escalation
	(+) Tolerance for change
	(+) Time keeping
	(+) Meeting deadlines

When compared to the three cultures studied in this research, United kingdom seemed to best fit with agile adoption and India seemed to have less fit.

This study has revealed the first step that can be used to enhance and study further to get a better understanding of agile adoption in different cultures.

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7.5 Summary

This chapter provided the results based on research problem identified in the first chapter. The final outcomes of the research are shown here. Tables and figures show a theoretical framework to help practitioners to understand cultural issues related to agile method implementation. When compared to different cultures studies, the UK seemed to be the best fit for agile method implementation, then Australia being the second with some cultural changes and lastly India with more cultural changes.

CHAPTER 8
RESEARCH SUMMARY AND CONCLUSIONS

8.1 Introduction

The effect of cultural differences is often overlooked or neglected when software development projects are planned. Multicultural project teams are very common and have been noted as a successful project management approach. Apart from resource skills, infrastructure, tools and technology, cultural factors also play a key role in terms of establishing a good working relationship. While the existence of cultural differences among software teams located in different parts of the world is undisputed, what is more pertinent is whether these cultural differences are a barrier to successful software development and implementation. This thesis explored this idea, focusing on agile methods. Cultural barriers are acknowledged to be a risk, yet how exactly they are an issue needed to be verified. Identifying these cultural differences and their impact not only makes it possible to customise communication, organisation and software development, but also enables managers to better manage their teams. The goal of this research was to identify existing cultural differences based on defined cultural agile attributes, and to identify the means of addressing them to help improve the implementation of agile methods in culturally diverse groups.

8.2 Summary of Research

This is the first study to present a framework with culture related agile attributes and, the first to study the relationship among different cultures in implementing agile methods. This study explored agile adoption in different cultures by using a selection of Hofstede's and Hall's cultural dimensions with consolidated cultural agile attributes. The research began with the researcher's personal interest and the reality seen with multicultural environments and agile methodology. The researcher's experience with working in different cultures and the considerations that were needed to work within different cultures were the starting point of this research programme. Looking at the importance and practicality of agile methods, and based on emerging research in agile methods, the research programme was seen as important. Agile methods and the agile techniques used within them were the foundation for this research and the study of these agile techniques along with cultural dimensions were the main steps in the research

journey. Based on the agile techniques and cultural dimensions, cultural agile attributes were collated and used as the base for this research programme.

Chapter One discussed the research goal, objective and research questions. This chapter helped to set the foundation for understanding the research problem. Subsequently, Chapter Two and Three presented a literature review in the areas of agile philosophy and culture respectively. These two chapters provided information to frame the interview questions for data collection. Chapter Two contained an in-depth study of common agile methods; the outcome being a list of commonly used agile techniques. In turn Chapter Three studied cultural dimensions in context of agile methods implementation, and relevant cultural dimensions were then chosen. The output of these two chapters provided a list of cultural agile attributes that were collated based on agile techniques from Chapter Two and cultural dimensions from Chapter Three. These cultural agile attributes then formed the foundation for data collection. In Chapter Four, different research methods were studied to verify which method was best suited for this research programme. Action research, case study, ethnography and grounded theory were all considered, with the case study research method being selected. Based on the research method, the different stages that were planned for this research programme were discussed in Chapter Five. Data collection was discussed and explained in Chapter Six. The study involved data collection in Australia, India and the United Kingdom and the data collected was presented in the context of different cultural dimensions and different cultures. Discussion based on the data and the research analysis was presented in Chapter Seven. Finally, Chapter Eight (this chapter) provides a summary of the significance of the research, highlights contribution to knowledge, and re-iterates research outcome of this research programme.

8.3 Conceptual Significance of the Research

This research focused on software project success and the use of agile methods to better manage projects. This section discusses the approach taken in this research focusing on issues, objectives, research questions and the outcomes achieved.

8.3.1 Issues, Objectives, Research Questions and Outcome

Figure 8-1 is a representation of the research problem. The research was oriented around three major areas of software engineering:

- Software project management,
- Agile methods implementation and
- Intercultural challenges.

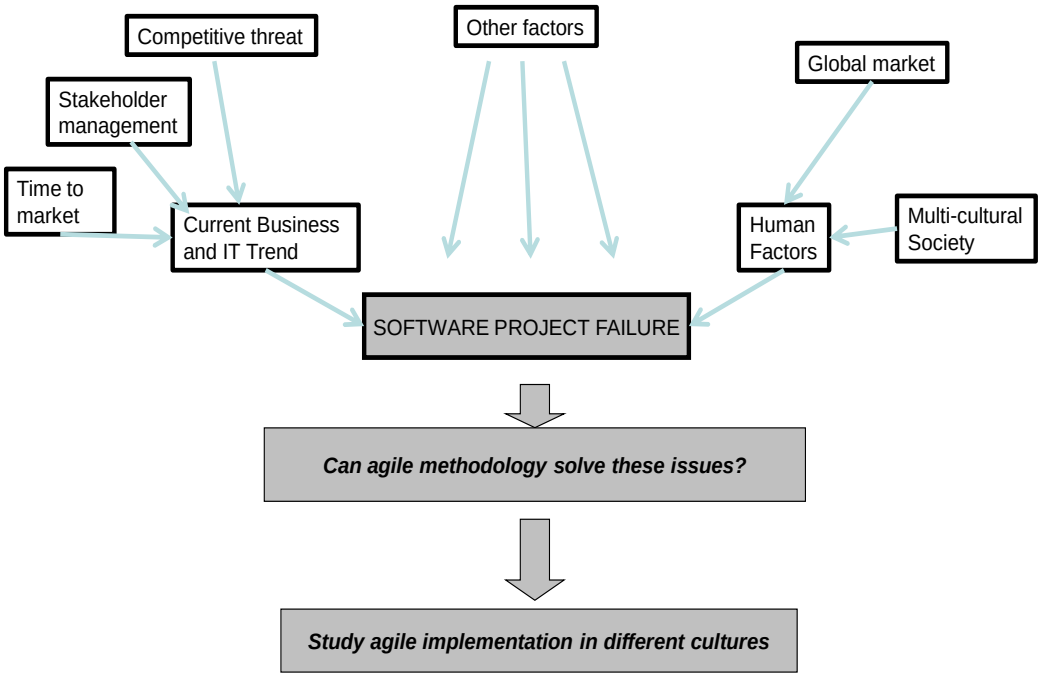

Figure 8-1: Research Mind map.

Relevant literature was studied to identify the significance of the problem. The research questions were identified:

Foundation Research Question –What are the enabling and limiting cultural factors that influence implementing specific agile techniques?

Research Question 1: What are the cross-cultural challenges across different software development teams working collaboratively to adopt and implement agile methodology?

Research Question 2: What cultural changes are required in a software development project team, in a medium to large organisation for a successful agile implementation?

Based on the research questions, the objectives were defined. The following are the objectives of this research as described in Chapter One.

Objective1: To understand, compare and contrast different agile techniques in commonly used agile methods [Foundation Research question].

Objective 2: To identify the culturally related agile factors that can be used to describe, analyse and understand culture, which in turn will help to implement agile methods successfully [Research question 2].

Objective 3: To synthesise a theoretical framework for implementing agile approaches in different cultures [Research question 2].

Objective 4: To provide an understanding of cross-cultural challenges seen when implementing agile methods in different cultures [Research question 1].

The outcome of this research programme contributed a theoretical framework that can be used in the future for understanding the cultural differences in different cultures such as Australia, India and the United Kingdom. The agile adoption framework in this thesis is an attempt to address the issues identified in Chapter One with regards to software project failure and global market. This will help the agile community in supporting the growing demand from organisations that want to adopt agile practices. This framework is independent of any particular agile method. Thus there are no restrictions in using any agile method or combination of methods or agile techniques in using this framework.

The achievements as part of this thesis can be divided into four parts:

1. Identify and study different agile techniques used in common agile methods and compare and contrast to provide help based on selection of appropriate agile method or combination of agile methods [Objective 1].
2. Provide a cultural understanding and suggest changes needed in implementing agile methods [Objective 2].
3. Gather details based on employees' view on cultural attributes for their specific culture to help design a theoretical framework for agile implementation [Objective 3].
4. Generate and provide a theoretical framework for different cultures to identify what cultural changes are required to implement agile and a study of inter cultural changes required in global market [Objective 4].

8.3.2 Practical Significance of the Research

Investigation on the implementation of agile methods in different cultures, and study of the associated inter cultural challenges, is the first study of its kind. Although there are general studies on agile method implementation, the issues and challenges in incorporating agile methods into different cultures has not been studied in the past. Therefore, this research contributes to the literature on the impact of culture on agile methods.

Firstly, with communication being reported as the biggest problem of software development teams, exacerbated with cross-cultural issues, this study provides an insight into an alternative approach to working with and across different cultures. With application, this research will assist in the management challenges in adopting agile methods in and across different cultures. The framework assists in promoting understanding of different cultures and cultural attributes that impact project group management. This will promote increased awareness of potentially detrimental situations.

Secondly, the research programme accessed a combination of cultures, namely Australia, India and the UK. There is little research literature that compares cultures and agile project team management. Whilst there are some research available on Australia and India, there was limited published research seen in these cultural combinations.

Thirdly, this theoretical framework describes the integration of two dimensions, namely agile techniques and cultural agile attributes, in relation to software project implementation. Understanding the cultural mindset that a team is working within is as important as managing the methodology used for projects. Thus, this research has encompassed these two major areas of the modern software industry.

Another important aspect of this research is the contribution of the research to agile techniques. The framework and research results provide a basis for practitioners to select and use techniques most suited to the needs of the project and project team. The collation of different techniques of agile methods will help practitioners to combine different agile techniques to cater for the needs of different projects.

While the research conclusions have contributed to the software engineering field, it is evident that there are many directions in which this research can be extended.

8.4 Conduct of the Research

This section covers the stages and steps involved in the research. Different stages of the research were shown in Chapter Five and the same figure is used again to discuss the stages, steps and outcomes in detail.

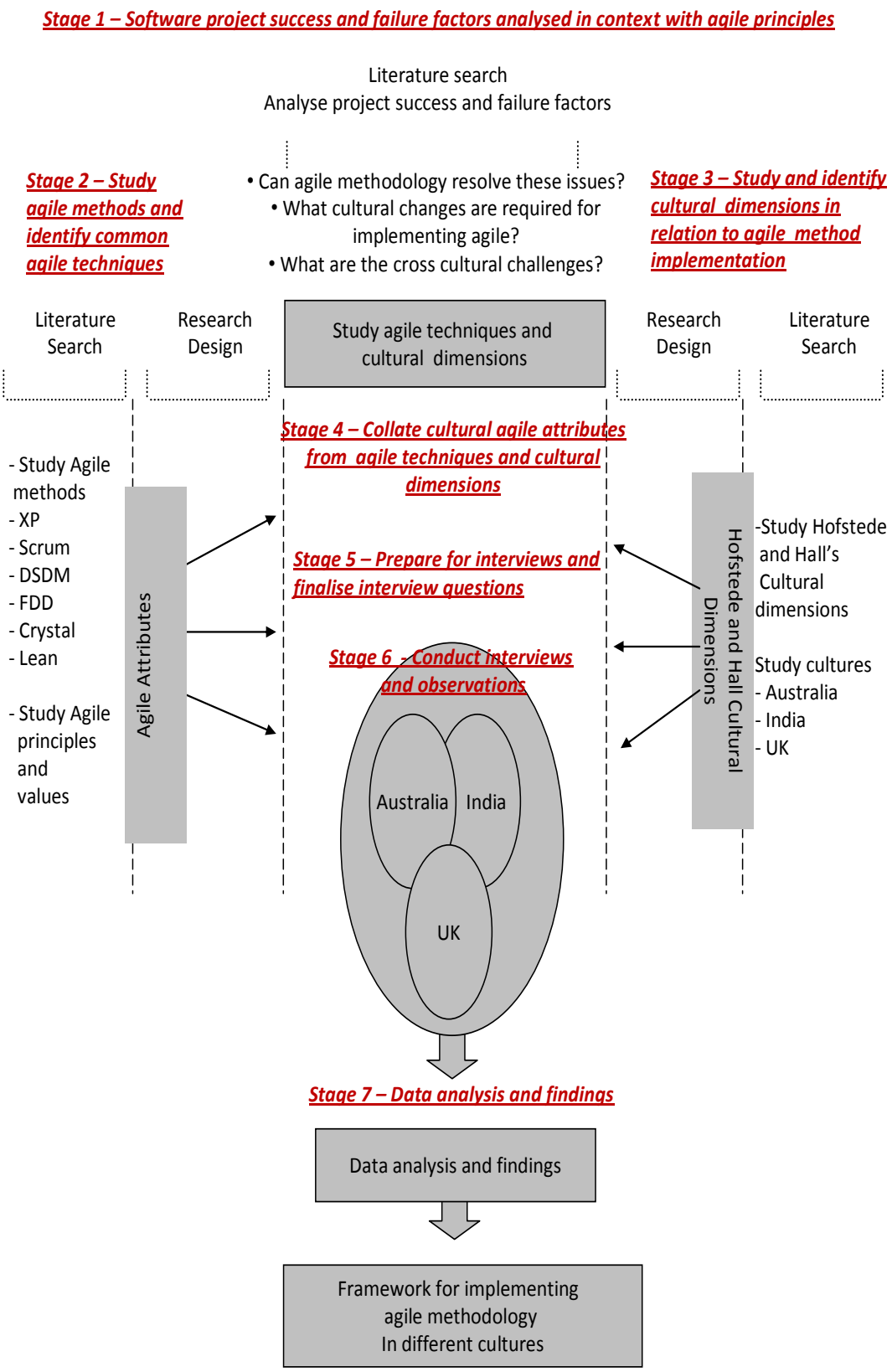

Figure 8-2: Stages in the research.

Table 8-1 maps the stages of figure 8-2 to the research outcomes.

Table 8-1: Stages and outcomes of research.

Agile principles [P] Agile techniques [T] Cultural dimensions [C]

Stages in the research	Steps	How?	Where?	Conclusion	Outcome
Stage 1 – Software project success and failure factors analysed in context with agile principles	Study current software project success and failure	Literature search	Chapter 2 – section 2.3.5		
	Study agile principles from the Agile Manifesto	Literature search	Chapter 2 – section 2.3.4		
	Analyse how agile principles can be used to overcome current project failure factors	Self analysis	Chapter 2 – section 2.3.5	Agile principles help resolve current software failure factors	**Agile principles [P]**
Stage 2 – Study agile methods and identify common agile techniques	Study agile methods and understand process, and attributes of each agile method	Literature search	Chapter 2 – section 2.4.2 and appendix		
	Consolidate and compile agile techniques for six commonly used agile methods	Self analysis	Chapter 2 – section 2.4.2 and appendix	There are common and specific agile techniques among the agile methods	**Agile techniques [T]**
Stage 3 – Study and identify cultural dimensions in relation to agile method implementation	Study cultural dimensions from different cultural authors	Literature search	Chapter 3 – section 3.3.2	There are many cultural dimensions from different authors	
	Justification and selection of cultural dimensions from different authors	Literature search and self analysis	Chapter 3 – section 3.3.3	Five cultural dimensions from Hofstede and Hall were selected	**Cultural dimensions suited for agile implementation selected [C]**
Stage 4 – Collate cultural agile attributes from agile techniques and cultural dimensions	Match agile techniques to relevant cultural dimensions	Self analysis	Chapter 3 – section 3.3.8	Each agile technique can be matched to one or more cultural dimension	
	Collate cultural agile attributes based on agile principles **[P]**, agile techniques **[T]** and cultural dimensions **[C]**	Self analysis and feedback from agile experts	Chapter 3 – section 3.5.1		**Cultural agile attributes collated and used as a basis for data collection**
	Match cultural agile attributes to cultural dimensions	Self analysis	Chapter 3 – section 3.5.1	All cultural agile attributes selected can be matched to a cultural dimensions	

Stage 5 - Prepare for interviews and finalise interview questions	Comparison and selection of suitable research method	Literature search and analysis	Chapter 4 – section 4.4.5 to 4.5.3	Case study -interviews was selected as appropriate data collection method	
	National culture selection	Self analysis	Chapter 5 – section 5.7.1	Australia, India and the UK were selected	
	Respondents selection based on specific criteria	Self analysis	Chapter 5 – section 5.7.2	Reasonable number of participants selected for interviews based on specific criteria	
	Finalise interview questions	Self analysis	Chapter 5 – section 5.7.4	Interview questions were compiled based on collated cultural agile attributes from stage 4	**Interview questions finalised based on cultural agile attributes**
Stage 6 – Conduct interviews and observation	Collated cultural agile attributes are briefly described	Self analysis	Chapter 6 – section 6.2.1		
	Interviews conducted in Australia, India and the UK	Self analysis	Chapter 6 – section 6.3.1 to 6.3.5	Data collected and transcribed into cultural dimensions and cultures Australia, India and the UK	**Data collected and transcribed**
Stage 7 – Data analysis and findings	Data Analysed and findings were tabulated and described	Self analysis	Chapter 7 – section 7.4.1.1 to 7.4.1.6	Cross-cultural challenges in adopting agile methods are discussed and reflected in a figure	**A theoretical framework to manage cross-cultural challenges across Australia, India and the UK software development teams working collaboratively to adopt and implement agile methodology *[RESEARCH QUESTION 1]***
		Self analysis	Chapter 7 – section 7.4.2	Cultural changes needed for cultures Australia, India and the UK compiled	**Specific cultural changes required in a software development team in Australia, India and the UK are identified to help implement successful agile methods *[RESEARCH QUESTION 2]***

8.5 Limitations of the Study

Despite the contributions of this study, a number of limitations are recognised. Many of these limitations represent opportunities for future research.

The data collection was in some cases limited to a specific location due to the difficulty in getting participation contacts. For example, in Australia most data collected were from Western Australia and in India, data were collected in Chennai, Bangalore, Hyderabad and Coimbatore. In the United Kingdom, data collection was conducted solely in London. Though the participants who were interviewed had worked in other cities in their specific culture, participants from other areas in a country may have provided different data. The researcher is convinced that the data collected demonstrated the evidence that attributes data collected reflected the culture. A cross reference was also made to the literature to verify this.

The multicultural nature of countries such as Australia and the United Kingdom could have created data discrepancies which were undetected. An assumption was made that, even if the participant originally belongs to a different culture, if the participant has lived in another culture for at least five years then the participant was considered to belong to the new culture. These are the complexities that exist in different cultures which have to be studied in natural setting. Thus the assumption of what is a homogeneous culture could be considered as a limitation. These differences may have been seen comparatively higher in Australia and the UK as there are more migrants when compared to India.

Another limitation might be the size of the organisation. Depending on the size of the organisation, the cultural agile attributes could be different. Thus separate studies for small, medium and large organisation may have resulted in different outcome.

8.6 A Critical Review of the Research Process

There are many difficulties and challenges in a research programme. Looking back at the study and critically self evaluating the process has revealed some ideas that could have been considered.

Although the interviews were organised and participants were engaged in casual settings, there were couple of interviews where the managers insisted on being

presented during the interview of the team member. Inclusion of management in interviews with staff participants may have had some influence, i.e., the presence of managers may have influenced the answers. But as an observation, due to this action a strong hierarchy was noted and recorded in field notes. An approval to have team members being interviewed without the presence of the managers could have been an option that would have helped avoid this situation. Surveys were not considered appropriate for this study programme, but in situations as described above, may be an additional survey form may have been useful in the data collection for triangulation of results.

As part of consolidating cultural agile attributes, agile experts were individually asked for feedback. Their comments were incorporated into the final list. Focus group or group discussion with a panel of agile experts may have resulted, a more in-depth list. This may have provided a richer list of cultural agile attributes. Focus groups also help to build up on other's ideas in the group. Delphi technique is also another option to have considered for this process. Delphi technique helps keep attention directly to the issue and to be able to gather broad range of ideas and views.

Some interview data gathering had to be done using note taking. For security reasons, some organisations in India refused to allow electronic equipment. Thus taking notes, asking questions and listening had to be done at the same time. This was challenging and during that process, some of the follow-up questions could have been unknowingly omitted.

8.7 Further Research Opportunities and Directions

While this research effort breaks new ground in verifying the link between agile adoption and cultural changes, there is still a need for more research in this area. Given the evidence and discussions provided in this thesis, there are several avenues open for future work.

1. *More attributes can be investigated:* In this study, the cultural agile attributes were collated based on a combination of culture and agile methods. These cultural agile attributes were validated by agile experts to confirm the list was comprehensive. There may be other attributes that can be included in future.

2. *More cultures can be investigated:* Cultures that were studied in this thesis were Australia, India and the United Kingdom. There are several cultures that can be added to this thesis to further validate the framework. Similar data collection techniques as this research or other relevant techniques could be used to collect data in other cultures keeping the cultural agile attributes as the foundation.

3. *Practical analysis:* This study provides a theoretical framework. Subsequent research could validate the framework in multiple cultures and in practice. Different cultures can be studied in detail based on the theoretical framework, and other methods such as action research and case studies can be used in different organisations.

Figure 8-3 shows some possible future research opportunities.

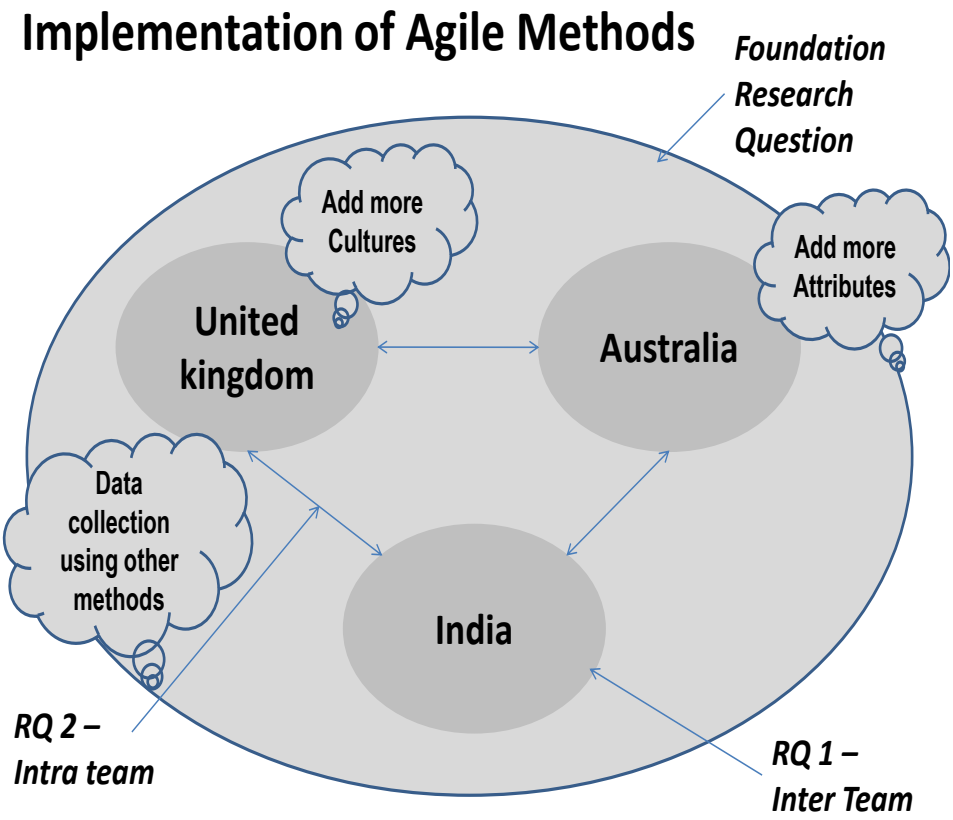

Figure 8-3: Future research opportunities

8.8 Conclusion

The literature has recognised the importance of managing the success of software development projects. Using agile methodologies is seen as a way that may result in improved project success. Cultural impacts and influences are also recognised and to be known a critical factor in successful projects. The growing need to work between cultures have also been identified as an important factor.

The aim of this research is to determine the extent to which agile methodology can be adopted within and among different cultures, to provide a framework to assist practitioners and researchers to work in global teams, and to understand and manage cross-cultural challenges. This research through investigation has summarised negative/positive influence of cultural agile attributes in implementing agile methods in different cultures and provided a theoretical framework to manage cross-cultural challenges.

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APPENDIX A

List of abbreviations and Glossary of Terminology used in the Thesis

List of abbreviations

AM	Agile Modelling
ASD	Adaptive Software Development
CASE	Computer Aided Software Engineering
CRIS	Comparative Review of Information Systems
DSDM	Dynamic Systems Development Method
ETHICS	Effective Technical and Human Implementation of Computer-based systems
FDD	Feature Driven Development
HCI	Human Computer Interaction
ICT	Information and Communication Technology
IDV	Individualism
ISO	International Standards Organisation
IE	Information Engineering
IS	Information Systems
IT	Information Technology
JSD	Jackson Systems Development
LD	Lean Development
LTO	Long time Orientation
MAI	Masculinity Index
MAS	Masculinity
MERISE	General-purpose modelling methodology in Information Systems
NICTA	National Information and Communication Technology Institute of Australia
OOA	Object Oriented Analysis
PDI	Power Distance Index
RAD	Rapid Application Development
SDLC	Software Development Life Cycle
SE	Software Engineering
SSADM	Structured Systems Analysis and Design
SSM	Soft Systems Methodology
STRADIS	Structured Analysis, Design and Implementation of Information Systems
UML	Unified Modelling Language
UAI	Uncertainty Avoidance Index
XP	eXtreme Programming
YSM	Yourdon Systems Method

Glossary of terminology

Term	Meaning
Agile methods (Light weight methods)	Method based on iterative and incremental development, where requirements are solutions that evolve through collaboration between self-organising, cross functional teams. Good examples of agile methods include eXtreme Programming, SCRUM, DSDM, FDD, Crystal, Lean etc.
Agile principles	Agile methods are developed based on some core principles defined by the Agile Manifesto and these are termed as agile principles
Agile techniques	Agile techniques are techniques that are specific to agile methods and are collated based on process and methods used in agile methods
Cultural agile attributes	A list of attributes that are used in this research program to identify common attributes that are cross referenced by agile techniques and cultural dimensions.
Monochronic	Monochronic cultures just do one thing at a time and they value certain orderliness
Pair programming	Pair programming is an agile technique where two developers work together side-by-side on one work station, one acting as the developer and the other as an observer. The two developers switch role frequently.
Polychronic	Polychronic cultures like to do multiple things at the same time
Refactoring	Improving design of existing code in smaller increments to improve functionality
Software development methodology	Software development methodology or systems development methodology in software engineering is a framework that is used to structure, plan, and control the process of developing information systems
System metaphor	This is a simple share story that explains how the system works and involves handful of classes and patterns that help the flow of the systems being developed.
Traditional methods (heavy weight methods, Plan driven methods, waterfall method)	A classically linear and sequential approach to software design and systems development.
Test driven development	Test-driven development is a technique which involves short development cycles with automated unit tests
User participation	Involvement of users including business and other stake holders to help develop the system

APPENDIX B

Data Collection - Notes

Culture Analysis – Australia

Individualism/collectivism in Australia

Ref	Cultural agile attributes	Coding	Comments
A1	Team Collaboration	Teamwork	We need to work together to successfully manage the projects In most cases we work together – but at times, we prefer to work independently to get things done
A1	Team collaboration	Group / culture awareness	Team's collaboration – it is almost like cultural relationships are formal. On personal level that is not enough for collaboration, on single team level commitment is good. We are fun loving and cheerful culture
A1	Management support	Commitment	Business stake holders need to contribute – need money and time and the main area is commitment from business and stake holders
A1	Open and honest communication	Openness	Most members in my team are open in discussing any issues. During meetings we discuss issues openly and try to resolve them
A1	Self organising Team	People Oriented	But I can't see someone trying to go out of the way to resolve someone else's problem
A1	Dedicated Team	Work life balance	We are trying to give a balance to work/life. We have policies in place to cover immediate family requirements

A2	Team Collaboration	Teamwork	Job sharing and helping each other is also not seen very well We don't tend to help someone else's problem; we focus more on our own problem.
A2	Team Collaboration	Group/culture awareness	Cultural relationships are really formal and help is offered only if asked
A2	Management support	Commitment	... No one was taking responsibility....
A2	Open and honest communication	Openness	Where there is an issue we openly discuss the issue to find who needs to do what, most members talk openly to find the area of fault and fix it.
A2	Self organising Team	Self organising	... Team that gelled together; self organised – wasn't too much red tape – easy to see all – visible, good structure...
A3	Team Collaboration	Teamwork	Teams are really important, if someone has got a problem, share with the team, someone can help. Sometimes the act of explaining it to someone actually helps them to solve their own problem
A3	Team Collaboration	Group/culture awareness	Coordination among teams is not very strong in Australia, there is a tendency for members to work in isolation, this is improving specially in industry...
A3	Open and honest communication	Openness	Team members are able to openly argue issues that have conflicts in meetings and discuss in a positive manner, By nature Australians have the tendency to keep things open and honest, and very rarely try to hide any issues

A3	Self organising team	Self organising	We have a good bunch of self disciplined team members who can work independently and cooperatively
A4	Team Collaboration	Teamwork	Importing people from other states and other countries, this creates team issues
A4	Team Collaboration	Group/culture awareness	Heterogeneous culture sometimes makes it harder when working together, an understanding of how things work with different people is important.
A4	Team Collaboration	Group / culture awareness	It doesn't bother me where they come from provided they can do their job
A5	Team Collaboration	Teamwork	Interacting with higher management and stakeholders and working together with team members is an area that Australia could focus more on working together. I have seen a lot of working together here, but I believe there is more space for improvement. Our culture is very independent.
A5	Team collaboration	Group culture awareness	We need t recognise the weaknesses and be aware and working on the strengths rather than weaknesses. We try hard to work together, but as we are all more an independent person, our attitude and culture to adjust and cope with others is very limited.
A5	Open and honest communication	Openness	In some situations we tend to be open and in some cases we cover up the situation to get out of issues. But most times we are very open and discuss issues openly
A5	Self	People	You cant always drag them – you can educate

	organisingTeam	oriented	them – but they have to keep up-to date
A5	Dedicated Team	Commitment	Commitment and collaboration – not sure if Australia has an ideal solution
A6	Team Collaboration	Teamwork	Teams rarely gel together, because of heterogeneous culture the team try their best to work together but sometimes they don't work that well
A6	Management support	Management support	Stakeholders are kept well informed
A6	Open and honest communication	Openness	What I like to say – I can't always say – I need to know the organisation culture first before I start working. What you say and what is doable is also important
A6	Self organising Team	Self organising team	With team, they are well advanced as well and can manage tasks and are capable of organising themselves
A6	Dedicated Team	Commitment	Collaborative cooperative team is very critical to all projects and I think Australia could do better in that
A7	Team Collaboration	Teamwork	Probably not to that extend. We get contractors and to expect that from contractors is not possible. I think that's in the culture we do work for the team – but wouldn't go to the extent that they jump in to take responsibility. When someone is sick – going to help them – I don't think that works here.
A7	Team Collaboration	Group / culture awareness	[Pair programming] It is not a culture suppose – haven't thought about – probably depends on team and practice – if someone is so caught up with code and another dealing with that may

			be not a good way to work. It does happen – lead programmers guide the developer. Swapping not sure. Probably up to the individuals
A7	Management support	Management support	More management support and collaboration and involvement with higher business is needed
A7	Dedicated Team	Commitment	On single team level commitment is really good, but involvement is not 100% there, processes in place restricts from doing things effectively and collaboratively Team dynamics – not to that extent, I think we can improve more on dedication
A8	Management support	Commitment	... but it is not that – it is planning and commitment. We tend to lose on commitment sometimes
A8	Open and honest communication	Openness	The team trusted the Project Manager and stakeholders were not happy that the issue was not raised before. In this situation things were not discussed openly, and honest communication was lacking.
A10	Team Collaboration	Teamwork	Good communication between project manager and team and quality culture
A10	Team Collaboration	Group/culture awareness	Communication and collaboration is a hard one – we need to start to learn – how to work together and have the same goal
A11	Team Collaboration	Teamwork	We see people who don't plan properly and this actually affects the whole team
A11	Team	Group / culture	[Pair programming] The skills levels between 2 developers may be different. I personally

	Collaboration	awareness	wouldn't have a problem, but with the staff that I have worked with in different places – there could be some conflicts. The culture is you just do and continue carrying on with your work.
A11	Dedicated Team	Commitment	In government, commitment and coordination can be improved
A12	Negotiation	Negotiation	There are also technical people who don't like to liaise with other business areas, they have personality clashes
A12	Team Collaboration	Group/culture awareness	I haven't had any problems or issues with different culture, India, Hong Kong, British, New Zealand, Malaysia etc. These people have been selected very well to work well with the culture. But awareness of this needs to be there
A12	Open and honest Communication	Openness	We should be able to work well with others, openly discuss and help each other in progressing towards the same goal, but though we openly discuss, we don't work well together
A14	Collective Ownership	Collective ownership	Taking ownership is seen quiet often...diversity is important – should be able to communicate so that team members openly discuss and resolve based on collective work and take ownership and responsibility
A17	Team Collaboration	Teamwork	Working together [pair programming] – not sure how productive that will be – in one workstation – not sure sharing will work well. Doesn't seem like it will look like a good environment for working – may be could not get along well – not productive

A17	Team collaboration	Group / culture awareness	People get along very well – lot of our staff are contractors – all are happy – feedback from contractors tell they enjoy working here – there is no us and them – everyone's opinion are valued – regular communication - reporting
A18	Team Collaboration	Teamwork	The main area for project success is the team work. Even if you don't have skilled team, if the team can work together, then project can reach success. We work well in a team, but don't communicate among the teams to get the project going in a high level. Things that happens outside their life will also have an effect on the project as it can have emotional influence and attitude changes
A18	Team Collaboration	Group/culture awareness	It is beneficial to have team who are like minded – it is a good and healthy thing to have diverse culture provided it is managed well, I have seen that communication and working with each other doesn't always work very well Asians have different way of working – it can be easily done – but this organization took a while to get through it. It is beneficial to have team who are like minded – it's a good healthy thing to have diverse culture provided it is managed well. Open and challenging – respect others views – holistic view – personal ownership should be there – they made a difference and they were part of the change -
A18	Dedicated Team	Commitment	Lots of work needed in areas such as working together and team dynamics and commitment – people management – or else we will see

			overhead increases
A19	Management support	Management support	Biggest factor is artificial pressure from management to get business case
A19	Dedicated team	Commitment	All of these issues can only be managed if the team has commitment. Team members in general do their part of the job, but to work based on a dedicated team; I think we have to work differently. The only way this is going to work is by working as a team in a dedicated fashion.
A20	Team Collaboration	Teamwork	Personal characteristics – their background – I do think that people and their ability to communicate with each other makes a lot of difference in success of a project and this is an area that we have to focus a bit more. I asked them what solution do you recommend and they keep looking at me because it was my job to provide the solution – manager decides – then we had a chat – this is Australia – I need you to work differently – and I will help u to work differently – I don't have time to arrive at an outcome – I will question you why you came with this outcome – but I will trust you to make the decision of the solution – having convinced me. I will backup you. Lets work and it did work well soon.
A20	Open and honest communication	Openness	Constructive type culture – work together – happy to openly discuss No such thing as a bad idea – be open to suggestions – should not feel suppressed

A21	Management support	Management support	Lack of involvement of business – inability to estimate – scope changes – don't plan our projects very well – not managing expectations – [it's the approach that is making this happen]
A22	Team Collaboration	Teamwork	I like to drink beer – and find some times similar hobbies and that will help work very well. Pub – potential getting together. Restaurants may be chosen not allowing vegetarians – can create a rift. Team management is the biggest task in managing projects. Teams in Australia like to work in isolation and like their personal space. We need to start working in pairs and learn to work in a collective manner We should introduce and increase stand-up meeting at least for 5 minutes to get the communication going. PRINCE2 also speaks about this. You may have a concept and it will be quicker to just discuss in very small group meeting to finalise progress and solution, small things can also be sorted out
A22	Team Collaboration	Group/culture awareness	2 Developers working together as pair programming will be very difficult as one will be interested in one area and the other in another area. Keeping both focused – I think it will be very difficult. Getting along well - also to progress in the same pace will also be difficult. You read a book in your own pace – that gives you enjoyment. I don't think I would like to go on someone else's speed – their view etc.
A23	Team	Group /	They were learning together – to gain

	Collaboration	culture awareness	confidence. In that area it is a bonus, other areas – I am not totally sure – some are skill based – really good analyst – you don't want to change them to do something else.
A23	Open and honest communication	Openness	I have seen it working in some areas – other areas I am not totally sure – small projects and if you can afford to do this then experience will be gained, sharing ideas, code review etc. I am not sure if it will work in big projects
A23	Dedicated team	Commitment	Also what is exactly required – too loose requirements, what exactly do you need, - there is methodologies, we all say we follow methodologies – it is definitely the culture. I know people from Europe – how they deliver, how it can be well managed. Multi-cultural – mixing of ideas – in italy – they have similar culture – quality is followed. Quality is not a very big thing in Australia.
A25	Team collaboration	Teamwork	I haven't personally have any problems with range of different culture people – those people who have come have been selected very carefully and selected very carefully – to suit Australian ways – highly skilled and professional attitudes. Extravert – train people to be open and expected and encouraged to speak up in meetings – not too much – this can work negative – very strong opinion – will also spoil the team Team dynamics – able to listen all of the ideas

			and acknowledge –
A25	Open and honest communication	Openness	Developers only – they are not making any decisions or critical tasks – they are not like the project leads. But I could understand that that could be a big issue.
A26	Team Collaboration	Teamwork	Team – only focusing on their own work and not understanding the bigger picture Understanding and adopting the methodology – ensuring that project manager and team understand well. Some of the team members are only interested in their area of work, not interested in a bigger picture, they just like to work independently
A27	Team Collaboration	Teamwork	We do communicate with other areas but then the information doesn't get filled out below when management makes decision
A27	Team Collaboration	Hand holding	If there is a problem with another team member, the need to go and help him/her out is not expected. Paternal/maternal nature is not seen here, each one is expected to resolve their own issues
A27	Open and honest communication	Openness	Outspoken, not shy to say their view - open
A27	Management support	Management support	overall picture is not very clear – they work on their little area – bit isolated – we do communicate with our group and manager – then the information doesn't get filled out below when management make decision
A28	Team	Teamwork	The resources are working independently to

	collaboration		achieve this goal, but as a team we need to work better to achieve success.
A28	Self organising team	Self organising	Project team fundamentally needs to be right, development methodology should be clearly known, PM methodology, governance, should be right. Teams in general are self organizing and are able to sort out issues among themselves. They discuss and manage project in a self managed way.
A28	Dedicated team	Commitment	The commitment level in projects are alright, we try to finish things fast and move on, but the nature of the projects are such that full commitment and planning are very important which is not seen very well here.

Power distance Index in Australia

A1	Trust people more than process	Trust and respect	Trust – blame sharing – respectful – and trusting people's judgement is generally seen and experienced. Their work is trusted and their decision is respected
A1	Decision making	Quick Decision making	Quick decision making – proactive thinking and making good decisions (in their own allowable area) is seen quiet often.
A1	Decision making	Able to make decision	Open and making right and honest decision is clearly seen most areas
A1	Blame sharing	Taking responsibility	Involvement is really not there 100% needs more improvement. People are hardworking, but the processes in place restricts taking responsibility
A1	Transparency	Transparency	From IT perspective – in higher level it is not

			very clear and not very visible, but at the lower level it is visible and transparent. In high level it's not there yet – but daily business need – it is there
A2	Decision making	Able to make decision	... the decision is made by the board who sometimes don't know to make the right decision.
A2	Authoritative	Hierarchy	Some projects have too much red tape – but in most cases the hierarchy doesn't affect daily tasks and routine. But in some cases the loud person gets his project approved.
A2	Authoritative	Escalation	We follow methods and steps to escalate any project issues. Processes are in place for escalation
A2	Transparency	Transparency	At the high level transparency is not very clear. When priority changes, board decisions are made there is no transparency
A3	Authoritative	Escalation	Quiet often we are unable to manage well. But in most cases, we escalate and raise issues to management. Sometimes it is too late and not been escalated at the right time and sometimes at the right level
A3	Blame sharing	Taking responsibility	This issue was resolved by discussing and analysing business, and mainly due to different groups taking responsibility to cover their areas of responsibility. But in general, we need to start taking responsibility to what we do.
A3	Transparency	Transparency	Engagement of the team in communication helps the project; in general teams expect that they have been told all information without anything being hidden.
A4	Decision	Quick	It is seen most times that decision making are

	Making	decision making	always delayed and takes a very long time. Making quick decisions are not seen very often, especially with higher management.
A4	Blame sharing	Taking responsibility	These regular issues gets enhanced due to the fact that team members and project managers don't take responsibility
A4	Transparency	Transparency	Managers don't understand the details of estimates – before they speak to business, they should speak to others who actually do the work to get the real information. People on the ground do the work
A5	Trust people more than process	Trust and respect	Give them the responsibility and the PM has enough authority / responsibility will make the project operate well. In most cases the Project Manager allows the team to handle situations and manage project tasks with trust in others.
A5	Decision making	Able to make decision	Making correct decision at the correct level is also an issue when managing projects, proper governance - access to the right people at the right time is important
A5	Authoritative	Hierarchy	Right people at the right level making the decision – was also an issue for this project.
A5	Blame sharing / taking responsibility	Taking responsibility	All of these issues force us to take responsibilities. But by nature we tend to point fingers at others to pass the responsibility to others.
A6	Authoritative	Hierarchy	In government you don't argue with your boss, but you are still obliged and expected to raise your views and provide your comments to make things happen better. In university culture while it

			is quiet ok to challenge – many cases senior management are cowards to do anything.
A7	Trust people more than process	Trust and respect	Trust is certainly there... lot of it is based on the confidence of the developers. Australian culture expectation is that the developers are expected to pull their knowledge into practice, I very much trust them to follow – procedure and help continue the project well/better, this is pretty common and how it works
A8	Decision making	Quick decision making	Appropriate influence and decision making is lacking in some areas and in some projects, be upfront about what you can do and how much will it cost
A8	Authoritative	Escalation	No surprises attitude – fully aware of issues and escalate them early – non experienced project managers will take all in their shoulders – don't tell others is the problem. Things will happen that will be out of control – Project Manager should identify that one can fix and escalate. Share the problem and put the problem where it belongs.
A8	Transparency	Transparency	Estimation – go off the rails – is because they have not spent much time at upfront Commit to what you can – be upfront about what you can do and how much will it cost – phase it out rather than a big project – generally we speak out openly to communicate the real situation
A9	Trust people more than process	Trust and respect	When they say this is not what I asked for – it is a matter of trust and – we should get requirements signed off – so that we have some guarantee to confirm the requirements.

A10	Trust people more than process	Trust and respect	... motivate the team, you never get the best team, but you need to get enough from them....
A10	Authoritative	Escalation	Mitigate issues at high level at the right time Quiet often the issues are not escalated – unless the Project manager thinks it is needed – all in good intension though
A11	Trust people more than process	Trust and respect	Yes indeed this is seen in this culture. They are confident and most times get support for their decisions. Trust is very important and always expected from all. People should feel really free – to make the right decision and management should agree and accept the work decision.
A11	Transparency	Transparency	When business changes in the requirements – most times they inform the developers and those sort of transparency are there.
A12	Blame sharing / taking responsibility	Taking responsibility	Project sponsors could have helped us a lot if they knew their responsibilities. We thought they knew – we did presentations to sponsors and stakeholders and in more than 1 occasion – but unfortunately none of them kept it in their mind. Passing the responsibility to avoid problems are commonly seen here, 'relaxed working culture' is seen and managers pass on the responsibilities to others
A14	Authoritative	Escalation	In both cases the issue was not escalated to the right level at the right time.
A17	Decision making	Able to make decision	Approval process is very important, decision has to be made in the right level by the right

			person....some guidance can be given but the final decision is made by the manager, some time there is also a control board who make the decisions
A17	Transparency	Transparency	Transparency is not seen in all areas, sometimes at the lower level, 'yes' transparency is seen – but at higher level 'No'
A18	Decision making	Able o make decisions	...decision making becomes harder as there are lots of unknown. Decisions are made by management and they don't understand what is being done at the lower level.
A18	Authoritative	Escalation	Sometimes we have to be open and tell the board that we haven't spent enough time in this phase and – people have not spent enough time dedicated. Sometimes people should be able to be open and honest and escalate the state of the project without hiding. ...and they should not have any fear when they communicate the bad news.
A20	Trust people more than process	Trust and respect	Australian culture is we are all equal and we all have individual capabilities – and help maximize the talent in each – and help the organization grow.
A20	Decision making	Able to make decision	It is also seen that it is your job and you made the decision what you think is right, information is not required to be shared unless it is really required.
A20	Authoritative	Hierarchy	[Hierarchical issues are subtle – and are seen when growing to higher level – L8 and his manager – PhD English – commenting sarcastic.] The methodology gives us a framework to do this – but pressure from above stops it – we get

			pressure from management and business to finish project on time and sometimes we have to take short cuts so that we don't get blamed from above
A20	Blame sharing / taking responsibility	Taking responsibility	"We couldn't do it right but we could continue to deliver wrong repeatedly" That is an accurate reflection of what tends to happen.
A20	Transparency	Transparency	Australian culture is we are all equal and we all have individual capabilities – and help maximize the talent in each – and help the organization grow.
A21	Trust people more than process / Empowered	Hierarchy Empowered	Working with systems analyst from Philippines which had a strong diversity – while presenting alternatives I asked them what solution do you recommend and they keep looking at me because it was my job to provide the solution – manager decides – then I had a chat – this is Australia – I need you to work differently – and I will help you to work differently – I don't have time to arrive at an outcome – I will question you why you came with this outcome – but I will trust you to make the decision of the solution. I will back you up
A21	Transparency	Transparency	To have everybody involved and even to acknowledge is not seen much nowadays
A22	Trust people more than process	Trust and respect	It is also seen that most times we do things just for formality reasons. It is also seen that it is your job and you made the best decision that you think is right which is right on that day. In government – make decision – inform everybody – get their feedback. Very much need to know basis – not information is shared unless it is needed –

			specially at the highest level
A22	Decision making	Quick decision making	We are considered pretty slack – always slow – can get things done tomorrow attitude – weekend – no decision will be made. 5 o'clock sharp – sort of a model is what expected and work-life balance is. Do if you can – if not leave it to the next day. If someone rings at 4:55 – that will not to be done. It is changing – particularly in the management areas – less and less time spent with the families.
A23	Decision making	Able to make decision	Ya – this is allowed and seen throughout agency – in your capacity. Team are capable of making decisions – but the pyramid type of culture – difficult. In government – I tend to make some one else make the decision. Culture is to make their own decision – but the structure sometimes stops them. I trust your expertise. Manager also discusses or asks for the team to provide inputs – people are also questioning why we did that – how and what? The final decision is manager's
A25	Blame sharing / taking responsibility	Taking responsibility	Project manager not being responsible, the attitude to pass on responsibilities are seen
A29	Trust people more than process	Trust and respect	To trust others to do their work, not personally involved. They respect their views and discuss openly.
A29	Decision making	Quick decision making	… they almost went to see what was the best product, and didn't consult the relevant people; consequently - project failed, the other factor was it was done largely in isolation,…. Decisions

			were made without consulting the relevant staff.

Uncertainty Avoidance Index in Australia

A1	Risk taking	Risk taking	People are ready to take risk, there are some motherhood sort of people as well, but in general many actually take risks and try out new things
A1	Tolerance for change	Unstructured situation	We normally work well to situations where things gets changed all the time
A1	Tolerance for change	Tolerance for change	Planning has become very critical and it is a business thing. It has to come from high from the business area
A1	Innovation	Innovation	I think people are quite ready to take on change and ready to accept it
A2	Risk taking	Risk taking	Team members don't like to take risk unnecessarily. In general, many like to take risks and try out new things, but in software development community, this is not seen much
A2	Tolerance for change	Tolerance for change	I think people are quite ready to take on change – and ready to accept it. On the whole people themselves are quiet happy to take on change. Business changes all the time and IT is not ready or capable of managing the change. But the acceptance of changes is clearly seen in most areas.
A2	Proactive	Proactive	Most team members like to plan ahead and deal before issues happen, but sometimes we tend to keep things in a relaxed way to deal when it happens.

A3	Tolerance for change	Tolerance for change	We understand that change is normal and is part of software development team When project is in a critical situation, and almost towards the end, we have had times when some major change is expected due to government reform, tax changes etc. We understand that this is normal and change is part of software development team.
A3	Innovation	Innovation	We in Australia are very innovative. We try to do new things and the only time we don't is due to funding
A3	Proactive	Proactive	Most of us here are proactive, but when it comes to projects, we tend to not be proactive
A4	Risk Taking	Risk taking	To a certain extend if the team members are skilled, then the risk can be reduced. Sometimes you have fresh graduates allocated to project. So the estimates change and the risks is more
A4	Tolerance for change	Tolerance for change	Most tasks involves wanting someone else to do something before someone else starts the next task. There are times that things can go wrong and have to manage this We accept the fact that change is normal and that projects have to go on, and plans have to be changed.
A4	Proactive	Proactive	In most of the situations, we act proactively to situations. When situations change, we rarely get panicky, as a group we have been able to change our minds and think proactively
A5	Risk taking	Risk taking	We rarely take risks, we like to do tasks in an organised manner

A5	Tolerance for change	Unstructured situation	In most cases, we like to have an organised way of projects. When there are unstructured situations, we tend not to cope well
A5	Proactive	Proactive	We normally plan ahead and think ahead
A6	Risk taking	Risk taking	I think in Australian culture, we rarely take risks, we prefer to plan well in advance and also make sure the best team suited is allocated to the project. All needed choices for a project are made well in advance to make sure the projects run smoothly
A6	Tolerance for change	Tolerance for change	That's the argument for not planning. Although you can't be certain of what/how the projects are going to be but you can have a fair idea and atleast plan for the worst case scenario and then you are now capable of managing the worst case.
A7	Risk taking	Risk taking	Taking risk is not common but, it is the culture to try new things and if something goes wrong, it is accepted that – it is ok I do see it – I also see that they have to prove it. That has happened – direction has been there and took forward with new technology, prototyping and showing to get consent. It is part of the culture to take risk and do things innovatively
A7	Innovation	Innovation	Across the board I will say yes – but my personal experience has not always worked that way. Now there are tools that they can play with. It is the culture within the profession to try new things.
A8	Tolerance for change	Tolerance for change	'No surprises' – it is expected that the team is fully aware of the issues and escalate them

			early.This is the culture to be open and honest, you will need to share the problem and put the problem where it belongs
A9	Risk taking	Risk taking	In most situations, we don't like to take risks as we like planning ahead
A9	Tolerance for change	Reacting to change	When things change unexpectedly, we normally manage well, but in some situations we do find hard when change occurs
A9	Innovation	Innovation	We like trying innovative tasks.
A10	Tolerance for change	Tolerance for change	With project steps, we prefer to go ahead with planned schedule. But when things do gets changed, we don't mind having an alternate optional plan.
A10	Innovation	Innovation	Yah I think we are mostly very innovative... we like trying out new things
A11	Risk taking	Risk taking Innovation	Risk taking –Yes, risk managing is part of the project management and meeting the deadlines and the other aspect. Australians like to take risk and they also like to come up with new ideas
A11	Innovation	Innovation	Sometimes you need to push people to something new, [15 minutes standup meeting] sometimes there is also physical animosity – sometimes good chat near the coffee area helps solve big issue.
A12	Risk taking	Risk taking	We don't take much risk at work. At home, Australians do take risks and like to be sportive. But when it comes to work, we are more conservative and like to try planned steps
A12	Tolerance for change	Tolerance for change	At work, we don't like surprises. When it comes to change, though we know change is common, I

			don't think we manage well.
A13	Risk taking	Risk taking	When in projects, we don't like to take too many risks, we prefer to plan ahead and follow the schedule. Sometimes if change is required then, we plan ahead with options
A13	Tolerance for change	Unstructured situation	We like to know what's happening ahead. We don't like surprises
A14	Innovation	Innovation	We do take and look at innovative ideas to make the operational work successful. When in IT, we will need to try new innovative tasks, and this is part of the IT industry.
A14	Proactive	Proactive	We are expected to work proactive. IT industry changes all the time and the competitiveness is very strong. We are required to act proactive and take initiatives to be in the lead
A17	Risk taking	Risk taking	Risk taking – generally not practiced
A17	Innovation	Innovation	Innovative – yes that is in here – they don't mind trying new things Proactive thinking – That exists here – always trying to get new things done
A18	Risk taking	Risk taking	When it comes to projects at work, our tendency to take too many risks is avoided. We keep a risk log to make sure we manage our risks well. We don't like taking risks
A18	Tolerance for change	Tolerance for change	When during the project, some change is required and it has affected the schedule and cost, then these are managed in an organised manner to make sure the project doesn't have any huge

			impact
A18	Proactive	Proactive	We work very hard to plan things ahead. We are more of a proactive culture rather than a reactive culture
A19	Tolerance for change	Unstructured situation	When a situation is not planned and things are done in random, this is something we don't like – we tend to keep things simple and try and be open and structured when it comes to work situations
A19	Innovation	Innovation	We normally tend to try out new things... in IT this is a common practice anyway
A20	Risk taking	Risk taking	We don't take much risk when it comes to work
A20	Tolerance for change	Tolerance for change	We prefer situations to be planned and organised. When things gets changed, it is generally not acceptable
A20	Innovation	Innovation	We are more of a innovative bunch in our culture. We don't mind trying new innovative tasks
A20	Proactive	Proactive	We also like to keep steps organised for a project.
A21	Tolerance for change	Tolerance for change	There is nothing wrong – in finding something new during the duration of the project – it's ok to have cost overrun and time schedule changing is ok. You spend ½ a million dollars and why do you want to give something that is not current? Recognise that things are always changing and do a managed/controlled change.
A22	Risk taking	Risk taking	Taking control – Making right decision – taking risks – not an Australian thing.
A22	Tolerance for change	Unstructured situation	We are very comfortable with situations that always changes. We accept the fact that in reality

			we can't always plan ahead. When situations changes, we need to work around it
A23	Tolerance for change	Reacting to change	Americans are very good at deadline – Australia is slow – specially government, Europeans deliver – they are focused and time conscious – we are more relaxed and don't plan ahead very well – Quality is not a very big thing in Australia.
A23	Risk taking	Risk taking	We tend to not taking risk. Just go with bleeding edge if we have to – but not trying to take risks.
A23	Innovation	Innovation	Yes in the culture – but due to costs we don't
A25	Tolerance for change	Tolerance for change	We don't like change
A26	Tolerance for change	Reacting to change	We try to keep things aside and like to take life easy. But when something goes wrong, we should be able to act fast. Due to the fact that we are a very relaxed culture, we tend to keep things to 'whenever time suits' attitude
A27	Tolerance for change	Unstructured situation	We are normally very comfortable with late changes. We do have good processes in place. But the fact that software requirements always changes and accept changes even at the end of a life cycle is something that we will all accept and work accordingly.
A28	Risk taking	Risk taking	Taking risk is not seen at work environment, we tend to be organised and structured in the process
A28	Innovation	Innovation	But we like taking innovative actions, we prefer to try new ideas
A29	Tolerance	Unstructured	When it comes to work environment, we like

	for change	situation	situations to be well planned and structured so that if anything goes wrong, we can manage the projects effectively
A29	Innovation	Innovation	Most areas we are very innovative

Time in Australia

A1	Time keeping	Timeliness / promptness	Most times we try to commit ourselves to the time and we always deliver on time
A1	Time keeping	Focused	I have seen team members very focused during meetings, and when allocated a task
A2	Time keeping	Focused	We are very focused and when we are at meetings we rarely attend to phone calls.
A2	Time keeping	Prioritisation	Though we are not perfect with regards to prioritisation, as part of the culture we are expected to follow and keep the prioritisation
A2	Time keeping	Breaks and personal time	We also like to take breaks and work in a relaxed atmosphere. We do take project deadlines seriously but also believe to work with regular breaks
A3	Time keeping	Timeliness - Promptness	When a deadline is given, we try our best to finish on time. If not during regular meetings, these will be discussed well in advance to make sure all stakeholders know the status
A3	Time keeping	Prioritisation	In most cases, we are able to handle multiple tasks, we still fail to gather requirements and prioritise and manage tasks well
A4	Time keeping	Prioritisation	Trying to get things on time, competing with resources etc have been the hardest.

A4	Time keeping	Breaks and personal time	Though we have small intervals for personal break times, we cover them with extra work during the day
A5	Time keeping	Separation of work / personal	As part of the culture we have a clear separation between work and personal life
A6	Time keeping	Timeliness / promptness	Meetings are mostly on time, and if attendees are unable to make it they inform well in advance and all who attend will be there on time
A7	Time keeping	Prioritisation	Prioritised work gets allocated to team members. Based on estimations, the tasks are assessed to make sure that there is enough time. Then based on priority it is allocated to team members
A9	Time keeping	Timeliness / promptness	Most meetings start and finish on time
A10	Time keeping	Prioritisation	Work normally gets prioritised and we only commit to what we can do.
A11	Time keeping	Focused	Most team members are committed and focused to the work.
A11	Time keeping	Breaks and personal time	The tendency to take frequent breaks are seen – but very rarely this becomes an issue as the work always gets done
A12	Time keeping	Timeliness / promptness	I can't comment on that – the people who I have worked with they are on time for meeting and to deliver, but they don't make decision
A13	Time keeping	Breaks and personal time	We are able to manage our times ourselves. If in case we need some urgent work for the family, then we work less on that day and work extra hard the other day to catch-up with work.

A14	Time keeping	Separation of work / personal	Family importance is always seen here. We make sure work life and family life are separate and the balance is managed pretty well
A20	Time keeping	Timeliness / promptness	We are a lot more disciplined now a days and also justify better. Requirements – time has been a great factor spending time – or could not have a competitive advantage – always under pressure in a short time frame.
A20	Time keeping	Breaks and personal time	Things that happening other than that happens outside their life will also have an effect on the project – attitudinal changes

Context - Communication pattern in Australia

A1	Meeting deadlines and expectations	Easy going	When tasks not allocated and no deadline then we are sometimes easy going and relaxed
A1	Outspoken	Outspoken	In most cases we negotiate very well with business – we communicate openly and manage conflicts pretty well
A1	Negotiations	Negotiations	Negotiation – without collaboration the negotiation is difficult – should be more – involvement of stakeholders, business, plan, awareness, and technical link. Conflict resolution – there are processes in place to solve issues quick. People in general have the habit of talking it out and resolving issues immediately

A1	Proactive	Proactive	I am not sure if we can call ourselves as a proactive culture. We do like to think ahead but sometimes, as we are laid back, we tend to not act fast
A2	Meeting deadlines and expectations	Easy going	Oh Yah, that's a good representation of our culture.
A2	Transparency	Outspoken	Management had confidence in the project team as the team are able to manage their time and prioritise and communicate these to the business efficiently. They are outspoken and any project related issues are openly discussed and managed
A2	Negotiations	Negotiations	Communication strategy cannot be claimed as the best in Australia. But we are good at negotiations. When we need to liaise with business and user community normally we are able to work together and negotiate final project decisions
A3	Meeting deadlines and expectations	Easy going	Team also love to take things easy – this has sometimes worked out ok, as there is no stress level, but the relaxed mentality has also had negative impact on projects
A3	Transparency	Outspoken	Engagement of the team in communication helps the project, in general teams expect that they have been told all information without anything being hidden
A3	Negotiation	Emotional	When we are amidst project, we tend to follow the rules and makes sure things are done on time and schedule. If in case a decision needs to be made, then as a team the decision making takes place. As part of the culture very rarely emotional

			decisions are made. The managers also tend to listed to their heads rather than heart.
A4	Meeting deadlines and expectations	Easy going	You have to be easy going with team members to get much more from them, you cant be too rigid with people you are dealing with, If you are fairly easy going, then you get much more.
A4	Negotiation	Emotional	We don't take much emotional decisions.
A4	Proactive	Proactive	In most of the situations, we act proactively to situations. When situations change, we rarely get panicky, as a group we have been able to change our minds and think proactively.
A5	Meeting deadlines and expectations	Easy going	The Australian culture is such that we like to take life easy. Though we like having commitment and quick results, when it comes to real life situations, we tend to push back and make sure life is not too stressed out
A5	Transparency	Outspoken	Not all projects have good communication strategy, a flow of communication through the hierarchy should be managed better. But in case of a need to resolve issues, most members discuss openly rather than back biting
A5	Negotiation	Negotiation	We don't involve ourselves with too many negotiations, if something needs to be done, then it is expected to be done.
A6	Meeting deadlines and expectations	False promises	Sometimes people are making false promises – sometimes they really want to do it, but find it hard as planning or communication failure has stopped them from providing
A6	Meeting deadlines	Easy going	Very relaxed culture, no pressure attitude, take things as it happens sort of culture/nature...

	and expectations		
A6	Proactive	Proactive	We have a proactive – culture. We tend to pre-plan and organise ourselves pretty well ahead of the need. We also like team members to see outside the box
A7	Transparency	Outspoken	You would expect the people to be completely transparent and let others know, in most cases the members are outspoken and communicate in such a way that things are discussed openly
A7	Proactive	Proactive	In a work environment, we have changes frequently and planning is very hard. We need to work in a proactive manner and in most cases I think we do
A8	Meeting deadline and expectations	Easy going	We like our breaks and don't like stress. We heard many going on stress leave…..
A8	Negotiation	Emotional	We rarely get emotional or use our hearts over head. Most decisions we make are based on what is right at that point in time. We do feel for people, but when we make decisions we look more for 'what is right?'
A9	Meeting deadlines and expectations	Easy going	In most situations, we like and work in a very easy going way. Sometimes, even passing on the responsibility to others is seen. No weekend or extra work unless it is required. When during lunch, we read books even if we have a priority issue to be tested with critical date schedules.
A9	Transparency	Outspoken	We are very outspoken, we like to resolve issues

			in an open manner. When management doesn't communicate, they are being raised as issues and everyone at work is expected to talk openly and honestly
A9	Negotiation	Negotiation	Sometimes, when we make work issues, we do negotiate to get a smooth transition
A10	Transparency	Outspoken	Yah definitely, we are in a culture where we speak openly and like to keep things transparent
A10	Proactive	Proactive	Most team members are proactive in their work. This is just the nature of the work is such that we have to be proactive
A11	Transparency	Outspoken	Pair programming might work, but with a lot of initial and continuous input and management, interaction should be very heavy for this to work, individuals are very strong here and like to raise their views openly, if there is a conflict – then this won't work. Taking responsibility was also an issue with pair programming
A12	Meeting deadlines and expectations	Easy going	We strive hard to stick to the schedule. On that basis – I wouldn't call ourselves easy going because we try our best to complete tasks on time. But we don't go out of the way to meet the deadlines.
A12	Negotiation	Emotional	Some time, it looks like we are emotionally bound due to the fact that we respect personal views, but when it comes to decision making for department, we tend to go without any emotional influence
A13	Transparency	Outspoken	In many cases I have seen the team discuss all sorts of issues openly. We don't unnecessarily

			hide views from others. There are back-biting as well, but in a professional sense, we are very outspoken
A13	Negotiation	Emotional	No emotional decisions are allowed at work place, there are even conflict of interest policies and procedures that cover these
A13	Proactive	Proactive	The team members with the project leads and management work in a proactive manner
A14	Meeting deadlines and expectations	Easy going	Real work life balance is seen in most of the Australian agencies... very relaxed atmosphere and passing on the responsibilities to others in the team is also seen quiet common,
A14	Proactive	Proactive	We are expected to work proactive. IT industry changes all the time and the competitiveness is very strong. We are required to act proactive and take initiatives to be in the lead
A17	Direct customer involvement	Direct customer involvement	Working together daily (business and developers) – Change in culture is required – I don't think it is possible – don't have enough resources to spend time for all projects
A18	Negotiation	Negotiation	Respecting others view and openly discussing any conflicts is very common here, we like to discuss issues in an open way and with others views, we also respect and think that it is alright to have difference of opinion.
A22	Negotiation	Negotiation	Not very good – not used to trying to negotiate – especially when compared to other cultures. Very self determined and will do what they think is right – so no need to negotiate.

A22	Meeting deadlines and expectations	Easy going	We are considered pretty slack – always slow and can get things done tomorrow attitude – weekend – no decision will be made. 5 o'clock sharp sort of a model what is expected and work-life balance is very critical here. Do if you can and if not leave it for the next day is a common attitude. If someone calls around 4:55 that will not get done the same day.
A23	Meeting deadlines and expectations	Easy going Taking responsibility	I don't think we have a culture of finalise – we get close but never finish – close enough is good enough attitude
A25	Meeting deadlines and expectations	Easy going	As part of the culture, we tend to keep situations in a relaxed manner and to take the attitude of 'easy going'
A25	Negotiation	Emotional	We rarely make decisions emotionally. We like to use our head over heart and prefer to negotiate in a fair manner
A25	Proactive	Proactive	In some cases we plan ourselves well before in hand to manage projects better. But I think in most cases we can be more proactive in making decisions
A26	Transparency	Outspoken	I think it is in the culture and the expectation is that we are allowed to speak out loud of our views and ideas. When there is a conflict, we try to resolve by talking and discussing openly
A26	Proactive	Proactive	Work in the organisation always requires us to be proactive and I think our team members are all mostly very proactive

A27	Transparency	Outspoken	We are very outspoken and transparent. Any work discussion we have we tend to keep it open and honest
A27	Negotiation	Emotional	When it comes to negotiation, we try not to bring in emotional game. We are always expected to work based on what is right and have no room for friends and family. This is expected of us as part of a fair work ethics
A29	Meeting deadlines and expectations	Easy going	Yah, Australian culture is that we are very easy going. Sometimes it gives positive effects like we tend to think and take life in a calmer way. But sometimes it does turn out negative as we are too relaxed that we don't take responsibility to make quick decisions
A29	Proactive	Proactive	We are not very proactive when it comes to work environment. We tend to make reactive decisions and don't plan ahead. I think we can improve in this area

Other comments gathered in Australia:

- Skills, Right resources at the right project level is not seen very common in projects, skills not good enough
- Investing into new technology is not seen much

Culture Study – India

Individualism/collectivism in India

I1	Team Collaboration	Teamwork	Team management is not an issue here, we work very well together
I1	Team	Group/culture	English – we think in our mother tongue – I say

	Collaboration	awareness	something to you, but you can misinterpret. The more heterogeneous culture is – it is harder to manage. Diversity has good and bad
I1	Team Collaboration	Hand holding	I have asked the team to come up with ideas – they should be defining what works for them, working together is seen really well here in Indian culture and we like to work as a team, team should be able to find their own defects and suggests best way to manage them.
I1	Management support	Commitment	Well organized, committed, like to do innovative tasks, some time travel to meet the customers.
I1	Open and honest communication	Openness	Open with team, speaks well to all The more heterogeneous – it is harder to manage. Diversity has good and bad. Culturally we are very diverse, economic, language, religious, financially, [no male/female issue I think]. Now we are proud of our selves, we managed to provide software with standards – high standards, convinced other nations of our quality. Are capable of demanding customers.
I1	Self organising team	Self organising	Open with team members, speaks well to all, Indians also need some hand holding, used to depending on others, and prefer to make a group decision
I1	Dedicated Team	Commitment	Lots of commitment and communication is seen here, they help each other and intimate
I2	Team Collaboration	Teamwork	Whereas if the team is frequently changing - there could be employee contractor issues - contractor may be smarter than the employee - contractor could be contributing more than the

			employee - those sorts of things there is definitely there. We are individual - there will definitely be there
I2	Team Collaboration	Group / culture awareness	Yah definitely - one is putting additional work hours is seen here. Doesn't mean additional hours are going to make more productive - but definitely in India additional hours is put in and effort is more.
I2	Team Collaboration	Hand holding	There, people can be in the same position for few years and that is fine, but here people are lot more ambitious and expect promotions every 2-3 yrs, career orientation
I2	Dedicated team	Commitment	And between India - here people always put in their extra effort, instead of working 8 hours, they mostly work 10 hours or more - it doesn't work that way in other places. There - they plan better and they don't put in extra effort - and small to medium organisation - projects have more success in India than other places.....
I3	Team Collaboration	Teamwork	Organisations take full care of the team members, dedicated....
I4	Team collaboration	Hand holding	Sat'days – we do presentations – once a month team member give a presentation to the team and share the knowledge Our manager always makes sure we are guided and provided all the help we need to do our work efficiently.
I4	Management support	Management support	Communications (asked to only speak English – should not talk in another language) – gives us chance to practice

I4	Open and honest communication	Openness	We have regular team meetings – they talk to each other and build relationships and they also discuss issues openly One good thing I have seen is that all of them (in US) are open minded – everyone is friendly and – colleague wants to say something – they share their knowledge and love to share I don't think we talk openly in meetings – fear of what the others would thinks is a common reason for not speaking openly
I4	Dedicated team	Work life balance	Everyone is friendly, I had lots of opportunities to go overseas, but I didn't want to go because of family
I5	Team Collaboration	Teamwork	All team members jointly work together and talk issues Solve problems in the meeting
I5	Team Collaboration	Group / culture awareness	Speaking different languages – business and IT language – interpretation of things becomes very difficult Time zone issue
I7	Team Collaboration	Teamwork	Every one works together – very good – we share all the issues and are very friendly. If my team member can't finish – then I or someone help finish the code. We talk privately if we have any issues with a team member – if technical – then I will speak in a team meeting
I7	Team Collaboration	Group / culture awareness	Cultural difference – yes – we work as a team and other countries – western – they like to work independently –

I7	Team Collaboration	Hand holding	If someone is not showing much interested and not working well – the team will speak to that person We help each other to finish the work together
I7	Open and honest communication	Openness	Not everyone speak out in meetings –some only speak – may be 50% - only few speak out – they don't want to talk – some are scared as well
I8	Open and honest communication	Openness	No cultural issues within different countries, openness are expected, also accounting in western culture they prefer all in writing rather than just verbal. We need to openly discuss our issues; we do within team, but not with management. Countries don't matter – it is just people and the process. We have project meeting – every day – we discuss about all issues, personal issues, openly. Do you have a problem? What is happening to you? Peer support is always there. "I have a family problem – I am unable to concentrate – so we are very cautious about how we select the team, we may need to reschedule or delay the project – team is very important. Project status may change or team members will help to complete.
I9	Team Collaboration	Teamwork	Teamwork is extremely important – everyone is like Tendulkar in their own field – but they may not be good as a team.
I9	Team Collaboration	Hand holding	Fresh graduates don't know real life tasks – needs supervise support – we provide a lot of help with the fresh graduates – daily meeting – team members are given opportunities – but they don't know what to talk – so though an

			opportunity is given and is requested from every team member to talk – they don't know what to say – they are new – it will take more than 6 months to even understand what we are doing
I9	Self organising team	Self organising team	3-4 years in India – they are very demanding – want to go up the ladder very soon. They are very self motivated. In Australia and other western culture – it is ok to be at the same level for few years – but in India every year they expect to go up or move on.
I10	Team collaboration	Teamwork	We feel very comfortable working in a team than individual. We work very well together.If someone has to go on leave, we finish their work. If someone is sick, we help to finish their part of the code Some other firms they do work individually as well – sometimes they are looking at their own individual progress.
I10	Management support	Commitment	They (western culture) only work 7 hours – but dedicated. But here we work for many hours – but the commitment is not much. It is a feeling that we prefer to work long hours. People from other countries are very focused and they work sincerely for 8 hours – but here we spend a lot of time at work – but don't manage our time well and don't have 100% commitment. From morning we don't do much but then later between 5 and 7 do a whole heap of stuff to finish. But, in case if anything urgent, then we come extra hours and work – even weekends. Most times we discuss – the team is always consulted – technical stuff – then we follow.

I10	Open and honest communication	Openness	At work – when we think it is possible we do openly say that the time allocated is not sufficient. Now it is much better. But still we can improve – some still find it difficult to say their views. We will not confirm say "NO" but we will try to convince them to change the time.
I10	Dedicated team	Work life balance	In western culture time is important – family/life balance is there. Here we come at 6 and wait till 7/8 pm.
I11	Team Collaboration	Team work	Each and every person should be high standard for the project to be a success. It is a team work – most of the members work well together – shared information
I11	Team Collaboration	Hand holding	Organization care a lot about the employees and provide lots of facilities – making sure they retain all – commitment here is really good and dedicated. But they are very focused and time does matter.
I11	Open and honest communication	Openness	Initially we find difference when speaking to foreign – now we are used to. They have lots of methodologies and like to follow the policies. They speak a lot before getting into the work related conversation – they prefer informal. The Australians are more lenient when compared to US. To get trust it took a long time more than US.
I12	Team collaboration	Teamwork	Working together – helping each other – sharing information
I12	Open and honest	Openness	Human brain doesn't work for more than 5 hours continuously – Australia. Here we work

	communication		whole day – but maximum commitment is just the last few hours. Being open and honest – sometimes we don't want to lose the customer.
I14	Team collaboration	Teamwork	Customers Vs team? When I am trying to protect my team first, then I will come and fire my team. I will say that something might have gone wrong, and then verify, we need to get more orders. Will need to be flexible each time, but will make sure I will come back to the team and try to sort out.
I14	Team collaboration	Hand holding	….. we also giving the vision of the project and will make them more interested in the project. This will make them feel very important in the project……
I15	Team collaboration	Teamwork	If you are enjoying your job then that will also indirectly help with project success Sometimes we have to come late night or someone else has screwed up – we have to come and finish the product. We call going for coffee as going for team building – when you mingle with people – you relate to people – and then you discuss rumours. We go with supervisors – no difference between supervisors – but not all team are the same. Some time we even crack jokes – and there are 5 in the team.
I15	Team collaboration	Group / culture awareness	Rather than working with a team – teams are divided as India and US – managers always ask us to compete with US team. I don't think it is good. In India we share a lot of information –

			we help each other – we leave our work and help a lot. Very friendly – work culture is good – openness (only some do that) but most of them don't – certain level it has become personally. [Cultural differences] Working style – US - they are bit more professional – keeping up time – even direct communication. UK are more political than India.
I15	Team collaboration	Hand holding	In India it is more of a personal level and in US it is professional level. In India we work for a person but in US they work for a company. The personal touch is there.
I15	Dedicated team	Commitment	From Indian perspective – every one is really clever – the quality is judged by number of years with a reputed company – you continue if you like – but if you have a better company you leave.
I16	Team Collaboration	Group / culture awareness	We have train people to work professionally rather than emotionally. It is work – and should not be emotional amount it. Things should not be carried on with your life.
I16	Open and honest communication	Openness	I was talking to DBA – I didn't like it – but I was keeping quiet – as I thought I might be wrong. But later my friend – told me that you should not feel bad. In India when your manager tells you not to do something – they feel bad in India. Other culture they are expected to speak up.

I16	Dedicated team	Work life balance	Need more work/life balance
I17	Team collaboration	Teamwork	Success – only one – that is team work – motivated – communication is good I don't know about other teams – but our teams and friends – we consider all as same and work together and work more as a team to get the one goal.
I18	Team collaboration	Teamwork	When your manager is good – people will work and also do extra work to finish project on time.
I19	Open and honest communication	Openness	Open communication – we don't even need them to wait for a meeting – we just go for a coffee and discuss all sort of issues Some people are very shy – and then we have to go and ask them – because they don't come to us
I20	Team collaboration	Group / culture awareness	Cultural - change in India - Yes, to my knowledge the cultural impacts have been trained in the Indian software industry, India's role in the global scenario has changed a lot within the last few years. Understanding of rest of the world by India and India to rest of the world is also important, in terms of cultural diversity - there is a positive change
I20	Open and honest communication	Openness	Difference between different cultures - US - expect explicit and detailed specs, Japan - implicit assumptions made like they expect top quality without being asked or requested, take it for granted that quality is high, but in US the SLAs and defect numbers are explicitly defined

			and an agreement is made. The contract with US is very detailed and process management is less in US, but in Japan the process management is very detailed also very long, in Japan they always like to know exactly how u r doing, the process will need to be clear, but in US they are only worried about the end product with defects etc, but the process of how being done is not very important. They don't care as long as we deliver, they will define the contract and also stick to the contractual obligation as defined. But in Japan, they will try and understand the process and also help to achieve and be more involved in projects. if we define as 3m they will ask questions of how we r going to do in 3m.
I21	Dedicated team	Commitment	Very important to plan and focus and dedication is needed for a project success. Let it be US or any other road side company doing it doesn't matter, and commitment should be right from the top level to the end level. I have seen such commitment and have given 100% - even the tea attendant comes at 3am to come and provide tea, and that commitment was there. It not only helped with this project a success, but other future projects as well. What was the reason for commitment/motivation for the team? Very good question. No monitory motivation given, all young, many times naive, all had very positive active, dedicated, passionate arguments about design, more of enthusiasm. You feel like doing and commitment is there - There is a general misconception in India that IT people are getting more salary, monitory benefits and

			not doing better job than others are doing. I agree that in terms of number it looks good, but a developer is only doing a third level job, mundane job, if u talk to a programmer and ask him what u want to be in 10 years from now, he will say he wants to be a programmer, he doesn't want to move away from there. Top people are making lot of money, developers are not doing a class job, and we don't want these low level jobs given to India. We should not get things that other people don't want to do, yes, we are getting benefit out of it, not innovating anything, just routine jobs.
I21	Dedicated team	Work life balance	I would like to see a work/life balance and more socialising in Indian culture. Though we communicate well, we do that only with our team members, across teams and at different levels we don't do this very well.
I22	Team collaboration	Teamwork	People make the difference, the right person being there is a huge factor for project success, even when project fails it may be due to that there is a leadership issue, it could be even large org, has good brand name, and is always considered that - this person has achieved something. Summary is people does matter. People have said that they are working in so and so project because they like their boss, no one has told me that they are doing this project because, they like 6 sigma.
I22	Team collaboration	Group / culture awareness	Cultural and organisational difference - IT is able to bridge cultural difference, not just within countries but also inside the countries. When I came out of my place, I've identified that there is

			huge difference, now people work very well together, they are accepting the fact that all are same except from cultural and linguistic difference, people are discussing about their 2 cultures - and make +ve impact.
I24	Open and honest communication	Openness	…allow them to speak to the users and make sure customer is happy. Even if you don't know - don't say that openly - tell them we will find out and get back to them.
I24	Dedicated team	Work life balance	Difference in US - culturally Citibank in India and US the same. But small organisations it is difficult, people here were different from Infosys, Satyam, work starts very late in the day, Team relationship - all the same, working style is different. Peers - working is different.
I25	Team collaboration	Group / culture awareness	Compared to other industries - in IT industry people are putting extra man hours - not just for money, but for job satisfaction
I30	Team collaboration	Teamwork	Understanding different people is important. IT guys should be able to understand different people and should know different areas that are related to IT to manage IT projects properly. Making people feel important and happy is important. Keeping people at the right projects, they might only like technical work, so we make sure we give them more technical work and less other management work. But give opportunity to learn new area of interest. This will help them motivated as well.
I30	Team collaboration	Hand holding	They do small presentations to 30 over people - to learn how to learn public speaking - and help

			them in whatever way we can to improve their skills. We help ladies do other areas like necklace making, etc. to help them motivated to come to work.
I30	Dedicated team	Commitment	Biggest challenge is to keep staff motivated, how to motivate and achievement of success - for example - me - to know about IT and to keep going is my motivation.
I31	Dedicated team	Commitment	Western Managers are the same, India - time is not a big deal, but for them - if we say we finish in 24 hrs - it has to be done, more status updates
I32	Team collaboration	Teamwork	Team - people make a lot of difference, any success is as good as the people - not just exceptional people - but exceptional team - not trying to show that you are a super star -but to work as a team - those are kind of projects that have reached success. Finished on time, team morale is good, commitment - to project and team, customers are happy, lot of interaction, relationship made the success. …. Team profile - large team requires different kind of a model - political issues always exist - we are all human, if I look at it as a project manager, I can make it or use it in a healthy way, try and use it wisely and contribute - use it smarter way…..
I32	Dedicated team	Commitment	Cultural diff - US can't work after 6 - we start our day late - we take our time - can work till 10 pm, we have to give and take - sometimes not very healthy - ruins the relationships, once you start appreciate the cultural issues - then becomes easier, understand the culture - what

			works and what doesn't work - UK don't come to the point straight away, US - straight to the point, these are things that you need to understand - adopt. We get trained; other organisation trains as well, you learn mostly from peers, learn from people who have come from US/UK, lessons learnt helps here.
I33	Team collaboration	Teamwork	Lack of confidence creates politics, most have, but we try to give confidence, my role is primarily creating total management, identify them as what they are…..
I33	Team collaboration	Group / culture awareness	Mingling with different groups, weekend going out to resort, we should believe that they are all gems and diamonds, I have wonderful people working with me
I33	Team collaboration	Handholding	I believe in every individual - each person has got something good in them (diamond in them), staff left to another company as a senior developer, good advancement, good for the community, coaching has helped this person. Mentor and leadership
I33	Management support	Commitment	Trust between stake holders, trust trusttrust is the mantra for the team, give and take, clear communication, defined documentation and process model, alternatives, how to address, and admit their could be mistakes, no pointing figures
I33	Open and honest communication	Openness	Strategies - trust - believes empathies with them and communicate. I always tell them, talk - talk, that's the only way by which they will learn, If

			the client complaints I will take the blame, experience makes them perfect,
I33	Self organising team	People oriented	In Australia we have things hanging around - to remind people, but here I can't see this? In other western culture it is an individual work, they read and understand themselves, but here it is a team work, they ask the other person and try and help each other and work together to solve the problem. Very powerful, here you have 1 smart guy and you can see others hanging around him - he will be the master - and all help will be by him. This is the issue we have with American clients because they would like to handle 1-1 with a person, that doesn't work in an engagement area like this, centre of focus is a team, we channel through one person, but all work together.
I33	Self organising team	Self organising	but in India even from the ancient Veda time, it is like a gurukula, when they depend on some one to tell them
I34	Team collaboration	Teamwork	There are always going to be people issues, and conflicts, all tech people have been hand picked and they believe that they are one of the best and due to that there is some ego clash and difference in opinion, friction management depends on how the PM managers it…..
I34	Team collaboration	Group / culture awareness	Impact of cultures in orgs- they are bound to have cultural issues specially due to outsourcing and global market….. ….. it boils down to how the manager is managing the team effectively, even if there is

			friction, +ve energy will need to be created and good morale will help the project continuing. Rewards in training in latest tech, appreciation of letter, mail circulated and senior people give a pat on your back and also have monthly, quarterly and half yearly recognitions, employee of the year, not just monitory, recognition and appreciation
I34	Open and honest communication	Openness	Don't let them become issues, adopt, working with women with child, give her the flexibility to work from home, trust your people, if they don't deliver adopt and take ownership of the problem, keep informing the real situation, communicate well to avoid confusion, female issues doesn't always happen, but once they are married it becomes harder for them to commit themselves too much, responsibilities increases, I am not saying that they are not competent or capable, but it requires a lot of their time in the project, personal reasons may effect. Higher management position - only performance and potential will only be considered, male/female is not an issue,
I34	Self organising team	People oriented	Some go out of the way and follow it and follow rigidly, lot of time, they don’t understand the importance. It is immaterial, as far as their code is working, they are happy. They don't trust us? What can we do? They don't understand the reason, that's when PM will need to communicate, discuss and come to the agreed tailored process
I35	Team collaboration	Group / culture	Understanding each other due to cultural diff is a major issue - because we don't understand the

		awareness	customer, logistically physical dislocation will be challenging.
I35	Open and honest communication	Openness	I don't think it is required. Hierarchical structure can be used just for managing people for ease of management only. [political issues] teams members - it will exist anywhere - but don't think it as an issue. Openness is part of our culture. We are very open - we share lot of things, it disarms any type of issues, collaboration can be more - we don't think to go and speak to others, reusability can be more
I36	Team collaboration	Teamwork	Cultural difference - lot of difference, people in India are very young, but in other western country they have already a preconceived idea for different issues and it is very difficult to manage that situation. The young group in India will always like to do different things in different ways. Cultural changes in past few years ----- lot of changes - started understanding the importance of ourselves and ability - team work, perceptions has changed - because now we are also looked as managers and capable of doing management, leadership tasks. Mentality is changed. They have accepted the fact that we can do things in an efficient way.
I36	Team collaboration	Hand holding	…we always train people, and understanding is always lacking. Why are we doing? Blindly following - freshly from college - should understand the benefits and do it in the context of projects.
I37	Team collaboration	Teamwork	BusinessManager - is a person who deals with customer, he can talk, but wouldn’t know any

			project info, it is a concern, he is more of marketing, trying to get more projects, PM is in charge of managing projects, spokesman for the project…..
I37	Dedicated team	Commitment	When someone gives more money, better lifestyle, then go to the next step, some people are happy because they have their own priority, the others jump to the other org. [Western countries - they are not judged by the position, doesn't carry a lot of weight, but here your position, lifestyle make a lot of impact, they want to learn and move on] In western - ppl graduate in the same org learning different stages, but here in 5 yrs - u r at high level, how many project they wud have done is very less, that's difficult.

Power Distance Index in India

I1	Authoritative	Hierarchy	I am responsible for implementation of all the methodologies. People are not using them efficiently, it is a challenge – we have activities, role and outputs. 6 sigma, we subscribe to various standards/models we operationalise within the organization. [Interruption].
I1	Authoritative	Escalation	When we have issues we rarely escalate major issue at the right time.
I2	Authoritative	Hierarchy	In western culture, people can be in the same position for few years and that is ok. But here people are lot more ambitious and want to go up

			the ladder as 'Power' is a huge factor here, they expect promotions every 3 years
I2	Authoritative	Escalation	Expressing their ideas and views, most time we are not very out spoken and expressive
I2	Blame sharing / taking responsibility	Taking responsibility	Good checklists exist in our organisation, and most companies have list of things to do even before project starts. Mandated, every year training with project management exist. The issue here is individuals need to start taking responsibility
I3	Authoritative	Hierarchy	Hierarchical structures are seen very clearly here and in general in India, management control and getting approval before we do something, any communication going through the hierarchical structure are all very important in Indian culture
I3	Authoritative	Escalation	Sometimes we can give ideas, but the manager will make the decision and they finalise what is good for the organisation
I3	Empowered	Empowered	A paternal/maternal relationship with boss also exists and we only action anything if our boss is happy, we like to keep him happy, and our manager guides us and makes decisions for us, he also cares for us
I4	Authoritative	Hierarchy	- Other companies there are lot of hierarchical structure – management control. This company it doesn't happen - There should be some hierarchy – to get motivated and get guided form your boss – he will take care of you
I5	Authoritative	Hierarchy	We normally don't meet the clients – project lead

			explains to us what is required – leads also only talk during the start of a project Not all people talk openly – most of them feel that the decision should be made by the team lead – no need to talk We rarely see the bigger picture as we are not expected to know them, the managers go for most meetings and they come back and tell us what to do
I7	Authoritative	Hierarchy	Project lead does most of the estimation, design, and requirements gathering. The team members have to follow the time and instructions defined by the team lead.
I9	Trust people more than process	Trust and respect	Australia – not much aware of … very difficult to convince – no trust – They have lots of doubts – they don't accept immediately – they don't make decisions very quickly. Very relaxed – like to use microscope to study every single thing. In US – once they have given the job – once it's given, they are fine provided the work get
I9	Decision making	Able to make decisions	Decision making is always done mainly by team leads
I9	Authoritative	Hierarchy	Fear of boss is there in this culture – even if we work a lot together – we have this boss-subordinate relationship There is also a paternal/maternal relationship
I11	Authoritative	Hierarchy	Estimation done by project manager and the whole team has to follow whatever the estimate the lead has provided. UK is a bit lenient – we are more hierarchy and they are more flat. In UK I was talking to

			someone and I didn't know he was the CIO of the company – very simple – here in India very difficult to even see the CIO.
I12	Decision making	Quick decision making	India – hierarchy is very strong – the manager always makes the decision.
I12	Authoritative	Hierarchy	Australia – wasn't very cooperative first – then slowly we got used to and started working together. The trust wasn't there – they are very professional – very communicative – formalized – no difference between manager-subordinate – you don't even know who the manager is – he will also be working as everyone else. We still trying to provide information – Australia had ego problem.
I13	Decision making	Able to make decision	We always follow the guru/student relationship. In Australia they are very open and flat structure – this is a major difference – from school we like to be forced to do homework – and was always said what was right and wrong and never allowed to think according to what you feel is right. The same follows when we grow and at work – we like to be told what is right – what to do – when to do – how to do etc.
I13	Authoritative	Hierarchy	Obviously PDI is very high here. We follow the teacher/student relationship at work. We could have changed a bit over the years – but the basic underlying culture is to make sure that you satisfy the boss – and can't change the culture. In the corporate environment – we can enforce it. It has been now communicated to the team that the preferred option is for team to be open and

			communicative and – in meeting it is still the old way. Though they are very knowledgeable – it is still the same. Some are changing a bit.
I13	Blame sharing / taking responsibility	Taking responsibility	We work in their hours – sometimes they will not understand our issues – and will not adjust to adjust their working hours.
I14	Decision making	Quick decision making	So we work backwards, if we have 1/1/2008, then according to the time we have, we see what can be done. What modules can be done - or put up prioritised modules, who are the people available, resource available, training/hire, consultant being the leads? or share responsibility etc. has to be planned.
I15	Authoritative	Hierarchy	Used to be cumbersome before – but now its much better – things move much faster now. As it is a big organization there is beurocracy – Even here we distance a lot from higher management – we try to get contact with big boss – it doesn't really work that way – we don't get to speak to the big boss – no openness. When someone talks back or anything like that we know that he is going to leave to another company.
I16	Decision making	Quick decision making	Sometimes it is difficult to get approval or quick decision making.If the senior management likes it then it does get done fast – but if the manager doesn't have much interest then nothing gets done quickly.
I16	Authoritative	Hierarchy	Most of them are afraid to talk to the manager – in the same way – it is definitely not flat hierarchy –

			all of us in the team came together so it is much easier to work with each other – well communicated. Most of themthink it's not worth saying anything – because they believe it is not going to be heard anyway. Boss and team are all the same age in western culture – it is fine. When you work with an elderly then you have to work accordingly in India.
I18	Trust people more than process	Trust and respect	Everyone has different opinion – technical meeting – different views. But it is ok – but no one says what they like in meetings – but may be just go to manager.
I18	Decision making	Able to make decision	I can't do or make decisions beyond a certain level The way the supervisor helps you – quality time – mental happiness – motivated – comfortable – not just doing basic – but also do more than what is expected
I18	Authoritative	Hierarchy	It is very hierarchical. Process should be there – but not this difficult to get things done. Administration also is needed – but should be a good balance so that day to day work should continue without any difficulties.
I19	Trust people more than process	Trust and respect	I trust my team and would like them to take initiative – but will take time.
I19	Authoritative	Hierarchy	In my previous job – I never got feedback or never had chance to talk to my manager openly When they are planning to send a mail to their counterparts – then come to me first – they get the

			mail reviewed first
I19	Transparency	Transparency	Very informal relationship – relationship oriented – in other western cultures they are professional relationship
I20	Trust people more than process	Trust and respect	If you know that the deadline is 28th of February, then give an earlier date to the development team to aim to complete earlier, and it will be more manageable. Lack of belief becomes very obvious, and the team feels that the management is not open with them and also not trusting them, so it is better to say the real date and make everyone to work together to aim for the real deadline date
I20	Authoritative	Hierarchy	Avoid hierarchical, and make teams to work together, structure hierarchical should only be for operation feature. Be open, make them feel that they are not part of the problem, but part of the solution
I21	Trust people more than process	Trust and respect	More verbal communication, should speak to each other more, more socialising, Saying hi is very normal, in this culture not responding is normal, but now people are opening up, but need to increase in all levels of the organisation, work-life balance is really lacking - victims of timezone, can't say no to something at business, so need to be flexible - organisation culture needs change. Work from home - get the opportunities, when required, like doctor's appointment, wireless connection - Good practice - more successful project - one thing - any of the stakeholders should keep the emotions out of the way, this is my baby -

			becoming close to projects, etc. should be avoided. Getting close to their own code is not going to help the team
I21	Authoritative	Hierarchy	....people work because of the manager, not just money. Should know your stakeholders very well, understand the environment, issues already existing in the company/project, more visibility and control of these issues, flexible with any thing that comes in your way at any time, it can be a risk, issues, requirement, change, should be able to adopt to the current environment, understand the outside factors that keep changing, could be compliance issues, government related, community, legal related, should be aware of it, keep eyes, ears opened all the time, stock market can have an impact, should be aware of external environment to save your project, proactive, vision from IT perspective should be one step in front of organisation.
I21	Blame sharing / taking responsibility	Taking responsibility	2 areas: communication and responsibility, Communication: I am not talking about verbal communication. When you say that you will get back to someone, on a certain time, and you are not able to make it, you have to send to mail or call and communicate to them the details.
I22	Authoritative	Hierarchy	More communication needed interaction and understand people's problem, find lot of channels to communicate in down the hierarchy, should be able to connect to all levels to maintain consistency.
I24	Transparency	Outspoken	Good attitude, understand the difficulty of tech,

			should not blindly commit to the business, giving a false impression, and should be able to talk in business language,
I25	Trust people more than process	Trust and respect	Staffs needs to be always trusted and respected. In Indian culture, we normally respect staff and trust them
I25	Decision making	Quick decision making	Because of the hierarchy and nature of the culture, we tend to take a long time to make decisions. It is always expected for the managers to make the decision and the staff always depends on manager to make the decision.
I25	Decision making	Able to make decision	Staff also tries not to make any critical decision and keep that for the higher management to decide. When in critical situations, the staff actually wait for the management to make such decisions
I25	Authoritative	Escalation	In most cases, the tendency to hide and not escalate any project critical issues is seen commonly in Indian culture
I29	Decision making	Quick decision making	With projects, we see a lot of delays due to decisions are not being able to be made quickly. One of the reasons is that the hierarchical structure delays the process
I29	Decision making	Able to make decision	In some cases, we also don't have the culture to make self decisions. We always depend on the manager to make the final decision as this is the culture.
I29	Transparency	Transparency	Most times, the bigger picture is always hidden. We only get to know the smaller picture of the whole big goal. A bit more openness and

			transparency is required in Indian culture
I30	Authoritative	Escalation	A process of raising the risks immediately during a project should be practiced in India. We tend to keep things hiding until the end and then realise that things have blown out
I30	Blame sharing	Taking responsibility	In most cases we take responsibility of our actions, with regards to project tasks when things go wrong, the team always take responsibility and fix them as quick as possible
I30	Transparency	Transparency	As much as possible the 'Transparency' issue should be managed well in India. We tend to keep things undercover for no reason, talking and discussing openly will always help with good communication and project success.
I31	Trust people more than process	Trust and respect	The only way to succeed at work, is to 'trust' team members and allow team to carry on with their daily tasks. In India, we always have doubts and because of that we lose the trust in team members.
I31	Decision making	Able to make decision	In this culture team members should be allowed to make decisions on their own. Though the decisions should be what is best for the organisation and team, the culture to accept the fact that team members could also make decisions is still not accepted in India
I31	Blame sharing	Taking responsibility	Individuals normally take responsibilities for their actions. When things go not according to what is planned, there is generally no blame on others. In most cases team members take responsibilities of their tasks and correct them accordingly

I32	Trust people more than process	Trust and respect	'TRUST' is not seen commonly in India. It has become the culture where the manager always has doubts about his team and never trusts them for what they say and do.
I32	Authoritative	Hierarchy	In India the hierarchical structure is very strong and the subordinate staff are always considered below the superiors. Managers have all rights to show their authority and the staff generally listen to the manager to keep him/her happy
I32	Transparency	Transparency	An ideal culture will be when there is transparency in work place where the team members all work well together and gelled together to achieve the same goal. This is rarely seen in India
I33	Decision making	Able to make decision	This culture should allow for team to make decisions on their own – with liaising with other team members.
I33	Authoritative	Escalation	When things go wrong, we need to highlight these issues immediately so that actions can take place to avoid and overcome the problems. But the project managers keep things till the last minute to highlight crucial issues to the project members
I34	Authoritative	Hierarchy	Only few get involved, and giving some sort of suggestions is fine. More people get involved it will start giving communication delays as the communication is inversely proportionate to the number of people.
I34	Authoritative	Escalation	Success - failure factors - main one in communication, if it is issues, risks or any aspects of projects, the communication should be done

			and keep on top of the problem.
I35	Trust people more than process	Trust and respect	I have worked in other companies and I feel this agency is good a very good team culture with openness and team dynamics. I chose this culture - I wanted to come here because of this culture. People get feedback of their managers, anonymous feedback - I am comfortable to raise my issues straight forward. I don't feel the fear about it. He encourages me to give feedback. Other companies - I am not sure if it is the same. People dynamics, openness, trust. Not every one is got the culture - once all have got used to it, then all will love it. People used to be shocked to see this type of culture - leadership skills, talking openly is what are expected of you. If you don't open your mouth and sit idle – you are considered to be as not doing your work, you are expected to open yourself, even if you are wrong – you are expected to speak out. Our involvement in the community - initiatives - I can't see any other company has done this. We have people flying during tsunami - to help - strategic level and tactical level - we raised 2B across in MS raised recently - just for giving. Another aspect - giving to the local community -
I35	Authoritative	Hierarchy	We work with the PM and the team work together - looks at issues and try and work out. Follow good practices - hard benefit and soft benefit - helps with budget. Each team work in their own process - due to creativity is pride - now it is time for some common process in place, [introducing process - any issues] people are used to something and a

			change is always a problem or a difficult task.
I35	Transparency	Transparency	Politics - not much - collaborating can be much more - they are too excited or passionate about the work they do - and don't feel like collaborating – Culture - the best thing I liked here is the openness - there is no opportunity for politics or back biting - collaborating - we are improving, we come up with good process, sense of ownership is growing, success or failure has become team success or failure - not individual, entire team work is becoming together.
I36	Authoritative	Hierarchy	...decided by the IT manager, with consultation with everybody.
I36	Transparency	Transparency	All people involved should have a common understanding. Unclear requirements - being documented, people very important - who will affect the project.
I37	Decision making	Able to make decision	Here the developer becomes a senior developer in 1 year and then manage the projects in another year, they get lots of opportunities and options, and in India they always want to go higher, you need to have the mental ability to manage projects, in India when the developer becomes an expert in development, he is asked to start designing, when he becomes good in designing - he is asked to manage projects. He will be asked to manage the customer and lead. When you think you are ready to manage the customer, you will be asked to maintain the account, by the time u r good at one thing, they are asked to move on [Reason?] We don't have people, so the same person is asked to do multiple things, we hardly

			have people. Customer is also expecting, when another vendor is able to give estimate, why can't you give? [medium to large org] one of the big companies, their yearly recruits are freshers, 90% are freshers, then training takes time also, again training because of promotion, then we loose - then again train another person.
I37	Authoritative	Hierarchy	Lot of politics exist - one way it is good, as it has a competition, when there is >1 person, politics is always there. Some take it in bad way. I can't be against my manager - if I do , then I m in trouble,
I37	Authoritative	Escalation	When there is a time issue, when the PM comes to know there could be a delay, a successful PM will take the action on time and identify a fallback option, he would have informed regarding the quality, and inform stake holders, but if the PM is not experienced he will not be able to handle this well. Methodology all depends on the team and PM. So meth are followed - but how well depends on the PM
I37	Transparency	Outspoken	Culture - some are straight forward, some are soft and quiet, working in India has different work culture, we bond with people, we help people a lot, we don't have the habit of saying no, we aim for deliverables, in western - they are always clear, they cant work for more than 8 hrs, here we bury our time, work weekends. Growth is so huge - you are unable to handle it and weekends will need to be done. All people want to work hard - it is very sad actually how we have spoilt our selves, because of competition it is

			becoming worse. I have tried to change - but didn't work, the mobile is a deadly weapon, we get calls weekends, we can't live without it, your accessible 24 hrs, I can't be invisible at all, mobile and laptops we are expected to work all the time.

Uncertainty Avoidance Index in India

I1	Tolerance for change	Tolerance for change	A movie – Indian actor and Western actor. Western actor needed the script in advance to plan before he agreed. We have a lot appetite for uncertainty – we are more tolerant to change – an American company will go through a process for change – but not an Indian company.
I1	Innovation	Innovation	Can work on innovative tasks very efficiently, we like to try new things and like to take risks. We have this 'life is not steady' attitude
I1	Proactive	Proactive	I think in most cases we work reactively, not proactively
I2	Risk taking	Risk taking	Yah we do like to take risks – for projects, we are cautious
I2	Tolerance for change	Unstructured situation	In India, we are so used to things not happening as planned. Situations are in such a way that they always change
I2	Innovation	Innovation	Oh no sure, we sometimes try new things
I3	Risk taking	Risk taking	In India we don't keep up time very well, when

			projects have to be completed on time, we normally take risks to cover ourselves
I3	Tolerance for change	Tolerance for change	In India we are used to accepting the fact that change is normal and we tolerate any changes we see
I3	Proactive	Proactive	The situation in India is in such a way that we can't plan anything well in advance
I4	Tolerance for change	Unstructured situation	At work, situations always changes and sometimes we see the project plan changes, resources leave, external factors influence etc and all these create the working environment a difficult place to work
I4	Innovation	Innovation	We like trying new innovative process. In most cases we try but sometimes we cant implement due to cost and time
I4	Proactive	Proactive	No – most of us only have time to work reactively... though I desire is to work proactively
I5	Risk taking	Risk taking	Taking risks is seen commonly in our culture. We need to take risks to manage our daily work
I7	Tolerance for change	Tolerance for change	I think these sorts of changes in work environment is very common and we are used to change
I7	Proactive	Proactive	Working here we don't get time to start thinking proactively. We get multiple projects at the same time and the tendency to think of new ideas is very rare
I8	Risk taking	Risk taking	When compared to other countries, India, team are less risk takers

I8	Tolerance for change	Reacting to change	In Indian culture, we are used to change.
I9	Risk taking	Risk taking	I am not sure, we do like to take risks as life is not always planned. Sometimes we need to change the way we work and projects require risks taking as well.
I9	Tolerance for change	Tolerance for change	Yah we do have a lot of tolerance for change. In India, we cant promise anything as situations change all the time. We are so used to change and it is accepted.
I10	Tolerance for change	Tolerance for change	Planning is not done very well here, we like to go with the flow and have the gut feeling that things will get done when it is supposed to be done,
I11	Tolerance for change	Tolerance for change	Time is not considered very serious in India, here we like to be doing things in our own pace and if it doesn't happen, it's ok. "It can be done the next day" attitude is seen here. But if anything urgent, then the team are also ready to help
I11	Innovation	Innovation	We do like to try new ideas and be innovative. But in reality we don't get time to be involved in new ideas as the projects take a lot of our time.
I11	Proactive	Proactive	I think it is the culture where we tend to keep things to the last minute and because of that we never plan ahead and be proactive
I13	Tolerance to change	Tolerance for change	Acceptance of uncertainties is still there. Excuses are always there. Because of this factor – we are paying lot of costs. We have improved – even if we are not punctual – now have improved – atleast we know that we are like that – and that it is not right – we know we have done a mistake.

I13	Tolerance for change	Unstructured situation	Roads will be booked without notice and those sorts of uncertainties are common here. This is one of the reasons why we are not on time. And now we understand that we should at-least call and tell them that we are going to be late. In Western culture you will be informed a month before regarding road blocks and also there will be other reroutes etc to help the passengers.
I14	Tolerance for change	Tolerance for change	One day someone will fall sick, the other day someone will leave the company, all these are unexpected reasons for a project failure, depending on the complexity , nature of the project - the tolerance/buffer will be identified, there is no standards that exist how to fix the tolerance.
I14	Innovation	Innovation	We are always tied up with project work as the pressure is always there to finish the coding. We do like to be innovative, but in reality we rarely get an opportunity to try and be innovative
I14	Proactive	Proactive	It is the same for being proactive as the time is a critical factor, in most cases we tend to focus on work and not plan ahead
I15	Tolerance to change, Meeting deadlines and expectations	Unstructured situation	It is very common to delay things or postponing. Normally we have a meeting and have action items and then it stops there, nothing gets followed up. Uncertainty is part of life and as part of culture and societal conditions we believe nothing can be planned for a long term. We like to go with the flow and see what happens.
I16	Risk taking	Risk taking	We like to take risks, we understand work environment can never go smooth and in reality

			specially in IT field, the projects don't go ahead as scheduled and we tend to take a short cut or risk to manage these shortcomings
I16	Tolerance for change	Tolerance for change	Yah we do have tolerance for change, in reality daily tasks always changes due to external factors and internal resource etc. We are well trained to work around the situations to manage work effectively
I18	Meeting deadlines and expectations	Reacting to change	Managing deadlines – someone has estimated deadline and we are forced to complete by the due date, may be work extra. Even if we complain, they can't change the dates
I19	Risk taking	Risk taking	Risk taking is an integral part of business, we know how to manage risks well
I19	Proactive	Proactive	We try our best to be proactive, but in most cases we try to think proactively and work accordingly
I20	Risk taking	Risk taking	In real life situations, we try our best to avoid taking risks, but projects don't follow as planned and in those situations, we need to take steps that involve risks
I20	Tolerance for change	Unstructured situation	In Indian situations, it is crucial to see the unstructured situations in real business situations. We have mechanisms to manage them well, we see this all the time.
I21	Tolerance for change	Reacting to change	We react to change very well, we see changes happening all the time in daily life and at work and most of us here are able to work well with change
I21	Innovation	Innovation	Innovation is seen in India, we try to be innovative

I22	Risk taking	Risk taking	In India, we live in a situation where there are lots of uncertainties and we need to survive by taking risks – manageable risks
I22	Tolerance for change	Reacting to change	I think we do pretty well with changed situations. We know change is normal and work accordingly
I22	Proactive	Proactive	We work well and follow actions proactively
I24	Tolerance for change	Tolerance for change	In most situations we are able to accept changes. But when it comes to work situations, we don't like too many changes, specially while in projects
I24	Tolerance for change	Reacting to change	It is clearly understood that we will never be 100% perfect and changes is normal and we have to react positively to it and work with the change.
I24	Proactive	Proactive	I think we try to work proactively – but you cant always predict actions
I25	Risk taking	Risk taking	Projects are full of surprises and as we deal with foreign clients we have many occasions where we need to take risk to manage projects better. I think in India we manage our risks well
I25	Innovation	Innovation	We try our best to invest in new ideas and innovation, but in most situations we tend not to due to fear of going wrong
I29	Tolerance for change	Tolerance for change	During projects, we get lots of uncertainties and changes. As part of managing the projects well, we do look at the best option and tolerate the changes – we accept that this is life.
I30	Innovation	Innovation	Yah, we do try innovative ideas to incorporate different ideas of the real life situations
I31	Risk taking	Risk taking	Taking risks is part of our culture, we are in a

			society where we can't expect all days to flow well, we will have some unexpected situations and to manage them, we will need to take risks
I31	Proactive	Proactive	In most cases, we try to work proactively
I32	Tolerance for change	Tolerance for change	.... wanted to please the customers, you can run an extra mile - but can't run a marathon. That's when you get burnt out
I32	Proactive	Proactive	We are always reactive, and never proactive. We try to add in a process to solve the current problem. We don't take vaccine to prevent something. I have not actually seen anybody trying to use the lessons learnt. The database exists but there is no time, we have never used passed experience
I33	Tolerance for change	Tolerance for change	Share the burden with the customer, try to accommodate in the next project, relationship maintained.
I34	Tolerance for change	Tolerance for change	We can't plan anything as things do change and that is part of life. I was told that I had to leave to Bangalore tomorrow morning and now how do I change my other meetings? The others have to just wait. People change their minds and priority changes and high impact tasks do come all the time. We have to simply accept that and work around it.
I35	Tolerance for change	Unstructured situation	I can't think of a project where every thing that people were able to do was done - we can't afford to do mistakes, (I will give whatever I can to manage the people, don't say - you don't have budget etc. do whatever you possibly can for the team to do their work to achieve what is

			expected.) a leader will find funds, [escalating a problem is hard in Indian culture] we should not be afraid to fail, u will have bad times, but should take the risk to move on, people talk about maturity - look at the executives they are all less than 40,
I36	Risk taking	Risk taking	Every project I have worked, we had to manage tasks unplanned. In these situations we may need to take risks to avoid unwanted delays. We have managed these risks well in the past
I36	Innovation	Innovation	We like trying new ideas and innovation is part of our culture

Time in India

I1	Time keeping	Timeliness / promptness	Time management, planning and following the plans, plan your work and work your plan. Managing time is a big problem in India
I1	Time keeping	Focused	When we are in meetings, most time, the manager and other staff always get side-tracked. We don't plan our time well either
I1	Time keeping	Separation of work / personal	There is no work/life balance and we also tend to personal work during work time.
I2	Time keeping	Timeliness / promptness	Indiansalso have issues with time management, we can't deliver on time. We try hard but we like to postpone and keep things till the last minute before we finish a task.

I2	Time keeping	Prioritisation	We find it difficult to juggle between tasks and prioritise, we need to learn to commit and complete on time
I2	Time keeping	Separation of work/ personal	At our work environment, we get so carried away and don't realise that time has exceeded our work time. We tend to come on weekends to finish off pending work
I3	Time keeping	Focused	I can think of times when we are 100% focused – that's when we are almost at the end of the project. But at the beginning stage, we try not to take seriously.
I3	Time keeping	Prioritisation	Job priority is always there and we have our priorities, but then these priorities always changes
I4	Time keeping	Timeliness / promptness	Time management is a major issue for Indian culture, we blame all these external factors for keeping up the time, if we are asked to deliver on 10th – then on 8th we will start to worry about the deadline and realise that we will not be able to provide the application on time, then we reschedule the date
I4	Time keeping	Focused	While we are at work, we are much focused. When it comes to time management and focus – then I don't think we are focused to finish work on time
I4	Time keeping	Separation of work / personal	In most cases, we spend a lot of time at work, forgetting home
I5	Time keeping	Timeliness / promptness	This is the area we lack as Indians, we don't know how to manage time well, it is the mindset

I5	Time keeping	Prioritisation	We tend to keep the priorities right, but in reality they change all the time due to the fact that business changes always exists.
I5	Time keeping	Separation of work / personal	We rarely get a good balance of work and family. But when at work, we do enjoy and do get some good time to learn new ideas
I7	Time keeping	Timeliness / promptness	We tend to become slack at the beginning of any task and when under pressure we work pretty well. Managing time, should be well scheduled for Indian clients to keep project on time
I7	Time keeping	Prioritisation	We do prioritise our work and we have regular meetings to organise tasks
I8	Time keeping	Timeliness / promptness	In India timeliness in meetings with different parties is a major challenge. When it comes to false promises and time management – these are 2 areas that I think we would really like to improve to make our business a better place to work
I8	Time keeping	Focused	We are mostly focused. We tend to keep all jobs on track, when it comes to focusing at work, we are pretty good
I9	Time keeping	Focused	When at work we are not 100% focused. I have been to other places and can see how in western culture they are very focused when it comes to meetings and delivery
I9	Time keeping	Prioritisation	Time is the main factor that we will need to be looking at from Indian culture, we like to give false promises then somehow try to finish on time, and always fail. The main reason is we try to do multiple things at the same time

I9	Time keeping	Breaks and personal time	We do get break times but not that often. We get time to go to the coffee shop – but most of the time with the team – related to work
I10	Time keeping	Timeliness / promptness	Most times everyone attends meetings on time, some time when it gets cancelled – we don't get to know. If they have a serious problem and then even if they don't let the others know it is ok.
I10	Time keeping	Separation of work / personal	The females always get more advantage – as they don't have to stay back late, as mothers they get more privileged as well.
I11	Time keeping	Timeliness / promptness	We have to learn to manage time well, our daily work involves many tasks and it has been noted that we normally don't do much from morning 9 – 2 and then from 2 until 7 pm, we work really hard. This shows we are not managing our time well
I11	Time keeping	Prioritisation	Tasks always get prioritised and among the tasks that have been allocated to me, I normally work accordingly and most team members try to work based on priorities
I11	Time keeping	Breaks and personal time	We do get some personal time, but rarely get in between our work time. During work, we do sometimes try to finish personal banking, family matter etc. But we also stay back etc time and do extra work to finish off urgent project work
I12	Time keeping	Timeliness / promptness	Time – we are not very good at this. It is changing – but it is difficult and will take a long time to change. Hard to change – but trying.
I12	Time keeping	Focused	Human brain doesn't work for more than 5 hours continuously. Here we work whole day, but I feel

			the maximum commitment is just the last few hours only.
I12	Time keeping	Prioritisation	Sometimes prioritisation works, but most cases, it is hard to keep priorities all the time. It always changes
I13	Time keeping	Timeliness / promptness	Time management is a cultural factor that Indians tend not to follow much. We are so much used to not giving prominence to time and this is the area we need to improve if we want more successful projects
I13	Time keeping	Prioritisation	Most times – it is scope creep – and then time and cost will be an issue – there will need to be an agreement that the cost and time are rescheduled. Some clients don't care about scope – their main issue is time and cost. Just do whatever you can – here scope is not cared much
I14	Time keeping	Timeliness / promptness	Different in culture - US - time is very important, set time will need to be done. Here time is not a big concept. Meeting – 10 am, wait for 15 minutes and then leave. Can't do that in India. That is the only diff I can see, may be some cultural change, but not much. When you deal with them - then there is no much of difference. of course there is cultural difference, but u can get a pretty good understanding of them. u will know their expectation. Should have people skills, adjust to their needs.
I14	Time keeping	Focused	When it comes to being focused, I am thinking of meetings, projects etc. We are quiet focused when we are under pressure, even the other time we do take responsibilities and seriousness is

			always there
I14	Time keeping	Separation of work / personal	I rarely get to be at home with family when I need or want to. There is always some project deadline that stops me from taking my wife out, kids party etc. This work environment is always under pressure.
I15	Time keeping	Focused	Very normal to delay things or postponing – normally we have a meeting and have action items – and then it stops over there – nothing gets followed up. People come for a meeting late – if they get a phone they go out – it is not different in big organizations. It is difficult to fire some one for these reasons – it is quiet acceptable. We had a customer meeting – the chair person came15 minutes late – it was just acceptable. We have to learn a lot in this aspect.
I15	Time keeping	Prioritisation	We are capable to working based on priorities, we have group meetings, and project meetings and assign priority levels to tasks and assign them to resources accordingly
I15	Time keeping	Separation of work / personal	When I think about a balance between work and personal, I should admit that in India, we don't get a good balance
I16	Time keeping	Timeliness / promptness	When we get projects assigned, we have a time component assigned which is decided by the team leads. Now we are expected to complete on time. This is in most cases not feasible
I16	Time	Prioritisation	Good prioritisation is seen in India – we prefer to

	keeping		work under pressure and with priorities assigned
I17	Time keeping	Timeliness / promptness	Yes time is going to be an issue Power – hierarchy – making decisions will also be an issue – we can't take customer related issue
I17	Time keeping	Prioritisation	We often prioritise and follow them
I17	Time keeping	Separation of work / personal	We need to learn to stop work on time and go home to the family. At the same time, we should also learn to work 100% when at work and not to involve too many family related tasks during work hours
I18	Time keeping	Prioritisation	Priorities are set my project leads and we tend to follow them
I18	Time keeping	Separation of work / personal	When we are at work, we don't realise how much time is taken. But it is a fact that we don't spend enough time at home with family and friends
I19	Time keeping	Timeliness / promptness	People are mostly not on time – time is not a big issue – 5-10 minutes are all not an issue at all – it is changing now
I19	Time keeping	Breaks and personal time	During work, we rarely get a chance to have a break. It is almost like 'go gogo' to finish the deadline. This is also changing now – and we tend to ask for breaks. We have good lunch area and we like to get some break off work. Some offices do have tennis, entertainment breaks etc.
I20	Time keeping	Prioritisation	If you know that the deadline is 28th of February, then give an earlier date to the development team to aim to complete earlier, and it will be more

			manageable.
I21	Time keeping	Timeliness / promptness	The same way as you did today when u were late, you said I am running late due to so and so issue, can we postponed this event. Helps to maintain not just project management, but personal relationship, it matters. If I am going to be late for dinner, call my wife and tell her that I am going to be late. These simple things don't happen here. If you have to email or communicate, it matters a lot to that part of the world, this part, it is doesn't matter, we can do that later, it should not be the way. Responsibility: When you say you are going to do something, you got to do it, it boils down to communication part as well, and you got to do it good, there is only one way of doing it and that is doing it the good way, and there should not be any second way of doing it. Here I m running short of time, so I m going to do it in the fastest possible way, it may even be the dirtiest way, can I put a presentation in that way? yes it will work for one day - but is not going to take you any where. So it matters a lot on quality and responsibility.
I21	Time keeping	Prioritisation	When it comes to crunch time, when projects are reaching its deadline, when we are under pressure, we manage quiet well. The reason being the process in place to manage these quick changes are managed better in India
I22	Time keeping	Prioritisation	…..9 in the m'ing to nite working - how to make it fun and keep the seriousness going, how to delegate work, people skills make a difference.
I22	Time	Separation of	It is seen commonly in India that we spend a lot

	keeping	work / personal	of time at work. But this doesn't mean we spending productively. We should learn to work 8 hours and then go back and spend time with family and get back to work with full of more energy.
I24	Time keeping	Timeliness / promptness	Customer will understand if you explain to them that there is a 1 week delay.
I24	Time keeping	Prioritisation	I think the reason we don't do our prioritisation well is that we don't know how to keep up the time. There is a process in place to set priority but because of the time management, we don't follow the prioritisation
I24	Time keeping	Separation of work / personal	This is not seen in most work environment
I25	Time keeping	Timeliness / promptness	From the releases - we can estimate and then decide what the technology is going to be. The reason for this not happening is due to lack of time - lack of skills - month – I dont find any software company is having issues with money.
I25	Time keeping	Prioritisation	Project success - failure - estimation, risk identification. Not like other industries - mostly driven by delivery dates, dates are arrived by the customer, bcoz of business - mitigate at the right time, that's why failures occurs, success - tracking and highlighted right time, primitive action can be taken - the dates are given by the customer, tracking will be costly and time wasted.
I29	Time keeping	Focused	When at work, if we focus 100% we will be able to finish our work on time and go back home. But

			we tend to not work productively while we are at work. We can handle meetings and time management better
I29	Time keeping	Separation of work / personal	Hmmmm… we need to improve in this a lot. Most of us work 10 – 12 hours a day. Some even sleep at work. We have all facilities and don't feel bad about that. Food is provided, transport provided, but we don't realise our family time is not being utilised well
I30	Time keeping	Timeliness / promptness	In recent years we have improved in this area. We now realise the timeliness is the main factor when we work with western clients.
I30	Time keeping	Focused	Focusing on work is always seen in teams. We take tasks and priorities seriously and work towards the goals.
I30	Time keeping	Separation of work / personal	As the work environment is such that we have competitiveness and lots of projects, there is a tendency to work extra to get more money and satisfaction and experience.
I31	Time keeping	Focused	We do need to focus better to get things done faster.
I31	Time keeping	Prioritisation	Process to prioritise is well documented and implemented.
I32	Time keeping	Timeliness / promptness	When we work, we mostly delay our deadline due to bad time management. I think it is just the culture where we like to postpone events until the last minute
I32	Time keeping	Prioritisation	It is common for the team to prioritise their work and follow them accordingly. This practice is seen commonly in India

I32	Time keeping	Separation of work / personal	We tend not to separate our time to personal – if there are urgent pending tasks, then we tend to sacrifice our personal life for this work
I34	Time keeping	Focused	Team members tend to keep focusing on their work. We work well as a team and if the project is interesting we help and work together and keep them going
I35	Time keeping	Prioritisation	Work always gets prioritised and we manage our work well
I35	Time keeping	Separation of work / personal	At work, we tend to do some personal work but we actually work many hours at work – somewhere around 10 hours
I36	Time keeping	Timeliness / promptness	... plan well and don't over load with work, identify the people's talent and proceed accordingly,
I36	Time keeping	Prioritisation	Work gets prioritised and gets done accordingly. If they change, we get notified and a good process is in place to manage prioritisation well

Context - Communication pattern in India

I1	Meeting deadlines and expectations	False promises	We like to give false promises, we try hard to impress customers and due to that sometimes lose credibility as things are not done in the right way.
I1	Transparency	Outspoken	Open with team, speaks well to all, articulation of plans are really good. Among the team members they are very outspoken, but when it comes to boss/client, then the tendency to speak out

			vanishes
I1	Negotiation	Emotional	We tend to bring emotions into work sometimes. When we know our friends are in the decision making, then I feel we tend to bring emotions to it.
I2	Meeting deadlines and expectations	False commitment	We like a work environment which is more of a happy and non-conflict situation. To create this environment, we tend to agree to all what is asked for and due to the fact that we provide false commitments, even if we know that this is not possible, we face a lot of issues
I2	Transparency	Outspoken	Though this is changed in recent years, we still feel bad to discuss conflicts openly. We prefer to keep it to ourselves
I2	Proactive	Proactive	We don't plan ourselves proactively. We react to situations better, but our proactive nature needs lots of improvement
I3	Transparency	Outspoken	Yah we are told to be outspoken in meetings to discuss openly. But I think because of the fear of being misunderstood or to avoid any conflicting issues, we tend to not speak openly
I3	Negotiation	Negotiation	We are very good at negotiations. When it comes to business deals, we are capable of getting the best value
I3	Proactive	Proactive	In India we prefer to work ahead and plan in a proactive manner, but as we have loads of projects to be managed, we tend to work in a reactive manner as we don't have time to plan ahead
I4	Meeting	False	[False promises due to culture] – Because we are

	deadlines and expectations	promises	small team – whatever they ask we like to do to make the client happy and to make them their requirements covered.
I4	Transparency	Outspoken	In most cases we tend to speak openly, but we still can improve in this area as we feel bad to face conflicts
I5	Meeting deadlines and expectations	False commitment	I think this is in our culture. We don't like to make anyone feel bad, so we tend to 'not say no' to anyone. This sometimes have raised bigger issues
I5	Negotiation	Emotional	We are a collective culture and we value people more. Due to this reason, we can take decisions emotionally. When it comes to personal issues, we do think of their personal situations and work accordingly
I5	Proactive	Proactive	No, we rarely get an opportunity to think proactively, but I think we can
I7	Meeting deadlines and expectations	False commitment	We don't like to say "NO" we try to fulfil the requirements or requests from client as much as possible
I7	Transparency	Outspoken	I think here females find it harder to be open as in some cases they are categorised as arrogant
I7	Proactive	Proactive	Working here we don't get time to start thinking proactively. We get multiple projects at the same time and the tendency to think of new ideas is very rare
I8	Meeting deadlines	False commitment	We are tied up with work and tasks, when we can't do as requested, we tend to tell the clients

	and expectations		that we are fully busy and openly discuss. We used to give false commitment, but not any more
I9	Transparency	Outspoken	Daily team meetings – team members are given the opportunity to speak out, but they don't want to talk or express their views, so though an opportunity is given and is requested from every team member to talk, they don't know what to say
I10	Meeting deadlines and expectations	Easy going	I think by nature we like to take life serious and prefer to commit to doing projects on time. We are very hard working people
I11	Meeting deadlines and expectations	False promises	We try to negotiate what can be done. We don't like to say "No". It is in the culture to try to make everyone happy. We are sometimes asked to just follow instructions without asking questions/clarifications
I11	Transparency	Outspoken	I could say that in here we don't speak openly. The main reason is we feel bad to say something and hurt the other person. I believe it is part of the culture to keep everyone happy
I11	Negotiation	Negotiation	Our negotiation skills are pretty good. When we want some value to the project, we try to negotiate well to get going
I12	Meeting deadlines and expectations	Easy going	In Australia they like to work casual and to be very relaxed. They like Friday pub – work from home – they have lots of free time, we have to come on weekends – we can't come in shorts – informal not allowed.
I12	Negotiation	Negotiation	We like to negotiate and provide as much as possible to the customers. That is why we are up

			in the market. We are capable of doing things better.
I12	Proactive	Proactive	Our work is such that we can really be proactive
I13	Meeting deadlines and expectations	False promises	In Western culture you are expected to say what you feel like, but here we never say "no'. We like to say ahmmmmmmm and just 'may be'. We don't have the culture or brought up to just say yes or adjust your answer, but never say 'No' Even at school, if we haven't done our home work, we will get a smack and to avoid that we say some excuse of being sick etc to avoid the consequences. We will try to convince the teacher. When at work, we now try to do the same, give false excuses to get out of any serious consequences. We tend to lie to get out of the problem, we don't feel good facing the situation.
I13	Transparency	Outspoken	Sometimes we do like to discuss issues openly, but many times we have felt it hard to openly accuse someone. We like a culture where everyone is in a state of working together.
I13	Proactive	Proactive	We do like to work in a proactive manner, but the reality stops us from being proactive
I14	Transparency	Outspoken	When I took over the project the estimates were already done, and I had to stick the schedule. My team mates and team leads - were trying their best - but because of this one person - the whole package was unable to be completed. I also came to know only after about a month, and by then it was too late, and no indication actually showed that this could lead to a project delay. Nothing was highlighted. This was something that can't be highlighted to the superior or manager. we had to

			deal with him first - didn't want to inform manager.
I15	Meeting deadlines and expectations	False promises	Feel bad to say NO to their supervisors – social economic conditions – we have to do this Straight forward communication – false promises – you don't get a clear answer – cultural difference Infact I feel better working with people in US rather than in India – they know what they want – very clear – no hidden comments etc helps
I16	Meeting deadlines and expectations	False commitment	Most western cultures are aware that Indians have a tendency to promise even if it cant be completed. This has become the norm for Indians. We are trying to change, but very difficult
I16	Meeting deadlines and expectations	Easy going	We also like to keep relaxing until the priority hits the roof. We always like to work under pressure and we work better under pressure
I16	Transparency	Outspoken	Our managers always ask us to be open in meetings. But we fear just in case we have said something that has influenced for the manager to make a firm decision that affects us
I16	Proactive	Proactive	No we are not proactive at all, we know life is full of changes and we like to work based on a daily basis
I17	Meeting deadlines and expectations	Easy going	We like to work in a team and our daily routine is set. I think we tend to keep work to the last minute. We could manage time better and this reflects us as easy going as well
I17	Proactive	Proactive	No we don't work in a proactive manner. The

			reason could be because, we get changes every day. In IT, there is nothing that can be planned ahead as we have to work with the solution
I18	Meeting deadlines and expectations	False promises	[Saying NO] This is a problem – in India – we are trained that way and though we are trying – it is difficult. Technical team are good – they normally say NO and say their opinion. But other time I think we don't
I19	Transparency	Outspoken	Some people are very shy and then we have to and ask them because they don't come to us
I20	Meeting deadlines and expectations	False promises	Is it because of the culture that we don't like to say no, I have seen situations where people don't like to say no because of the culture that we were brought up? We just give false commitment because we don't want to hurt them? I agree to it partially, the second part is that, you don't estimate properly, you just commit for the face value to avoid failure, but unless u realise that this is going to make you more failures - you will not change. I have seen people and I do it as well, I tell them I can't complete - I need more time and clients are always happy to cater for this, but we have to make them aware and explain to them. They appreciate the fact that you are explaining and telling them the true story. Those who don't have western exposure don't do that, but those who are educated, should say no. It is also part of the culture not to say NO and it comes with experience.

I21	Transparency	Outspoken	How communication flowing, do have sessions with senior manager, suggestions are accepted, open, in western world, they are done in a formal way, but here, they do it because if you don't listen, people are going to move away.
I22	Meeting deadlines and expectations	False commitment	We do promise clients of a deadline date that we think the client will be happy with. In most cases, we do this to please the client as we hate to make anyone sad
I22	Negotiation	Emotional	We do take emotional decision, as part of our culture we have made decision to please our team members or friends
I24	Meeting deadlines and expectations	False promises	…. presented a wrong picture, we also have equal share to be blamed, they didn't understand - gave false promises India how things work is different from US. In India people don't do estimation properly - they don't know how to say no - expectation management is very weak, they say they will call in 3 hrs, but it will be 3 days. No feedback - no clear indication. Others time is not important, we take it for granted.
I24	Transparency	Outspoken	Good attitude, understand the difficulty of tech, should not blindly commit to the business, giving a false impression, and should be able to talk in business language,
I25	Meeting deadlines and	Easy going	I wouldn't call us as easy going, we don't relax during work hours, but we do delay our projects and keep actions till the end and sometimes this

	expectations		has made drastic impacts on projects
I25	Negotiation	Emotional	We tend to get worked up with the people around us. When it comes to work commitment, we work for the person than for the company and it does emotionally bind us to the people around us
I25	Proactive	Proactive	Most times we try to plan ahead and work in a proactive way
I29	Meeting deadlines and expectations	Easy going	We work hard and in most cases like to complete task on time. During work hours we are very focused
I29	Transparency	Outspoken	We openly discuss any issues related to work or personal. But there are many cases where we need to work towards a goal and achieve together
I31	Meeting deadlines and expectations	False promises	Always keeping the customers happy, our marketing team sometimes give false promises, customers are very important, we haven't seen our customers who we have been working for the past 5 years.
I32	Meeting deadlines and expectations	False promises	[Culture to say no] culture is not fully changed - we still don't like to say no - still try to figure it out - last 2 years it is changing a bit - our mentors have clearly told us that If we can't do it - to clearly say that to customers. It was really tough to change - that's how we were brought up, it is changing - within the last 2 years.
I32	Proactive	Proactive	No - We are always reactive, and never proactive. We try to add in a process to solve the current problem. We don't take vaccine to prevent something. I have not actually seen anybody

			trying to use the lessons learnt. The database exists but there is no time, we have never used passed experience.
I33	Transparency	Outspoken	There is lot of openness in work culture. But I think when it comes to manager/staff then we are not very outspoken. We have the fear of being punished
I33	Negotiation	Negotiation	Good negotiation skills exists with us. We are trained to negotiate where ever needed
I34	Transparency	Outspoken	Very outspoken, we like to openly discuss issues
I34	Negotiation	Emotional	No we tend to work from procedures that we need to follow. In most areas we take the right decision
I34	Proactive	Proactive	Yah we do work proactively
I35	Meeting deadlines and expectations	False promises	…. Most times we try and adjust to complete on a predefined date, that's when leadership coming up to say the real situation. Leadership is the one that brings about the cultural change. Openness, ability to say no, risk management, support for the individual who is struggling to achieve, cultural diversity, any where we are – we are one.
I36	Meeting deadlines and expectations	False commitment	It is the way we were brought up, we cant say 'No' to anyone. If any elders ask for some favour, we always say 'yes' and some how manage to convince them. This is in the culture and is also reflected at work
I36	Meeting deadlines and	Easy going	We also tend to delay tasks until the last moment. We have false confidence in our selves and don't plan well to finish tasks and priorities on time

	expectations		
I37	Meeting deadlines and expectations	False commitment	We are asked to say "no' if we cant do - but we never say no, in india - it is very difficult to say no, and we don't say no, we over commit, so all these things matter. Our culture, attitude is not to say no, some how deliver it, we spoil the customer. We try not to hurt customer, we also want to get more business, customers don't get hurt, they don't mind if u tell them upfront if u cant do.
I37	Transparency	Outspoken	different work culture, we bond with people, we help people a lot, we don't have the habit of saying no, we aim for deliverables, in western - they are always clear, they cant work for more than 8 hrs, here we bury our time, work weekends. Growth is so huge - you are unable to handle it and weekends will need to be done. All people want to work hard - it is very sad actually how we have spoilt our selves, because of competition it is becoming worse. I have tried to change - but didn't work, the mobile is a deadly weapon, we get calls weekends, we can't live without it, your accessible 24 hrs, I can't be invisible at all, mobile and laptops we are expected to work all the time.
I37	Meeting deadlines and	Easy going	We are not lazy, but we take things for granted. As our lives are full of surprises, we tend to not take anything seriously. This sometimes affects

	expectations		the projects as we keep postponing

Other comments gathered in India

- Lots of commitment, work extra, if only 8 hours is needed, we are ready to do 10 hours
- Good methodology or process is in place
- Good resources available
- Expected for the company to provide career opportunities
- 3-4 years in India – they are very demanding and want to go up the ladder very soon, they are very self motivated. In western culture it is ok to be in the same level, but in India they expect to go up and move on every year
- Phone ringing was seen almost during every interview and they were not time conscious at all, even on the phone
- Most interviews didn't start on time and finish on time. Some days they didn't turn up and needed to be rescheduled
- Females always get more advantage –as they don't have to stay back late, as mothers they get more privilege as well
- Cafeteria here is the best – I don't think any where in the world these sort of facilities are allowed. Here food is also equally important as work. Any one gives food, the staff will be very loyal to the company. These sort of taking care steps are very important to Indian culture
- Ambitious and competitiveness
- We don't want the low level jobs given to India; we want all levels of jobs given to us to do. We can manage projects etc.
- People work for the manager – not just for money
- Japan and UK – very hard working

- Biggest challenge is to keep staff motivated
- Cultural diff - US can't work after 6 - we start our day late - we take our time - can work till 10 pm, we have to give and take - sometimes not very healthy - ruins the relationships, once u start appreciate the cultural issues - then becomes easier, understand the culture - what works and what doesn't work - UK don't come to the point straight away, US - straight to the point, these are things that u need to understand - adopt. We get trained, other org train as well, u learn mostly from peers, learn from people who have come from US/UK, lessons learnt helps here.
- Leadership – Here the developer becomes a senior developer in 1 year and then manage projects in another year. Here we get lots of opportunities and options. Indians always like to and want to go higher. But do we have the mental ability to lead and manage projects
- Multi-skilled – We quickly get multi-skilled and agile requires people with multi-skills so that we can handle all situations. We can manage account, deal with people, analyse, code etc. [Reason?] We don't want to spend money so we have less people, and we try to get more out of few people. So the multi-skilled people always are preferred in organisations.

Culture Study – United Kingdom

Individualism and Collectivism in United Kingdom

U1	Team collaboration	Teamwork	[Working together] 100% We have been more productive – but we don't have regular meetings – as we have been working together – we have now become more understanding
U1	Team	Group /	Cultural – no – but linguistic difference – but

	collaboration	culture awareness	most of them can speak good English Spanish and Portuguese are similar culture [US] covering some one's backside, reluctant to take decision without involving the team, rigid culture, blame culture – if something goes wrong in America – it is far more culture of blame rather than culture of what do we do now. [Very friendly – helpful – willingness to share and help more – organized the other team members]
U1	Management support	Management support	[Management support] IT has become much more part of general business within the last 10 years – IT managers have become the support group for business If something goes wrong – we share the burden – no blaming culture Business knows what is happening all of the time
U1	Open and honest communication	Openness	Who ever comes up with the good idea will be accepted by everyone
U1	Self organising team	Self organising	[Independent team work] Yes – they do in the framework of the project – not certainly restricted
U2	Team collaboration	Teamwork	Here in UK we have people from all over the world – may not have the same culture as English Depending on how you adjust and work

			together Very honest Work – very well
U2	Team collaboration	Group / culture awareness	Our client is in Australia [Aus and UK] Not much of a difference India work fast – analytical skills are good UK – very formal US – a bit AUS – very relaxed
U2	Management support	Management support	Support of management Most of them are very supportive Very good Provide training Getting benefit both sides
U2	Open and honest communication	Openness	Openly – upfront say what they can and can't do
U3	Team collaboration	Teamwork	[Team dynamics] I think the relationship is perfect – it couldn't be better – we are friends and after work we are close to each other as well [Pair programming - XP] Yes I think so – working together will work definitely in our culture.
U3	Management	Management	[Management support]

	support	support	Its very good – they have the same ideas as us and I don't think they have any problem with us. Any time they are available – week days or weekends. Team meetings are there quiet often – we sit very close to each other – and we meet almost every day.
U3	Dedicated team	Commitment	Its very good – everyone in the team is very dedicated – if some one has a problem we help each other – after work we are friends –
U4	Team collaboration	Teamwork	[Team culture] Regular liaison We meet at Spain or Portugal
U4	Management support	Commitment	[Very friendly, helpful, happy]
U4	Self organising team	Self organising	Mentoring/facilitating/focused/result oriented – Facilitating – focused – [risk taking] ok to IT solutions – we try to avoid risks with IT is not good – I will be very vary to take risk
U5	Team collaboration	Teamwork	[Team dynamics] Pair programming – I think it is very much the case how we already work – they working very next to each other – talking to each other – Recognition is always like a team recognition – one solid team Very nice clever people [bigger team] we will change the dynamics to suit the environment

			[Physically far – is that an issue] No talking on the phone and also connecting remotely to their pc is not an issue I just watch them working I can also get lot of information over the phone Even if everyone is happy we still go around and make sure the communication and relationship is growing.
U5	Team collaboration	Group / culture awareness	I think we all actually work together and committed – the business know the IT is important. It is a very nice office here – it has a row of offices and an open plan area – their office is always wide open – I actually spend 4 hours a day in their offices.
U5	Management support	Management support	Management support Good management support Encourages confidence Always available Very strong Offer help [this is not the same in other companies – some companies when they don't have security – they keep their knowledge to themselves – sometimes it can be very nasty]
U5	Self organising team	Self organising	[Team working independently] Team members are encouraged to make decisions and work independently

U5	Dedicated team	Commitment	[Dedicated team] Most of them finish work an hour later than usual Nature of work is such that they love to continue and also cant stop half way through People love software then salary Self satisfaction
U6	Team collaboration	Teamwork	[Pair programming] Yes very much – all the projects we work very well together – coordinate and – skill set can be shared – more control can be done as well
U6	Team collaboration	Group / culture awareness	Entrepreneur culture [American culture is more aggressive than here – more performance related than here – faster than here] [Indian culture – is more of a combination of American and English culture – hierarchy is very strong in India – in UK is also it is there – but in US it is very flat] I want say that the commitment is more in India – in India they work 2am – but still the same commitment as US and UK I think. American culture is very open
U6	Open and honest communication	Openness	If you are with a client – you are free to express it – but freedom is also given to talk and explain their views.
U8	Team collaboration	Teamwork	[Team collaboration] We are fully committed to the project – and the

			business is as well Business and IT don't meet that often – but they know each other – emails and phone conversations are very frequently There is different ways of tackling things – how we want things to be done. We are more than a development team – we try to think as business – we ten to force them to the same way
U8	Team collaboration	Group / culture awareness	[Pair programming] Why not – we got team members with senior and junior developers– they normally work together – but the responsibility is just given to one person. I think it will work [Culture difference] Portugal is more close to tactical approach – UK is more practical – and Spain is in the middle
U8	Management support	Management support	[Commitment from management] - it is seen most times
U8	Open and honest communication	Openness	Some times when we have meeting – I want them to talk openly and sometimes I will be wrong and I would like them to tell me when I am wrong
U8	Dedicated team	Commitment	Fully committed – apart from work we are also friends We work quiet flexible – we work many hours – an hour to start – the management like every one to respect. We can't come early and leave early – or come late and leave late. Common

			sense – reasonable end time If something needs to be delivered tomorrow then the team will be working extra hours to finish the work
U9	Team collaboration	Teamwork	Good team management – also technical ability Good specification – in depth analysis – constant communication with users and also helps to design well – from the beginning Cost – to stay on budget Delivery on time We work very close to each other – team relationship is really good – I play multiple roles and at the same time I always believe it is a team effort and I don't have the time and knowledge to do everything – I depend on other people – you can't expect everyone to be the same – some like to learn new stuff – people management is harder than managing projects – the whole project will fail if we cant communicate very well. Very flexible, capable of working even complex tasks.
U9	Open and honest communication	Openness	If you talk to people in the way they like – then they work very well for you even for nothing. You can approach people in different way – a guy he didn't like communicating or email – 1,2,3,4 and ask what status it is in – others like to talk – if I say I will deliver on Thursday – he will ask if I could get on Tuesday – so the approach is different. Even the body language you can see that they are not happy. My husband is Irish – he is very argumentative- and I am as well. It's not good to keep quiet if

			you have an issue –should be able to openly discuss – most in UK do that. It is not easy for women to go for a meeting and see something – women in business have to be hard – I am quiet soft – but still to get my view out – I have to be outspoken – it is quiet intimidating – I say I want the meeting at this time and I need these are what I want to be done – etc helps to get things done faster
U10	Team collaboration	Teamwork	Team – lack of confidence – pretending what you are doing – not enough technical skills
U10	Team collaboration	Group / culture awareness	Friendly Chinese – commercial Turkish – entrepreneurial Indian – obsessive English – UK – arrogant – distant – non communicative Culture is the mind set – British English mentality – think they are professional But Indian and other cultures they are very interactive
U10	Open and honest communication	Openness	[Pair programming] Yes it will work - I think – in UK culturally we are a very open society – to implement a strategy – very close society – very passionate – they worry about their work – worry about their job security – very competitive as well
U11	Team collaboration	Teamwork	Team work very well with each other – people have to rely upon all – They don't like peer review – knowledge transfer is good –

U14	Management support	Management support	Business commitment – It is seen – the value of IT is seen very high -
U15	Team collaboration	Teamwork	Hard working and accountable, All members understand the importance of their tasks and place within the projects, we are always willing to provide help to one another in order to stop issues. This prevents problems escalating and allows for us to address accountability. We believe in moving people to take on more responsibility and greater roles within the organization in order to reward and re-structure the group which results in building a larger more productive team.
U15	Open and honest communication	Openness	As with many organizations issues exist mainly with misunderstandings and small arguments between teams and management, I think is normal and is usually resolved with good spirits. I do not believe that distance exists and would not stand for this if any of my team members felt alienated or under appreciated
U15	Self organising team	Self organising	Hard working and going beyond required duties.
U17	Team collaboration	Teamwork	Relationship is generally good – levels are managed well so that the hierarchy – advice and support is good – fairly tight but even relationship – 3-4 people

Power distance index in United Kingdom

U1	Trust people more than process	Trust and respect	Absolutely – I personally encourage it – I think it is in every organization and I think it is the general culture We have the process in place as well for team to make decisions appropriately
U1	Decision making	Able to make decision	We are given enough authority to make decisions in our limits... we tend to make use of this and make quick decisions and work better
U1	Authoritative	Hierarchy	The organisational structure is not very hierarchical. We discuss issues openly and work better as a team. Most decisions are made as much as possible as a team
U1	Authoritative	Escalation	Yah... this is an area we will need to work on... I think some times we do tend to keep things to the last minute and don't let management know or escalate
U1	Transparency	Transparency	Yes – bigger picture understanding is there
U2	Trust people more than process	Trust and respect	Trust is the same in both places – we have trust among the team and management… we like working well together and keep things open so that the project can go well…
U2	Decision making	Able to make decision	The team has been always making the right decision. We are able to and capable of making quick decisions based on what we are authorised to.
U2	Blame sharing	Taking responsibility	In most cases, we do take responsibilities of what we do. When project goes in the wrong direction, we as a team sit and work out the best approach and always take responsibility of our

			action
U3	Decision making	Quick decision making	It depends on the decision level – big decisions are taken by management – but other software related decisions – we can make them
U3	Decision making	Able to make decision	Yes – making decision efficiently – if we don't have any clear specification – then we are capable of taking decision of how to do things.
U3	Transparency	Transparency	Bigger picture – I think so – we are very close to the business and we understand well – and also understand the whole big picture.
U4	Decision making	Quick decision making	Yes we do take quick decisions – as and when they need to be
U4	Decision making	Able to make decision	Fairly bureaucratic – IT teams do what they want to do – but I think most companies have a very strict hierarchy – process is very strict of what we can/cant do and approval process
U4	Transparency	Transparency	There is a team ethic – when things go wrong we take ownership of it – most of the details are transparent – everyone feels part of the team – but there are few areas which can be more transparent – or some management issues can be more transparent
U5	Trust people more than process	Trust and respect	Yah I think [in IT] they have quite a lot of experience – it is always lot of communication and trust is always built and maintained.
U5	Blame sharing / taking responsibility	Taking responsibility	I don't think so – the company culture – if any one makes a mistake – no one crucify them – the blame is taken by the department – any one needs to panic about this

U6	Decision making	Quick decision making	The team work pretty agile and able to make quick decisions, but sometimes the hierarchy stops from progressing with decisions as we will need to wait for management approval
U6	Authoritative	Hierarchy	The structure has very strong levels of hierarchy where management approval is required in most cases. Though project manager makes decision, the final approval lies with management and sometimes the structure doesn't help with progress of the project
U6	Transparency	Transparency	We have a good transparency here, but not sure of other departments
U7	Authoritative	Hierarchy	We have different levels of management – but when it comes to approval, we normally do them based on a formal process. The business/management don't show authority towards the team.
U7	Taking responsibility	Taking responsibility	Most team members know what they are doing, we work very well together and when things don't go according to plan, then we have a plan b and take responsibilities to complete certain tasks.
U8	Decision making	Quick decision making	To the extent allowed for each member Quiet flexible Open environment Some questions are answered in the fly – we are always available to answer any question [would be harder if the team is distributed far – coordinating will be more difficult]

U8	Decision making	Able to make decision	I would say we are good
U8	Transparency	Transparency	yes that exist – I think so
U9	Authoritative	Hierarchy	Here the roles and responsibilities are very clear – and I know what my tasks are what my duties are – also know what is expected from you as well. It is important to know – but there is no issue of I am the manager, I am the leader. They make coffee for everybody – all work very well together. When something goes wrong – we make decision – then we know who is responsible for what etc.
U10	Trust people more than process	Trust and respect	As a team we work together, we respect each other. I think from business point of view, they too allow team members to make decisions and work with respect and trust. Managers are mostly seem to have respect and trust on team members
U10	Decision making	Able to make decision	The authority to make decision when needed is seen in most teams. We are expected to make right decision for the right situation
U10	Transparency	Transparency	The whole big picture is transparent in most cases, but there are situations where the management have not made it clear and transparent with some real situations.
U14	Authoritative	Hierarchy	Lot of flat structures – progression can be slow hierarchy – some have formal structures – it all depends on the organizations – mostly it is preferred that the process of authorization is seen

U14	Blame sharing	Taking responsibility	We as a team always take responsibility for our actions, most managers take responsibility of their tasks and project managers too
U15	Trust people more than process	Trust and respect	Flexible, adaptable
U15	Transparency	Transparency	Focused, (Aim to expand and develop company in to a global brand) Organized (Structured teams and departments allow the transparency of tasks) Efficient (Library of issues and solutions available to all)
U16	Decision making	Quick decision making	Structured. We have clear definitions of the structure within our organization so all staff are aware of who they have to approach in order to have a task organized. Distance does not exist within our organization because the structure is very flexible. Politics will always exist but it is how well it is managed that makes the difference. It is managed constructively within our organization.
U17	Trust people more than process	Trust and respect	[Trust – openness] Yes
U17	Blame sharing / taking responsibility	Taking responsibility	Blame sharing Responsibility is generally in IT manager

Uncertainty Avoidance Index in United Kingdom

U1	Risk taking	Risk taking	Risk taking – NO – Yes: provided they have always been calculated and have a backup plan
U1	Tolerance for change	Tolerance for change	Change in requirements late in development – We work towards the deadline that is acceptable by both business and us The whole team work together – what we need – they never say – oh it wasn't in the requirements I do think it will work even if it is a big team – but should be divided into functional team
U1	Innovation	Innovation	[Innovative/risk taking] Very highly motivated and dedicated – level of high pride in development I believe building of the team in terms of success helps project success greatly We work a lot closet Innovation – for the industry we are in we are in the leading edge
U2	Risk taking	Risk taking	Taking risks – reasonable risk – but not much – but very confident
U2	Innovation	Innovation	Innovative Very helpful
U3	Risk taking	Risk taking	[Risk taking] Yah – we tried to reduce taking risk – but we do take when we need to – we are trying to reduce
U3	Innovation	Innovation	Good – as soon as there is ways to do – we definitely try new things – we haven't got time to

			do that – but when we can we try to do that.
U3	Tolerance for change	Tolerance for change	Unknown and surprising changes are accepted and tolerated
U3	Tolerance for change	Reacting to change	Most times decision making takes a longer time when there is a sudden change due to getting acceptance
U4	Risk taking	Risk taking	We don't like to take risks, I will be very vary to take risks
U4	Tolerance for change	Unstructured situation	In UK, we tend to manage the situations well. We always have a backup plan
U4	Innovation	Innovation	Very high – mainly because he is always trying to find new ways of doing things –
U4	Proactive	Proactive	Working in a proactive manner is always expected of us. We try our best to work that way
U5	Risk taking	Risk taking	Probably no – we do take calculated risks where you have to – good understanding of what is being done – we do take small risks to go forward
U5	Tolerance for change	Unstructured situation	We tend to manage our changes well, though we don't like unstructured situation, we cant avoid them. We manage them pretty well
U5	Tolerance for change	Reacting to change	During projects we always get into a situation where something unexpected arises. We as a team work well to manage them quickly as possible and make sure the projects move on well
U6	Risk taking	Risk taking	I don't think so – only 5% will take risks and – they prefer someone else to take the risk and try when they are confident

U6	Tolerance for change	Reacting to change	In business environment, we always get into situations where unexpected delays occur. Government changes etc. We then will need to work accordingly to cope with the changes – we are in IT and this is the reality
U6	Proactive	Proactive	In most teams, we work proactively.
U8	Risk taking	Risk taking	I think so – because of the nature of the development – RAD – we have to take risk but of course under control – we are always fully backed up and generally don't like to take risks unless it is needed
U8	Tolerance for change	Tolerance for change	[Late changes] of course we can handle that – it just needs to be looked at how good the change is for the project It will be commonsense decision – anything for good software
U8	Innovation	Innovation	I would say its good – from what I can see it is good – I think innovation is good – it should not be seen as a waste –
U9	Risk taking	Risk taking	We don't like to take too much risk – we like to follow what has been tried already We like to do things in a traditional way – we look at competitiveness – what requirements are. Don't like to break rules.
U9	Tolerance for change	Unstructured situation	We are in business and the requirements changes, external environment changes; resources leave and come, etc. This is common and we understand that this is usual.

U9	Tolerance for change	Reacting to change	I don't think we work well to change. Sometimes we cant avoid them, but we try our best to manage well, but we don't succeed always
U9	Proactive	Proactive	Most staff in my team work in a proactive manner – we plan ahead as well
U10	Risk taking	Risk taking	Teams that he was working was structure was flatter – innovation was not much – IT should mirror the company they are dealing with
U10	Tolerance for change	Tolerance for change	In our culture the late changes and unexpected changes are managed well
U10	Tolerance for change	Reacting to change	All work very well or react well with unplanned change. Sometimes it becomes really hard to manage projects due to sudden change, but we manage well
U10	Proactive	Proactive	We work proactively, it is the expectation from the management/business that we work in such a manner we are always ahead
U14	Risk taking	Risk taking	Risks are commonly seen in IT culture and we normally manage them well
U14	Tolerance for change	Tolerance for change	Yah we are very tolerant to change – we know this is reality and business is always changing
U14	Proactive	Proactive	Though we try our best to be proactive, sometimes we cant as changes occurs so sudden that they are unexpected. We need to then react to the situation rather than act proactive
U15	Risk taking	Risk taking	We don't like taking risks
U15	Innovation	Innovation	Innovative ideas are always welcome by management provided we have enough time and

			money to implement
U16	Risk taking	Risk taking	In most situation we don't tend to take risks as IT is an area where risks should be avoided
U16	Tolerance for change	Reacting to change	We manage change pretty well and understand that changes are common in IT field
U16	Proactive	Proactive	We try to best of our ability to work in a proactive manner – this is what will help us to be in the leading edge.
U17	Proactive	Proactive	We do work proactively, but sometimes we tend to not plan ahead

Time management in United Kingdom

U1	Time keeping	Timeliness / promptness	We do deliver on time, and as much as possible we keep the promptness going
U1	Time keeping	Focused	While at work we are very focused, we like to complete tasks effectively
U2	Time keeping	Prioritisation	In UK very matured – team if we explain – they are very good at communication Working culture is good (in India they work 15 hours) here the time management is very good – productivity is the same – it is even much better here
U2	Time keeping	Breaks and personal time	We don't get too many breaks

U3	Time keeping	Prioritisation	Jobs get allocated and prioritised and we are pretty organised when it comes to prioritisation and scheduling
U3	Time keeping	Breaks and personal time	Break and personal time are just enough for staff to get a good balance between work and personal life. We are flexible enough to have that balance
U4	Time keeping	Timeliness / prioritisation	When we gather requirements, and when during development cycle, we are expected to keep the timeliness and maintain project schedule. If in case there is an issue, then we review and update the schedule to reflect the situation
U4	Time keeping	Breaks and personal time	There are regular breaks that we can take if we need to. There is no restriction on that. But we try not to unless we really need to
U4	Time keeping	Separation of work / personal	We are good friends outside work area as well. During work, even if we are friends, we are very professional. Then we spend a lot of time together as a team outside work hours.
U5	Time keeping	Timeliness / promptness	During our project work and normal operational work, we attend to meetings, discussions etc and we always keep the time on schedule.
U5	Time keeping	Prioritisation	During projects, we are assigned tasks that are estimated by others – sometimes team leads, sometime an expected date of completion is set. Then we work extra hours to complete – sometimes we communicate back to reprioritise the tasks as the work overload can become tedious
U6	Time keeping	Timeliness / prioritisation	Yes, most times we keep up the time and I believe that as part of the culture, we like when

			projects and tasks gets done on time.
U6	Time keeping	Focused	Most team members are really focused and determined to complete tasks on time and with full functionality.
U6	Time keeping	Breaks and personal time	We have a good balance of breaks and work. The work environment allows us to take off when there is a family need – this helps us to work better
U7	Time keeping	Focused	We are very focused and work on time
U8	Time keeping	Timeliness / promptness	We deliver frequently to business and we are expected to keep the schedule going as it has trickle effect is one release doesn't go through. But sometimes, we do miss the release – but mostly due to external factors like sudden leave, sickness etc.
U8	Time keeping	Prioritisation	We are constantly delivering for a group of companies – we deliver every 15 days – and it does work very well – versions We have every day meeting to go through the status or change in requirements We divide them into new modules and improvements – they come up with ideas or we come up with more ideas
U9	Time keeping	Timeliness / promptness	We work proactively and also maintain time, sometimes if we cant make releases, then we plan ahead and change the delivery date
U9	Time keeping	Breaks and personal time	Yah of course, we do get good quality time for personal needs

U10	Time keeping	Prioritisation	We have heaps of tasks pending and we require prioritising. We keep track of priorities and communicate among the team members with progress, issues and concerns.
U14	Time keeping	Breaks and personal time	Our balance of work and personal time is good, we tend to take less breaks compared to other western countries. We have lots of personal time, after work hours
U15	Time keeping	Prioritisation	Deadlines are a key factor in working on and delivering projects to our clients, Success or failure is depended on all pieces of the project fitting together perfectly. In additions to this it is important that all elements, client requirements and project objectives have been fully understood and covered
U16	Time keeping	Timeliness / promptness	We are good at time management. When we work with other cultures, we tend to be flexible if in case they don't finish on time. But we like all work to be completed on time
U16	Time keeping	Prioritisation	We also prioritise tasks according to business needs. If there are unscheduled jobs, then we reallocate accordingly based on resources available. If there are issues of scheduled dates, then we sit and discuss to reprioritise and lead to completion

Context - Communication pattern in United Kingdom

U1	Meeting deadlines	Easy going	We are very focused to determined in achieving target dates

	and expectations		
U1	Transparency	Outspoken	Though we are very open in meetings, I feel when the manager is in a meeting we tend to not talk too much
U1	Direct Customer involvement	Direct customer involvement	We also built the level of trust very early on. We also provided something which is equal or even better to the customers We worked on weekly basis to gather and communicate We spent awful lot of time with them – which was good
U2	Transparency	Outspoken	We have a pair programming aspect here They are quiet honest in what they do Communication is very good, but with higher authorities we tend to be reserved
U3	Transparency	Outspoken	When it comes to making decisions we tend to be quick and open. But I have seen occasions when we are with our boss, we tend not open up that well
U3	Negotiation	Emotional	We don't take emotional decisions, we tend to keep all decisions follow a process and based on authority / approval
U3	Direct Customer Involvement	Direct Customer Involvement	Yes of course – we used to ask them if we are not sure about it. We also get more ideas
U4	Meeting deadlines and	Easy going	We tend to be solution oriented and take situations seriously to discuss and get the best outcome

	expectations		
U4	Transparency	Outspoken	We are expected to contribute to a decision. This works very well with peers, but when it comes to authority and powerful person entering the room, this doesn't work that well
U4	Collective Ownership	Collective Ownership	Yah we do work very close to each other – ultimately we have our own responsibilities – because we need to take ownership – or should take the consequences
U5	Direct Customer involvement	Direct Customer Involvement	Pretty much – very close – touch base – close relationship – travel a lot
U6	Meeting deadlines and expectations	Easy going	No here we don't take work easy, we are very serious about what we are doing.
U6	Negotiation	Emotional	When it comes to work, we don't bring friends and/or family into the picture. We tend to be fair and don't like to make emotional decisions
U6	Proactive	Proactive	Yah, I think we do work in a proactive manner. We tend to plan ahead and think ahead to see what can make the work load better
U8	Meeting deadlines and expectations	Easy going	We like being friendly and work pretty well together. We tend to keep our focus on work
U8	Collective Ownership	Collective Ownership	If something goes wrong – they are there to support us – but don't take the blame – I like to take the final responsibility if something goes wrong.

U9	Meeting deadlines and expectations	Easy going	The tendency to take work serious is seen in most teams.
U9	Transparency	Outspoken	While at work, we are expected to speak up of any issues openly and I think we do speak openly to our best
U9	Proactive	Proactive	Most staff in my team work in a proactive manner – we plan ahead as well Yes, I believe we try hard to work in a proactive manner to keep projects going
U10	Meeting deadlines and expectations	Easy going	No I think by nature we tend to very focused and we take pride of our work. My whole team works really hard and I don't think we take work easy. We also tend to come extra hours to finish work
U10	Negotiation	Emotional	We rarely take emotional decisions. When at work, we are very professional. When we are outside work hours, we help our friends with their problems
U14	Meeting deadlines and expectations	Easy going	We are relaxed in our culture, but when it comes to work, we like finish on time and complete projects to the best of our ability
U14	Transparency	Outspoken	We do speak openly at work to get tasks going. But when we are at meetings, I feel we can discuss more openly. When we have managers in the meeting, then we tend to be quiet. But I feel in US, when the managers are sitting in the meetings, the team members speak more to show

			their input
U14	Proactive	Proactive	In most cases we work together making decisions, planning ahead, thinking outside the box. Though we try our best to be proactive, sometimes we can't as changes occurs so sudden that they are unexpected. We need to then react to the situation rather than act proactive
U15	Transparency	Outspoken	I think we are always open and honest. There is a tendency sometimes to keep work to ourselves to get credit. There is some 'keep it to yourself' attitude here.
U16	Meeting deadlines and expectations	Easy going	No we really try to get life serious. We are not a bunch of members who like to just aloof with work
U16	Proactive	Proactive	We try to best of our ability to work in a proactive manner – this is what will help us to be in the leading edge.

Comments gathered in the UK:

- Language is an issue. We have people from Germany, France, and Switzerland like neighbouring areas and other from India, China, and Australia etc. Both ways we have had language issues. Language problem is seen in some areas due to different languages spoken in all the European countries
- Portugal is more close to tactical approach, UK is more practical and Spain is in the middle
- It is not easy for women to go for meeting and achieve something. Women in business have to be hard. I have to be really loud and outspoken to get things done

- More than cultural, I think the language barrier is very important, understanding of languages is an issue

APPENDIX C

Cultural agile attributes and Coding - for Interview questions

	Cultural Agile Attributes	Individualism /collectivism	Power distance index	Uncertainty avoidance Index	Time	Context - Communication pattern
1	Trust people more than process		✓			
2	Transparency		✓			✓
3	Team collaboration	✓				
4	Self-organizing team	✓				
5	Dedicated team	✓				
6	Risk Taking			✓		
7	Innovation			✓		
8	Authoritative		✓			
9	Decision Making		✓			
10	Open and honest communication	✓				
11	Tolerance for change			✓		
12	Empowered		✓			
13	Meeting deadlines and expectations					✓
14	Proactiveness					✓
15	Time keeping				✓	
16	Direct customer involvement					✓
17	Management support	✓				
18	Collective ownership					✓
19	Blame Sharing		✓			
20	Negotiation					✓

These cultural agile attributes were used to help with interview questions. Cultural agile attributes are grouped based on cultural dimensions.

List of coding was developed based on the interviews and the terms used by participants.

Culture dimensions	**Cultural agile attributes**	**Coding**
Individualism/Collectivism	Team collaboration	Team work
		Group / culture awareness
		Hand holding
	Management support	Management support
		Commitment
	Open and honest communication	Openness
	Self organising team	Self organising
		People oriented
	Dedicated team	Work / life balance
		Commitment

Power distance index	Trust people more than process	Trust and respect
	Decision making	Quick decision making
		Able to make decision
	Authoritative	Hierarchy
		Escalation
	Blame sharing	Taking responsibility
	Empowered	Empowered
	Transparency	Transparency
		Outspoken
Uncertainty avoidance index	Rask taking	Risk taking
	Tolerance for change	Unstructured situation
		Tolerance for change
		Reacting to change
	Innovation	Innovation
Time	Time keeping	Timeliness / promptness
		Focused to complete
		Prioritisation
		Breaks and personal time
		Separation of work / personal
Context	Meeting deadline and expectations	False commitment
		Easy going
	Negotiation	Negotiation
	Proactive	Proactive
	Direct customer involvement	Direct customer involvement
	Collective ownership	Collective ownership

APPENDIX D

Interview questions

1) Individualism / Collectivism

Q1.1 How would you describe your team culture?

Q1.2 Explain situations when teamwork had an impact in your project

Q1.3 Are you aware of cultural difference among different cultures? How do you think the team are coping with different cultures?

Q1.4 Can you please explain how would you describe your management culture?

Q1.5 How would you describe communication at your work place?

Q1.6 Do the team like to work independently or in a group? Are they able to manage individually?

Q1.7 How would you rate your team's dedication? What is the commitment level?

2) Power Distance Index

Q2.1 Do you believe the team members and the management have trust among the members? Any examples to describe trust in your organisation

Q2.2 How quick do you think decisions are being made here? Are you allowed to make critical decisions?

Q2.3 What sort of leadership style do you believe exists in this organisation?

Q2.4 With regards to projects, do you see in general, issues being raised / escalated to higher management on time?

Q2.5 When things go wrong, how do you manage? Who takes the responsibility? Do you see in general team members taking on responsibilities for major impacts?

Q2.6 How does employee empowerment impact your work culture or environment?

Q2.7 Can you please describe what you think of when you think of transparency? Describe the work environment along the lines of transparency

3) Uncertainty Avoidance Index

Q3.1 Have you seen or experienced occasions when risks are taken in this organisation?

Q3.2 Software development environment is always changing. Do you believe your organisation is able to cope with the change?

Q3.3 Do you try innovative ideas?

Q3.4 Do you see team members working in a proactive manner?

Q3.5 How does 'sudden change in requirements' managed in your organisation?

4) Time

Q4.1 How well do you manage time?

Q4.2 How often do you see team members take breaks?

Q4.3 Do you have a good work/life balance?

Q4.4 How would you rate your prioritisation skills in this organisation?

5) Context - Communication Strategy

Q5.1 How best do you think the team is managing deadlines?

Q5.2 Do you see transparency in this organisation?

Q5.3 When it comes to scope change or project management, how best are the negotiation skills of your team?

Q5.4 Do you think customers involve voluntarily or do you need to force them to be involved?

Q5.5 When it comes to ownership, how is it managed in your organisation?

APPENDIX E

Past papers published

1. Enhancing Agile Methods for Multi-cultural Software Project Teams – CCSENET 2011

Abstract: It is well documented that software projects are typically over schedule, over budget and often do not meet user requirements. The main problems are all associated with people related issues. In order to address this problem the Agile philosophy was introduced with an associated portfolio of Agile methods. These methods are specifically designed to improve software project team management. However it is now increasingly common for software projects to have multicultural team members. It is well documented that people from different cultures have considerably different expectations and methods of interacting in a team environment. In order to address this problem cultural specific Agile attributes were defined based on Hofstede's cultural dimensions. The result of this study gives an insight to how cultural differences may affect a software methodology implementation, specifically Agile and how these problems can be addressed. Hence it is possible to select appropriate 'culture and Agile specific attributes' when working with multicultural software project team to help software development projects with agile methods.

2. An Evaluation of Agile Software Methodology Techniques – IJCSNS 2010

Abstract: It is well documented that software projects are often over budget, over schedule and many fail to meet the functional requirements. In an attempt to address this problem numerous software methods have been introduced such as Extreme Programming (XP), Lean Development, Scrum etc. The main problem however has been to provide guidelines for efficient and effective team management. The Agile software philosophy was therefore developed. Uniquely Agile is a framework of principles that employs a range of different software methods. This approach allows the strengths of different software methods to be identified and aggregated. Hence a project manager can identify the best software method depending on the type of project.

3. Enterprise Architecture – Bridge the gap between business, IT and Universities – ASEE 2005, Portland, Oregon

Abstract: Advancing technologies, emergent software development approaches, and economic conditions influencing corporate budgets are creating new challenges for the Application Services manager. In one of the studies (Brancheau et al. 1995), Enterprise Architecture was ranked near the top of the list of issues considered important by the chief information officers. This paper will identify what the current architectural thinking has been, based on interviews with a number of architects and

managers from a wide range of local government organizations in Western Australia. Based on the interview, a characterization of how architecture is perceived in practice has been identified. These results will provide a starting point for assessing architecture maturity and alignment within organizations, and can be used to help harmonize different architectural tunes played within organizations for a great project success.

4. Why users love to Hate IT? - ACIS 2003, Perth

Abstract: IT project success depends upon a number of factors. This paper is primarily concerned with end users and implements a method of incorporating end user participation in an IT project. This enables users to better understand and accept the new systems as well as ensuring that the final deliverable, the system, is really what is required. Furthermore, it required a change in attitude and perception of not only the end users but also the IT development staff. This technique was implemented and evaluated in a local government agency in Western Australia. The results were impressive.

5. Implementing user centred partnership design – ICEIS 2002, Angers, Paris

Abstract: IT project success depends upon a number of factors. There are many in the information systems discipline who believes that user participation is necessary for successful development. This paper is primarily concerned with end users and implements a method of incorporating end user participation in all the phases of an IT project. The proposed qualitative, case-based approach aims to achieve high level of usability of the delivered system and to make sure that skills and knowledge of the team are better used. This approach enables users to better understand and accept the new systems as well as ensuring that the final deliverable is really what the users required. Significantly this new method required a change in attitude and perception of not only the end users but also the IT development staff. This process involves studying the user tasks better, make users define what they want, make regular and early prototypes of the user interface, and user involvement from start until the end of the project. The aim of this paper was to identify the user centred factors involved in different stages of the project and to understand how the steps involved could make a positive difference to an organisation. This approach was implemented and evaluated in a local government agency in Western Australia. The results were impressive.

APPENDIX F

Cultural agile attributes – brief description

1. Team collaboration: Working together and the basis for bringing together the knowledge, experience and skills of team members

2. Management Support: Willingly providing support from Management to the other team members

3. Open and honest communication: Discussing project related issues in an open to all manner without hiding any information within the team and between team and business

4. Self organising team: The team are able to define the deadline and work towards the deadline in an organised manner

5. Dedicated team: Team members to be able to be focused and commit to reaching the expectation and goal or milestone of the projects

6. Trust people more than process: Trust among the team members and trust in management, stake holders, project leader etc. This indirectly helps working together

7. Decision making: Making decision in an appropriate time interval and by the right people

8. (*Non) Authoritative*: Authority and responsibility for results as a team and individual is required for agile, but overly authoritative nature will delay in implementing agile projects

9. Blame sharing: When projects fail, the blame and responsibility are shared between business and the IT team

10. Empowered: Team who have opportunities and motivation to make own decisions

11. *Transparency*: Keep all status open, even if there is bad news. This also includes openness in decision making, honesty, communication etc.

12. *Risk taking*: Taking calculated risks and managing risks to make sure project is progressing well and a culture to be tolerance for risk taking

13. Tolerance for change: Culture to accept change and work to progress the project without any impact

14. *Innovation*: Taking initiative to manage innovative actions and making sure projects are in the lead to implement requirements

15. Proactive: Thinking before the incident occurs and able to plan ahead

16. Time keeping: Promptness, managing priorities and getting a good balance of work time

17. Meeting deadlines and expectations: Project schedule is taken seriously and considered important

18. Negotiation: Skills required in liaising with other parties of the team to achieve the goal of the projects

19. Direct customer involvement: Customers involve from start to end during the project

20. Collective Ownership: Anyone on the team can change any of the code

APPENDIX G

Agile methods - Overview

eXtreme Programming (XP)

Refer to Chapter Two.

SCRUM

Scrum is a simple and straightforward method to manage the software development process based on the assumption that environmental (i.e. people) and technical (i.e. technologies) variables are likely to change during the process (Cordeiro, et al., 2008). XP has a definite programming aspect and Scrum has a project management emphasis, dividing development into thirty day iterations called ‘sprints’. The project management emphasis is on improving the circumstances to the greatest degree possible, monitoring the features being delivered, and constantly making adjustments. Scrum project involves facilitating the interaction of the team members based on the belief that communication, collaboration, coordination and knowledge sharing are important for delivery. Scrum starts with the thought that we live in a complicated world and therefore it is difficult to predict or definitely plan what to deliver, when to deliver and what the quality and cost will be (Highsmith, 2002a). Figure 2-7 shows the Scrum process diagram defined by Abrahamsson et al (2002).

Scrum - Process

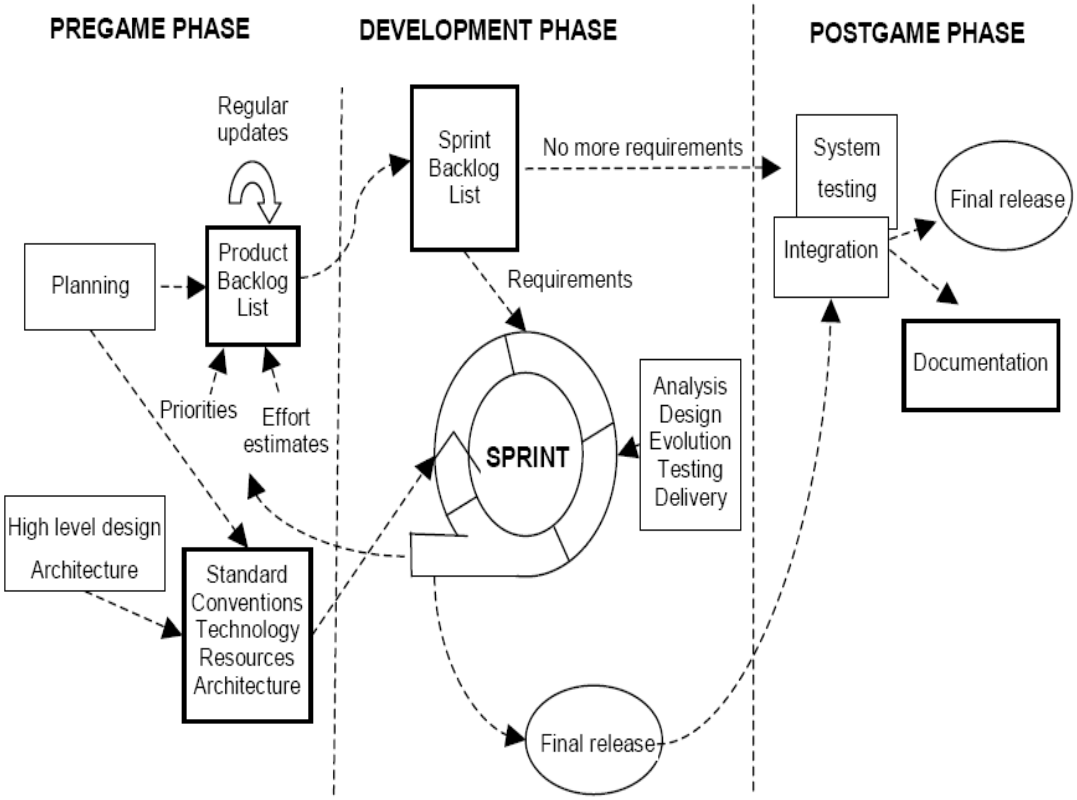

Figure 2-7: Scrum process diagram (Abrahamsson, et al., 2002)

The pre-game phase is a preliminary phase, which contains two sub-phases; planning and high level architecture design. In planning phase the system is defined and a list of currently known requirements is created and this is called product backlog list. The requirements are prioritized and efforts are estimates. The items in backlog are constantly reviewed and kept up-to date and new ones can be added. Planning also includes defining the project team, tools and other resources, risk assessment and management, training needs and verification management approval. The Scrum team reviews the updated backlog at every sprint phase to gain their commitment for the sprint. In the design architecture phase the high level design and architecture is done based on the current items in the backlog list. After this, a design review meeting is held and decisions of the implementation are done on the bases of this review. Also preliminary plans for the contents of the releases are prepared.

The development phase is treated as a ‘black box’, where unpredictable changes are expected. This means that all the environmental and technical variables are identified, observed and controlled through scrum practices during the sprints. The development team and the Product Owner then cycle through the process until the

planned features fit with the available resources for the Sprint. One final piece of the planning process is to develop a Sprint goal which is a business purpose for the Sprint. Without this goal, the team may lose track and become overly focused on tasks. In addition, keeping the goal in mind encourages the team to work towards the same goal. Team members' sign up for tasks that have been identified in the 30-day Sprint and everyone works towards this Sprint goal and everyone participates in a daily Scrum meeting. It is also observed that during the Sprint the priorities don't get changed. The daily scrum meeting energizes a Sprint. According to Highsmith(2002a) the daily scrum meetings are quickly considered as a positive approach by the people because they find these short meetings efficient and effective.

At the end of the Sprint iteration, a Post-Sprint meeting is held to review progress, display functionality to the customers and review the project from technical perspective. This phase also includes tasks like integration, system testing and documentation. Each day the developers record the days and hours invested in a task and its percent completion. This is a useful tool to monitor project progress.

Scrum identifies different roles with different responsibilities and these are listed in table 2-7.

Table 2-7: Roles and responsibilities in Scrum

Role	**Responsibility**
Scrum Master	Takes interest and care to make sure the project is carried through according to the Scrum rules and practices Is responsible for removing any impediments from the process
Product Owner	Takes responsibility for the project, managing, controlling and making sure the product backlog list is visible. Scrum Master, the customer and the management selects the product owner. Makes the final decisions regarding the Product Backlog Participates in creating estimates and turns the backlog items into features to implement.
Scrum Team	Has the authority to organize and make the necessary decisions to achieve the goals of each sprint. Is involved in the estimation, creating the Sprint Backlog, reviewing the Product Backlog list and suggesting the impediments that need to be removed from the project.

Customer	Participates in the tasks related to Product Backlog items.
Management	Responsible of the final decisions along with the charters, standards and conventions to be followed in the project. Participates also in setting the goals and requirements for the project, in gauging the progress, in selecting the Product owner and reducing the backlog with the Scrum Master.

Scrum - Practices

Scrum focuses more on management practices rather than providing any specific software development practices (Abrahamsson, et al., 2002). Following are the list of management practices required by Scrum.

Product Backlog contains everything that is needed in the final product based on the current knowledge. It defines all the work with priority and gets updated constantly. Product backlog can contain items such as features, functions, bug fixes, defects, requested enhancements and technology upgrades. The Product Owner is responsible of maintaining the Product Backlog.

Effort estimation is an iterative process, where the effort estimates get refined and updated more accurately when further information is available. The Product Owner and the scrum Team(s) are together responsible for the effort estimation.

Sprint is the procedure of adapting to the changing environmental variables such as requirements, time frame, resources etc. The Scrum team organizes itself to produce a new executable product increment in a Sprint that takes time from one week to one month.

Sprint planning meeting is a two-phase meeting organized by the Scrum master. In the first phase of a Sprint planning meeting the customers, users, management, product owner and scrum team decide the goals and the functionality of the next sprint. In the second phase, the Scrum master and the scrum team focus on how the product increment is implemented during the sprint.

Sprint Backlog is a list of product backlog items that are selected to be implemented in the next sprint. The items are chosen by the Scrum team with the Scrum Master and the Product Owner in the Sprint Planning meeting, based on priority and goals set for the Sprint. Unlike the Product backlog, the Sprint backlog is stable until the

Sprint is completed. The new iteration of the system is delivered on when all the items in the Sprint backlog are completed.

Daily scrum meetings are held to keep track of the progress of the Scrum team continuously and to solve any problems that have arisen during the sprint. All the members of the Scrum team must attend this meeting. The other interested can also attend but they must remain silent; only members of the Scrum team and the Scrum master are allowed to speak. The meeting lasts approximately 15 minutes, and every member of the Scrum Team tells what he/she has done since the previous meeting, what problems he/she may have encountered and what he/she will do before the next scrum meeting. Scrum meetings are arranged by the Scrum Master.

Sprint Review meeting is held on the last day of the Sprint. The results of the sprint are presented to the management, customers, users and the Product Owner by the Scrum team and the Scrum Master. The participants evaluate the results and make decision what to do next.

Scrum - Techniques

Scrum techniques are listed below in table based on the features identified for Scrum: product backlog, Sprint, Sprint goal, Sprint backlog, Sprint planning meeting, Daily scrum, Sprint review meeting, Release backlog, Customer on-site, Work space configuration, Daily builds and tests, testing (all types), Metrics – Product backlog graph, Sprint backlog graph.

Table 2-8: Agile technique with XP and Scrum

Agile Technique	***XP***	***Scrum***
Daily builds of complete system		✓
Iterative development	✓	
Iteration of fixed length		
Stand-up meeting	✓	✓
Customer on-site	✓	
Frequent delivery		
Whole team works same location	✓	✓
Dedicate meeting place		✓
Daily team meetings		✓
Testing is integrated	✓	
PM emphasis		✓
Communication	✓	✓
Collaboration	✓	✓
Coordination	✓	✓
Knowledge sharing	✓	✓
Working with uncertainty	✓	✓

Empowered to make decisions		
Courage to make mistakes		
Requirements as prototypes rather than text		
40 Hours week	✓	
Pair programming	✓	
Refactoring	✓	
Small software product releases	✓	✓
Collective ownership of code	✓	
Champion role		✓

DSDM

Dynamic Systems Development Method (DSDM) was developed in the United Kingdom in the mid-1990s. The DSDM features the best supported training and documentation of any agile software development methods, at least in Europe (Highsmith, 2002b). Based on best practices gathered DSDM framework was defined by member of DSDM Consortium since 1990 (DSDM, 2010). The DSDM is a nonprofit, independent organization which owns and administers DSDM framework (DSDM, 2010). According to DSDM more projects fail because of people issues than technology. One fundamental assumption is that nothing is built perfectly first time (DSDM, 2010). Due to the reasoning of the changing business requirements DSDM assumes that all previous steps can be revisited later and the current step need to be completed only enough o move to the next step (DSDM, 2010).

DSDM - Process

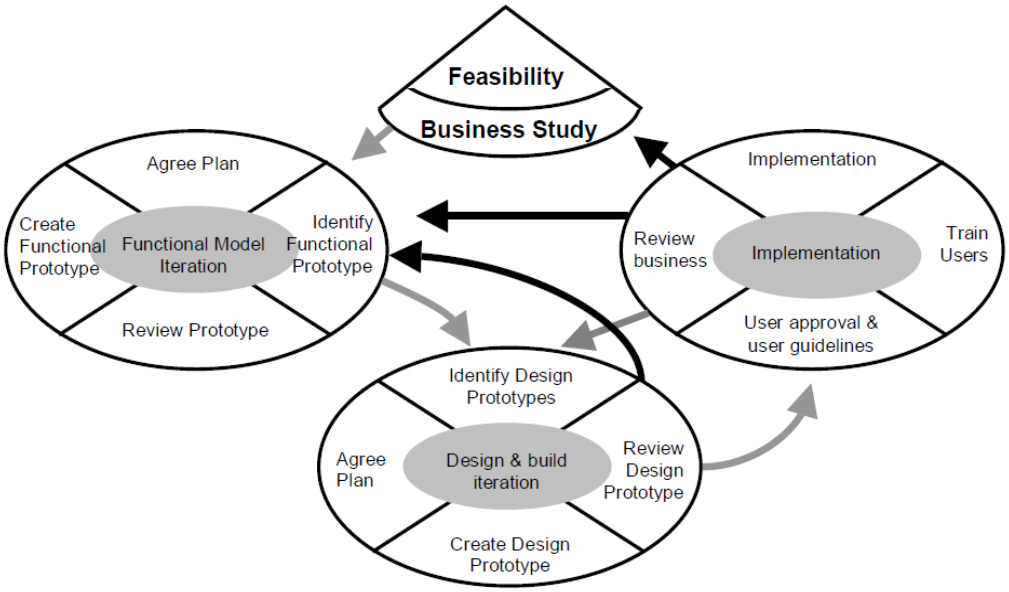

Figure 2-8: The lifecycle of a DSDM project (DSDM, 2010)

Figure 2-8 shows the life cycle of a DSDM project. The five phases of DSDM process are: Feasibility study, Business study, Functional model iteration, Design and Build iteration and Implementation. Feasibility study phase is first assessed if DSDM is the right approach for the project. If DSDM is chosen to be used, the problem is defined, cost evaluated, technical feasibility analyzed, and duration is maintained relatively short. The Business study phase is also short. During feasibility study and business study the requirements are prioritized.

During the Functional Model Iteration phase the requirements are analyzed further and a function model is created. Based on an initial list of priorities, the functional model iteration takes place by gathering and prototyping functional requirements. Nonfunctional requirements are also specified during this phase. Functional model includes functional prototypes, class models and data models with documentation. Functional model iteration is the first iterative phase in the process. The Design and Build iteration is the phase where the system is iterated to a sufficient level to be handled to the users. The agreed requirements in this phase are then tested and this does not have to fulfill all the requirements. Testing is done throughout the phase and is not treated as a separate activity. In the Implementation phase the system is transferred from development environment to production environment. This phase includes training users, completing documentation, and creating the increment review document.

DSDM - Practice

DSDM specifies different roles and responsibilities. In DSDM a developer always works with a user in a pair and this helps creating strong user/developer partnership (DSDM, 2010). In addition to the common roles as executive sponsor, project manager, team leader, tester, scribe and developer, there are other user roles ‘visionary’, ‘ambassador’, ‘advisor’. While the ambassador user should understand the business process and goals of the business process being automated, visionary user makes sure that the high level intend and vision for the product are not lost. The advisor user role brings day-to-day knowledge of business details to the development team. DSDM focuses on establishing and managing the proper culture for a project. Teams are empowered to make decisions, 100 percent dedication to the success of the project, Performers are quickly identified and easily rewarded, and collaboration and cooperation are encouraged between all individuals and work groups.

DSDM principles are explained in the DSDM Consortium and emphasize user participation. DSDM is a user centered method which involves active user involvement.

It is insisted that the users should be closely involved in the development and be part of decision making. DSDM teams consist of both developers and users, and they must be empowered to make decisions. The focus is on frequent delivery of products in agreed period of time. This helps the team to select the best possible solution that can be achieved in the given timeframe. Deliverables are accepted based on how fit the essential criteria to business purpose. Traditionally the focus has been on fulfilling the listed requirements, even if it is changing. Iterative and incremental development allows system to grow based on feedback from the users. All changes during development are reversible but the ability to reverse changes is limited to current increment only. Testing is not treated as a separate activity, but is integrated to the development process. During the development the system is reviewed and tested by users incrementally and developers follow the right direction based on advice from business. A collaborative and co-operative approach between all stakeholders is essential.

DSDM – Techniques

Based on the above two sections, the DSDM method is analyzed and a list of techniques are ticked.

Table 2-9: Agile techniques with XP, Scrum and DSDM

Agile Technique	***XP***	***Scrum***	***DSDM***
Daily builds of complete system		✓	
Iterative development	✓		✓
Iteration of fixed length			✓
Stand-up meeting	✓	✓	
Customer on-site	✓		
Frequent delivery			✓
Whole team works same location	✓	✓	
Dedicate meeting place		✓	
Daily team meetings		✓	✓
Testing is integrated	✓		✓
PM emphasis		✓	
Communication	✓	✓	✓
Collaboration	✓	✓	✓
Coordination	✓	✓	✓
Knowledge sharing	✓	✓	
Working with uncertainty	✓	✓	
Empowered to make decisions			✓
Courage to make mistakes			✓
Requirements as prototypes rather than text			✓
40 Hours week	✓		
Pair programming	✓		
Refactoring	✓		
Small software product releases	✓	✓	✓
Collective ownership of code	✓		

Champion role		✓	

Feature Driven Development (FDD)

Feature Driven Development (FDD) addresses the problem of response time to shorter and shorter business cycles. Managers have a way to plan that includes meaningful milestones and risk reduction due to frequent, tangible results. Clients see plans with milestones that they can understand. This is a five stage process: Develop an overall model, build a features list, plan by feature, and design by feature, and build by feature where design and build are conducted iteratively. The iterative design and build by feature part supports agile development by quickly adapting to late changes in requirements or business needs (Abrahamsson, et al., 2002). This is shown in figure 2-9.

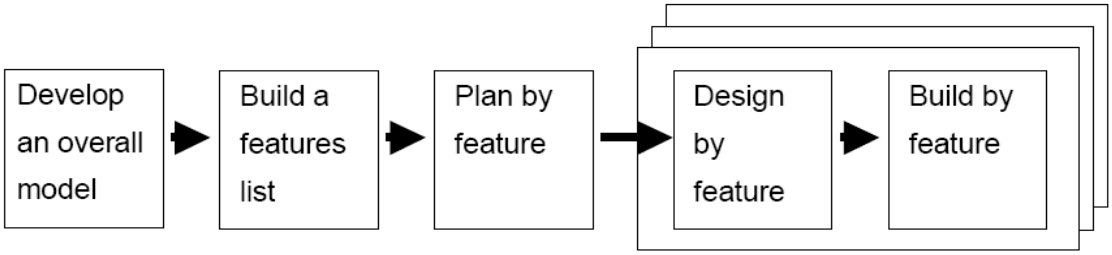

Figure 2-9: Sequential process for FDD (Abrahamsson, et al., 2002)

FDD - Process

When the Development begins, the domain experts are aware of the scope, context and requirements of the system to be built. The domain experts present a walkthrough to the team members and the chief architect. The domain is further divided into separate domain areas and a more detailed walkthrough is held for each domain areas. Further to the walkthrough the teams continue to work in small groups to create object models for domain areas. Based on the consolidated object models an overall model for the whole system gets developed. The next process Build a features list consists of identifying client valued functions that need to be included in the system. The list is divided into major feature sets, which include functions for a certain domain area. The features list is reviewed by the users and the sponsors to assure its completeness and validity. During the Plan by feature process feature sets are sequenced according to priority and dependencies. These feature sets also assigned to Chief Programmers who are responsible of the smaller teams implementing these features. Classes that were identified get assigned to individual developers and they become the

‘class owners’ for the classes. Schedule and milestones are set for the project. Schedule and major milestones are set considering the interdependencies between features, workload across different teams and class owners, risk factors involved in implementing the features etc. Design by feature and Build by feature are iterative processes, and during these stages features are designed and implemented. The length of iteration is from few days to a maximum of two weeks. A small group of features are identified and teams are formed to develop the selected features. There can be multiple feature teams working concurrently. The iterative process includes design, design inspection, coding, unit testing, code inspection and integration. If the iteration is successful the completed tasks are promoted and a new iteration begins with new set of features from the feature set.

Table 2-10: Roles and Responsibilities for FDD

Role	**Responsibility**
Project Manager	Administrative and financial leader of the project, protects the team from outside distraction and provides appropriate working conditions. Has the ultimate say on the scope, schedule and staffing of the project.
Chief Architect	Responsible for the overall design of the system. This role can be divided into domain architect and technical architect.
Development Manager	Leads daily development activities and solves conflicts among the team and handles resources.
Chief Programmer	Is responsible and takes leadership of small teams in the analysis, design and development of the new features. Participates in the requirement analysis and design of the projects. Selects the features to be developed in the next iteration from the features list and identifies classes and class owners.
Class Owner	Is responsible for the development of the class assigned to own; works under the guidance of the chief programmer. Tasks include designing, coding, testing and documenting new features.
Domain Experts	A user, client, a sponsor, a business analyst or a mixture of these. Understand well the knowledge of the real world and they pass the knowledge to the developers to ensure that a good system is developed.
Domain Manager	Leader of the domain experts and tasks include resolving arguments that may arise within the experts

Release Manager	Controls the process of the progress from one environment to another.
Language Lawyer / Language Guru	A team member who possesses a thorough and advanced knowledge of a certain programming language or technology.
Build Engineer	Responsible for setting up, maintaining and running the build process. Manages the version control system and publishes documentation.
Toolsmith	Builds tools for the development, test and data conversion teams, may also maintain database and websites.
System Administrator	Configures, manages and troubleshoots the servers, workstations and different environments that are needed in the project.
Tester	Verifies that the system will meet the requirements of the customer
Deployer	Participates in deploying the system
Technical writer	Prepares the user documentation

Above table reflects the details of roles and responsibilities needed for FDD.

FDD – Practice

'Feature teams' are formed to encourage doing design activities in small, dynamically formed teams to encourage evaluating multiple design options before one is chosen. Class or code ownership is a practice seen in FDD and an individual is assigned the responsibility for the conceptual integrity of that piece of code. There is also an owner assigned to a feature to make sure the feature is developed properly. Depending on the size of the project the build is fixed to regular intervals, weekly, daily and others continuously. A regular build ensures that there is always an up to date system that can be demonstrated to the owners of that system.

Regular builds are planned to help solve all synchronization issues as early in the process as possible. Configuration management to ensure easy way to identify/revert/change any versions of the completed source code are practiced in FDD (Murauskaite & Adomauskas, 2008). There is also an accurate progress reporting at all levels seen.

FDD – Techniques

Based on the above study the techniques are evaluated and the following ticks indicate the techniques used in FDD.

Table 2-11: Agile techniques with XP, Scrum, DSDM and FDD

Agile Technique	***XP***	***Scrum***	***DSDM***	***FDD***
Daily builds of complete system		✓		
Iterative development	✓		✓	✓
Iteration of fixed length			✓	
Stand-up meeting	✓	✓		
Customer on-site	✓			
Frequent delivery			✓	✓
Whole team works same location	✓	✓		
Dedicate meeting place		✓		
Daily team meetings		✓	✓	
Testing is integrated	✓		✓	
PM emphasis		✓		
Communication	✓	✓	✓	✓
Collaboration	✓	✓	✓	✓
Coordination	✓	✓	✓	✓
Knowledge sharing	✓	✓		✓
Working with uncertainty	✓	✓		
Empowered to make decisions			✓	
Courage to make mistakes			✓	
Requirements as prototypes rather than text			✓	
40 Hours week	✓			
Pair programming	✓			
Refactoring	✓			
Small software product releases	✓	✓	✓	
Collective ownership of code	✓			
Champion role		✓		✓

Crystal

Crystal family was proposed by Cockburn in 2001 and revised in 2002 and 2006 (Farhan, et al., 2009). Crystal's main theme is that there may be slightly different policies and conventions for each and every project (Farhan, et al., 2009). Cockburn compares Crystal Clear with XP, both light, simple, low ceremony approaches as below:

> XP pursues greater productivity through increased discipline, but it is harder for a team to follow. Crystal clear permits greater individuality within the team and more relaxed work habits. Crystal clear may be easier for a team to adopt, but XP produces better results if the team can follow it. A team can start with Crystal clear and move itself to

XP. A team that falls off XP can back up to Crystal clear(Highsmith, 2002a)

Crystal clear operates based on thinking about how software development should be done and then repeat based on past experimentation. This methodology also extracts the key issues of people and communication based on trust. Another aspect of crystal is to choose the practices that work for different domains, what works for a military project may not work for web content project. Many methodologies articulate the need to tailor methodologies to an organization or a project (Highsmith, 2002a).

Crystal – Process

Cockburn (2002) focuses on people, interaction, community, skills, talents and communication as first order effects on performance, process remains important but secondary. A project that is short on trust is in trouble in more substantial ways than just the weight of the methodology (Highsmith, 2002a). Cockburn proposes a set of methodologies from which team can select a starting point and then further tailor it to the needs of the project (Highsmith, 2002a). According to Highsmith (2002), the work 'Crystal' refers to the various facets of a gemstone, each a different face of the underlying cores of values and principles. Crystal methods are for designing a methodology to suit a specific project (Strode, 2005). Crystal is characterized by 2 techniques: incremental delivery and self-adaptation. It is based upon incremental delivery not exceeding more than four months. To cope with this constrained time a light weight documentation and heavy intercommunication between stake holders are recommended (Farhan, et al., 2009).

Cockburn defined a matrix to suggest a methodology for use in a given project and depends on number of people required for the project on x axis and hardness or criticality on y axis (Theunissen, 2003). The indexed values are: loss of life, essential money, comfort etc. The cross point indicates which methodology to use and these are coded based on colour.

Crystal – Practice

Automated regression testing is unique to Crystal methods (Strode, 2005).Users are actively involved in these methods (Strode, 2005). Key practices of Crystal include: pair programming, iterative development, writing test cases etc. Methodology size indicates the number of control elements in the methodology (Theunissen, 2003). Members of the Crystal family of methodologies share a common set of practices as

well as the tuned practices adopted according to situations. Another practice followed by Crystal is they are versatile. This means that the project team is not restricted to work on a specific method but may select parts from another method like XP (Theunissen, 2003).

Crystal clear is one of the methods in the family of crystal methodologies. There are others such as Crystal Orange, Crystal yellow, Crystal orange web etc. As part of this research these details are not specified in the thesis. Since the formation of the agile alliance, Cockburn has addresses the question of how his methodologies are classifiable as agile and how some of the other agile methodologies fit into his matrix (Cockburn, 2002).

Crystal – Techniques

Table 2-12: Agile techniques with XP, Scrum, DSDM, FDD, Crystal

Agile Technique	***XP***	***Scrum***	***DSDM***	***FDD***	***Crystal***
Daily builds of complete system		✓			
Iterative development	✓		✓	✓	✓
Iteration of fixed length			✓		✓
Stand-up meeting	✓	✓			
Customer on-site	✓				
Frequent delivery			✓	✓	
Whole team works same location	✓	✓			✓
Dedicate meeting place		✓			
Daily team meetings		✓	✓		
Testing is integrated	✓		✓		✓
PM emphasis		✓			
Communication	✓	✓	✓	✓	✓
Collaboration	✓	✓	✓	✓	✓
Coordination	✓	✓	✓	✓	✓
Knowledge sharing	✓	✓		✓	✓
Working with uncertainty	✓	✓			
Empowered to make decisions			✓		
Courage to make mistakes			✓		
Requirements as prototypes rather than text			✓		
40 Hours week	✓				
Pair programming	✓				✓
Refactoring	✓				
Small software product releases	✓	✓	✓		
Collective ownership of code	✓				✓
Champion role		✓		✓	

Lean Development

Lean Development (LD) is a term that emerged from the manufacturing realm of lean production in the 1980s. LD embodies the concept of dynamic stability, the ability to adapt quickly and effectively to a wide range of customer demands, combined with the ability to build stable, continually improved internal processes that are general purpose and flexible across a wide range of products (Highsmith, 2002a).

Lean - Process

The 12 principles of LD can be defined as follows: Meeting customer expectation, software should provide the best value for money, active customer participation, multi-disciplinary team effort, adapt to changes and requirements, software that is applicable across multiple domains, buy rather than build, an 80 percent solution today rather than 100 percent solution tomorrow, eliminate waste by minimizing paperwork, small teams etc., choose technology according to the project objectives, understand business impact, and understand the category of problems that LD is designed to handle. According to LD principles, excessive documentation does not add value but only takes up resources and time.

Table 2-13: The seven wastes of software development (Poppendieck, 2002)

The Seven Wastes of Software Development	
Overproduction	Extra features, unnecessary features, gold plating. Develop according to requirements statements; develop according to immediate client requirements.
Inventory	System requirements waiting to be developed, excessive documentation. Develop code not documentation, deliver frequently, don't accumulate code
Extra processing steps	Code directly from user statements, get clarification directly from clients, implies clients are an integral part of the development team.
Motion	Remove extra lines of communication, have developers together with clients in close proximity.
Defects	Test early and test often. Release nothing until it has been thoroughly tested. Test-driven development.
Waiting	Don't make clients wait, deliver frequently, fast iteration cycles, reduce decision-making time, communicate face-to-face for immediate understanding and decision making.

Transportation	Deliver work directly to the client, avoid hand-offs between participants (eg: analyst to programmer to tester to implementer to customer)

Table 2-13 is a list of seven wastes that can be seen in a software development project. The company 'Toyota' was focused to adapting market demands by reducing system response time and that helped the system capable of responding quickly and lean method was used for this (Morien, 2005). This is a good example of how agile can be used in a successful project.

Lean – Practice

Lean discusses about eliminating anything that does not add value to the final product. Te value of each document to be produced is evaluated to minimize the inventory of documentation. The concept of reducing cycle times and iterative development are practiced. 'Decide as late as possible' is another concept practiced here allowing the customers current needs are reflected in the system and further adjusted depending on the requirement changes. Developers are allowed to do what they do best and are always empowered. A test driven approach is also practiced in Lean development with test cases written before implementation. Lean also creates a culture of continuous improvement. The above details were gathered from Poppendieck(2001).

Lean – Techniques

Techniques used in Lean have been analyzed and the following table explains them with a tick.

Table 2-14: Agile techniques with XP, Scrum, DSDM, FDD, Crystal and Lean

Agile Technique	***XP***	***Scrum***	***DSDM***	***FDD***	***Crystal***	***Lean***
Daily builds of complete system		✓				
Iterative development	✓		✓	✓	✓	✓
Iteration of fixed length			✓		✓	
Stand-up meeting	✓	✓				
Customer on-site	✓					
Frequent delivery			✓	✓		✓
Whole team works same location	✓	✓			✓	✓
Dedicate meeting place		✓				
Daily team meetings		✓	✓			

Testing is integrated	✓		✓		✓	
PM emphasis		✓				
Communication	✓	✓	✓	✓	✓	✓
Collaboration	✓	✓	✓	✓	✓	✓
Coordination	✓	✓	✓	✓	✓	✓
Knowledge sharing	✓	✓		✓	✓	✓
Working with uncertainty	✓	✓				✓
Empowered to make decisions			✓			✓
Courage to make mistakes			✓			
Requirements as prototypes rather than text			✓			
40 Hours week	✓					
Pair programming	✓				✓	
Refactoring	✓					✓
Small software product releases	✓	✓	✓			
Collective ownership of code	✓				✓	
Champion role		✓		✓		

These techniques will be analyzed further and a list of agile attributes will be defined by the researcher. These are discussed in detail in Chapter Five.

APPENDIX H

Hofstede's cultural dimensions - Overview

Key differences between Collectivist and Individualistic cultures (Hofstede, 1997)

Collectivist	***Individualist***
People are born into extended families or other in-groups which continue to protect them in exchange of loyalty	Everyone grows up to look after him/herself and his/her immediate family only
Identity is based in the social network to which one belongs	Identity is based in the individual
Harmony should always be maintained and direct confrontations avoided	Speaking one's mind is a characteristic of an honest person
High context communication	Low context communication
Relationship employer-employee is perceived in moral terms, like a family link	Relationship employer-employee is a contract supposed to be based on mutual advantage
Hiring and promotion decisions take employees' in-group into account	Hiring and promotion decisions are supposed to be based on skills and rules only
Management is management of groups	Management is management of individuals
Relationship prevails over task	Task prevails over relationship

Key differences between small and large power distance index cultures (Hofstede, 1997)

Small Power Distance	***Large power distance***
Inequalities among people should be minimized	Inequalities among people are both expected and desired
There should be, and there is to some extent, interdependence between less and more powerful people	Less powerful people should be dependent on the more powerful; in practice, less powerful people are polarised between dependencies and counter dependence

Teachers expect initiatives from students in class	Teachers are expected to take all initiatives in class
Teachers are experts who transfer impersonal truths	Teachers are gurus who transfer personal wisdom
Hierarchy in organizations means an inequality of roles, established for convenience	Hierarchy in organizations reflects the existential inequality between higher-ups and lower-downs
Subordinates expect to be considered	Subordinates expect to be told what to do
The ideal boss is a resourceful democrat	The ideal boss is a benevolent autocrat of good father
Privileges and status symbols are frowned upon	Privileges and status symbols for managers are both expected and popular

Key differences between weak and strong uncertainty avoidance index cultures (Hofstede, 1997)

Weak Uncertainty avoidance	***Strong uncertainty avoidance***
Uncertainty is a normal feature of life and each day is accepted as it comes	The uncertainty inherent in life is felt as a continuous threat which must be fought
Low stress: subjective feeling of well being	High stress: subjective feeling of anxiety
Aggression and emotions should not be shown	Aggression and emotions may at proper times and places be ventilated
Comfortable in ambiguous situations and with unfamiliar risks	Acceptance of familiar risks, fear or ambiguous situations and of unfamiliar risks
Time is a framework for orientation	Time is money
Comfortable feeling when lazy; hard working only when needed	Emotional need to be busy; inner urge to work hard
Precision and punctuality have to be learned	Precision and punctuality come naturally
Tolerance of deviant and innovative ideas and bahaviour	Suppression of deviant ideas and behaviour; resistance to innovation

Motivation by achievement and esteem or belongingness	Motivation by security and esteem or belongingness

Key differences between feminine and masculine societies (Hofstede, 1997)

Feminine	***Masculine***
Dominant values in society are caring for others and preservation	Dominant values in society are material success and progress
People are warm and relationships are important	Money and things are important
Work in order to live	Live in order to work
Managers use intuition and strive for consensus	Managers expected to be decisive and assertive
Stress on equality, solidarity, and quality of work life	Stress on equity, competition among colleagues, and performance
Resolution of conflicts by compromise and negotiation	Resolution of conflicts by fighting them out

Summary of distinction between long term and short term orientation (Hofstede, 2001)

Short term orientation	***Long term orientation***
Immediate gratification of needs expected	Deferred gratification of needs accepted
Traditions are sacrosanct	Traditions adaptable to changed circumstances
Short-term virtues taught: social consumption	Long term virtues taught: frugality, perseverance
Spending	Saving, investing
The bottom line	Building a strong market position
Analytical thinking	Synthetic thinking