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Influence of cultural dimensions on Agile team behavioral characteristics

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ABSTRACT

Context: Agile methodologies are widely recognized in western countries. From past few years, its practices are being successfully adopted in global settings especially in eastern countries. Across the world, teams are following its values and principles. Are all the teams behaving in the same way? Potential difficulties related to culture arise while implementing agile practices. Due to variance in backgrounds and behaviors, social cliques and issues are likely to be formed between the team mates which become a hurdle.

Objectives: The study unravels the list of relationships between the agile team behavioral characteristics and Hofstede cultural dimensions. It also explores whether Indian employees working in an agile environment possess the required behavioral characteristics which are useful for the effective functioning of a team. The other objective of this study reveals the influence of the years of experience of the agile employees on behavioral characteristics.

Methods: Data collection processes include a literature review and a web survey.

First, in the literature review analysis of the empirical studies from year 1999-2011 was done. The review approach helped in collecting and summarizing the data. The studies were identified from the most reliable and authentic databases that are scientifically and technically peer reviewed such as Engineering village, IEEE Xplore, ACM digital library, Springer Link and Google Scholar. A survey was conducted with 33 practitioners from various multinational organizations in India. Statistical analysis was used to analyze the data.

Results: Hofstede's cultural dimensions had noticeable influence on agile team behavioral characteristics. Although, all the enabler characteristics were not seen in Indian culture, the results clearly show that some of the cultural dimensions are enabling factors to function well in an agile team and some hinder the team effectiveness. The result from the literature review shows the list of relationships between Hofstede cultural dimensions and agile team behavioral characteristics. All team behavioral characteristics were to a certain extent demonstrated by Indian agile employees, which can be known from the survey results. It is also seen from the survey results that, team behavioral characteristics can be demonstrated more effectively by the experienced agile employees.

Conclusion: From this study, we have found the relationships between Hofstede cultural dimensions and agile team behavioral characteristics. List of agile team behavioral characteristics which were followed by Indian agile employees were obtained from the survey. We conclude that Indian agile employees were able to demonstrate all the agile team behavior characteristics required for an effective functioning of a team. One more interesting thing which came into our attention, after analyzing the survey was that years of experience of agile employees do have an effect on the employees which influences the demonstration of team behavior characteristics. It was clear that demonstration of these characteristics were not only dependent on individual's nature but also on the years of experience in agile environment. The absence of relationships which were not found through literature needs to be focused. Hence we conclude that there is a need for conducting even more in-depth surveys and reviews to investigate the unfound relationships.

Keywords: Agile software development, agile team, Hofstede cultural dimensions, Power distance, Individualism/Collectivism, Masculinity/Femininity, Uncertainty avoidance, Autonomy, Shared leadership, Learning, team orientation, Redundancy, Literature review and Survey.

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Terminologies

Term/Abbreviation	Definition
Authors	Students responsible for writing the thesis: Veena Veerla and Maanasa Subrahmanyam
PD	Power Distance
HPD	High Power Distance
LPD	Low Power Distance
IND	Individualism
COLL	Collectivism
MAS	Masculinity
FEM	Femininity
UCA	Uncertainty Avoidance
LTO	Long Term Orientation
STO	Short Term Orientation

1 INTRODUCTION

The main purpose of this chapter is to provide the reader a brief introduction about the subject which is discussed in this thesis. Therefore, we explained the motive which drove us to choose this topic. Next, discussion is done about the aims, objectives and research questions in a detailed way. Thereafter, structure of the research design and mapping between research methodologies and research questions are presented.

1.1 Research Motivation

Agile software development is a knowledge intensive process where interactions are said to be done between various aspects of methodologies like tools, products, process, people etc [9]. A separate knowledge cell is maintained in the organization to gain knowledge on related fragments, tools and processes [9]. These days many organizations are moving to agile software development due to immense benefits over traditional software development. Values and principles built in the agile manifesto in 2001 are extremely useful to manage and develop the software [52]. Agile methods can also help in providing solutions for the overheads which are present in the traditional software development environment [9]. Agile is widely adopted by the practitioners since 2002 because of its benefits like effective means of project execution over time, productivity, increased employee morale and customer satisfaction [52]. It also mitigates challenges in offshore projects like linguistic hurdles, communication gap, control, trust, collaboration between team members, transfer of business domain, decrease project visibility, client business security, cultural differences, spatial factors, technical and regional hurdles, document maintenance, configuration management and synchronization issues [4, 27, 39, 51, 59, 63, 64, 70, 118].

The success of agile software development depends on the team performance [80]. To get the best out of a team it is essential for the team members to interact with each other. The members of an agile team are expected to have the qualities which improve the productivity of the team, encourage other members to actively participate in the team activities, and understand their roles in any kind of situations [41]. There are five basic behavioral characteristics of an agile team: autonomy, shared leadership, redundancy, learning and team orientation [40, 80, 78]. These characteristics play a vital role in the success of agile teams. These characteristics resemble the team work components in the Dickinson and McIntyre's model [80]. Presence of these characteristics ensures motivation and satisfaction between the teammates. These characteristics help to understand self-organizing teams in a better way and make the teams successful [15, 40]. However, not all organizations have favorable conditions to implement agile methods. For example, teammates may belong to various origins and backgrounds. Interaction between such teammates can be difficult and can lead to the formation of social cliques and issues [2]. According to Brockmann [91] introduction of agile methodologies can also upset those organizations which follow hierarchical structures, which in fact are common in certain countries and culture. Decision making process is also tedious in agile teams because it is affected by the culture and mind set of employees. Also, neither culture nor mind set can be easily changed [77, 80, 81, 112]. Underestimating the impacts of cultural differences on the team can be disastrous which can create barriers between them leading to break down of the whole team [43]. According to [88] agile methods are more of a cultural thing rather than engineering. According to [43] most of the leaders are not aware of the fact that cultural differences could influence team dynamics.

“Culture is said to be a matter of ideas and values, a collective cast of mind” [93]. According to [36] all nations differ by the different dimensions of culture. To

understand the concept of culture and its various perspectives in software development, several cultural dimension models were created by researchers like Hofstede [91], Edward Hall [122], and Trompenaars [33]. Cultural dimensions which are proposed by E.T.Hall views culture in the aspect of communication. All the dimensions are differentiated solely on the basis of verbal expressions and individuals reactions [122]. As these cover only verbal and communication related concepts these dimensions are not considered. Another work of Frans Trompenaars and Charles Hampden Turner was also considered irrelevant as these dimensions provide juxtapositional view of different cultures [122]. Other researcher like Lewis [62] proposed a single dimension 'Time' is not considered as it is inadequate for this research study. Among all these models, Hofstede's cultural dimensions model is mostly cited in the literature [7, 101].

Geert Hofstede is a Dutch anthropologist who did a large survey with IBM employees around the world [26]. Over 60,000 employees responded. With the help of the opinion of these respondents, Hofstede created his model of the cultural dimension. He provided a factor analysis in 40 countries comprising of 32 questions from the data which he has obtained [7]. From this data, he identified four dimensions of societal culture [101] - Power Distance index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty avoidance index (UAI), and a subsequent study revealed fifth dimension – Long Term Orientation (LTO). His cultural dimension model is popular, but it has several limitations and critics [13, 38, 62, 121, 122].

The benefits of Hofstede cultural dimensions model are:

- His study was based on empirically strong data which was collected from 60,000 people over 40 countries.
- Participants of the survey were employees from a large software organization who were from various nations and cultures.
- Many researchers based their work on the existing Hofstede's cultural model [101].
- It identifies the impact of cultural dimensions at workplace [29, 34].
- Insight knowledge of various national cultures for effective interaction with people around the globe is done by this cultural dimensions model [108].
- This cultural dimension model is highly used not only in software arena but also in areas like anthropology, sociology, communication, education, psychology, marketing, accounting, business, management, administration, economics, law, and operations research [93].
- It emphasizes on culture and values of the computer professionals [25,121].
- It is suitable to explain and understand the role and impact of culture on the software development processes [101].
- Hofstede's work inspired thousands of empirical studies of its cultural dimensions [127].
- Gibson, Kirkman, Lowe almost reviewed 200 empirical studies quantitatively using Hofstede's dimension which were published in 40 journals and book series between 1980 and 2002 [127].
- Hofstede's empirical research is inspired by many other researchers exponentially [127].
- In spite of its limitations, relationship between its dimensions and outcomes are highly relevant to organization [127].
- Hofstede always defended his methodological decisions, never failed to respond to any criticism and clarified the claim implications and claims [126].

Hofstede's limitations:

- According to McSweeney, Hofstede theory has been criticized as vague and contradictory as data is collected from only single multinational organization [13].
- From the proposed dimensions, 'Masculinity/Femininity' has received most criticism over other dimensions for its incorrect categorization of certain countries. As this dimension of the Hofstede is related to gender, but the majority of his study was carried out with the participants who were well educated middle class working men (women were excluded from the survey) [101].
- Accuracy of the data collected from questionnaires remains an issue as questionnaires have some limitations [101].
- As the data collected by Hofstede is almost 40 years old this may render the model obsolete, as culture is viewed as dynamic and constantly changing by many researchers [101].
- New models should analyze culture in terms of contemporary standards and must upgrade the continuous shifting of cultural boundaries [69,101]. Application of the Hofstede cultural dimensions on software to understand the impact of culture is proven inadequate and deficient by many of the researchers who still use his model as their basis of work [101].
- Culture consequences does not "capture" the social reality it illustrates [26].
- The countries are not distributed evenly across the dimensions. A general distribution pattern follows which run along the line of separating west from the rest [126].
- The Hofstede analysis is of unified questionnaires which reappeared are attempted to force cultural idiosyncrasies into the rubrics of Western minds [126].
- Hofstede model follows cultural relativism. According to Ailon, cultural relativism is a tendency to see the world which is not only limited by one's own culture but it is also limited in terms of its effect on other cultures [126].
- When Hofstede findings are followed by practitioners, risk of defining their indigenous culture is seen which are in terms of external and private to them. This produces devaluing and over valuing their mechanisms [126].

The primary focus of this thesis is to understand how cultural dimensions influence the above mentioned (autonomy, shared leadership, redundancy, learning and team orientation) agile team behavioral characteristics. This research study deals with two different areas, culture and agile software development. Although certain related research papers on the influence of cultural dimensions on agile projects exist, till now, no comprehensive and systematic work has been done to identify the influence of cultural dimensions on all five behavioral characteristics (autonomy, shared leadership, redundancy, learning and team orientation), which are necessary for effective functioning of agile teams. The authors of this research aim to investigate this relationship by means of literature and empirical study.

1.2 Aims and Objectives

The main aim of this research is to understand the influence of cultural dimensions proposed by Hofstede on the behavioral characteristics (autonomy, shared leadership, redundancy, learning and team orientation) necessary for effective functioning of an agile team. Our objectives are as follows:

- Obtaining existing evidence which demonstrates measures or observes the influence of cultural dimensions on the behavioral characteristics (autonomy, shared leadership,

redundancy, learning and team orientation) necessary for effective functioning of an agile team.

- Identifying whether selected Indian employees currently working in agile projects can demonstrate the behavioral characteristics (autonomy, shared leadership, redundancy, and team orientation) necessary for effective functioning of an agile team or not.
- Exploring influence of cultural dimensions on behavioral characteristics (autonomy, shared leadership, redundancy, learning and team orientation) of agile teams based on gathered empirical data.
- Exploring the effect of years of experience of Indian employees on agile team behavior characteristics.

1.3 Research Questions

Here below, RQ1 deals with the influences of cultural dimensions and agile team behavioral characteristics. In order to validate the above relationships it is important to test them in a specific culture (Indian culture) which leads to formulation of RQ2 and RQ3. Solving RQ2 gives the necessary team behavioral characteristics which are demonstrated by Indian agile employees and by solving RQ3 we obtain whether experience plays an important role while demonstrating the team behavioral characteristics.

RQ1: What is known about the potential influence of cultural dimensions proposed by Geert Hofstede on the following behavioral characteristics: autonomy, shared leadership, redundancy, learning and team orientation?

SQ1.1: What is the relationship between autonomy and cultural dimensions?

SQ1.2: What is the relationship between shared leadership and culture dimensions?

SQ1.3: What is the relationship between redundancy and culture dimensions?

SQ1.4: What is the relationship between learning and culture dimensions?

SQ1.5: What is the relationship between team orientation and culture dimensions?

RQ2: Do selected Indian employees working in agile projects demonstrate the necessary behavior required for effective functioning of an agile team? How can we use the theory to explain the results?

RQ3: Does experience in agile environment effect behavioral characteristics of an agile team?

1.4 Research methodology

In order to answer the research questions, two research methods which are mentioned below were selected.

- Literature review
- Survey

Overview and detailed view of research methodology is shown below.

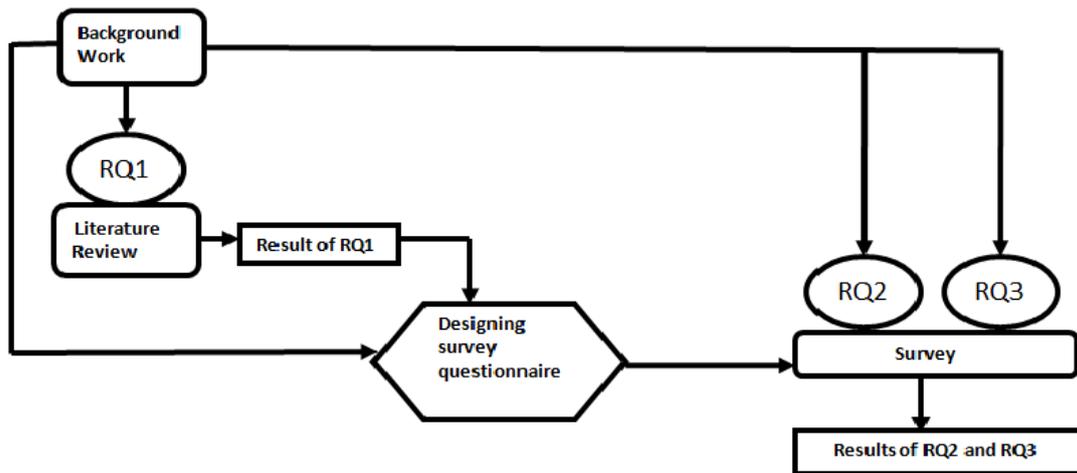


Figure 1: Overview of research methodology

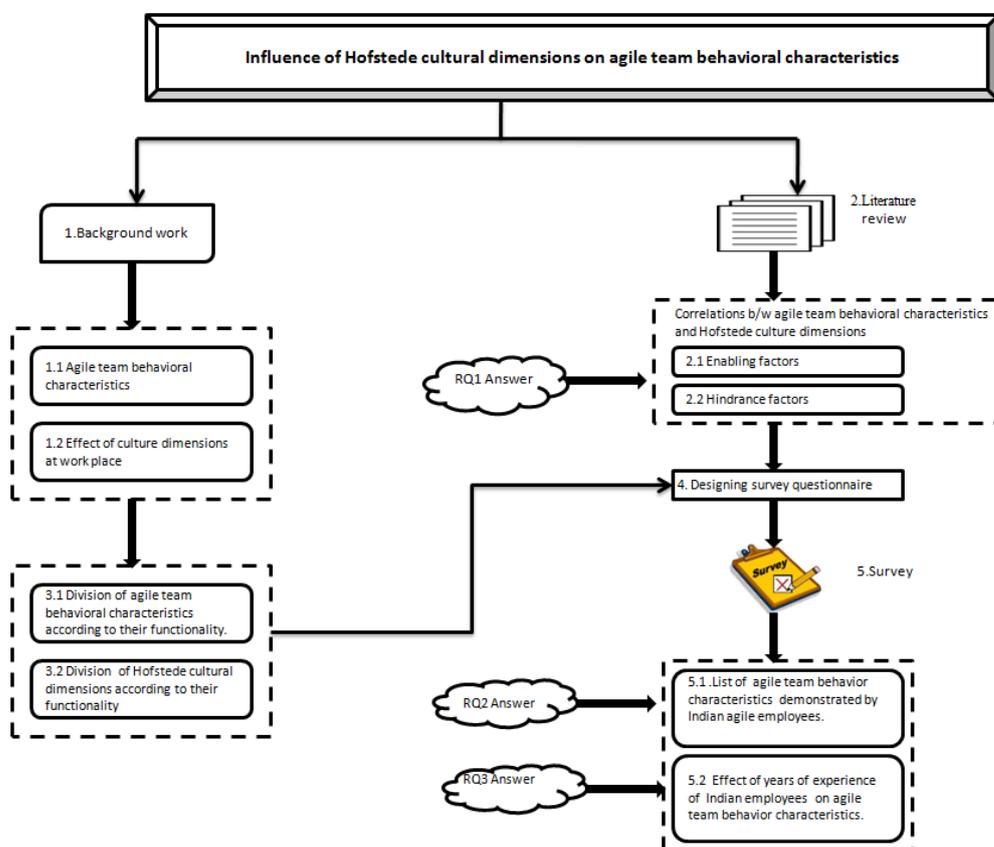


Figure 2: Detailed research methodology

The above figure 2 shows the detailed description of research methodology. Background work was done in the first step of this research work. Basic knowledge about agile and cultural dimensions was acquired through it. Answer for RQ1 was obtained by performing literature review. Result of RQ1 provides the relationship which explains the influence of cultural dimensions on agile team behavior characteristics. Relationships were found in the form of enabling and disabling factors. From the background knowledge obtained, each agile team behavior characteristic and cultural dimension were divided according to their functionality. Then the survey questionnaire was designed with the help of the result of RQ1 and divided functionalities. The survey was conducted on the employees working in India in agile environment. Results obtained from the survey were analyzed in the next step. This

survey helps in answering RQ2 and RQ3. List of agile team behavioral characteristics seen in Indian agile employees were listed for answering RQ2. And RQ3 answers whether the years of experience of the Indian agile employees effect the demonstration of agile team behavioral characteristics.

1.5 Thesis outcomes

Table 1: Thesis outcomes

Research question	Thesis outcomes
RQ1: What is the potential influence of cultural dimensions proposed by Geert Hofstede on behavioral characteristics (autonomy, shared leadership, redundancy, learning and team orientation) of an agile team?	1) List of factors which enable the effective functioning of an agile team. 2) List of factors which hinder the effective functioning of an agile team.
RQ2: Do selected Indian employees working in agile projects demonstrate the necessary behavior required for effective functioning of an agile team? How can we use the theory to explain the results?	Degree of attainment of agile team behavior characteristics demonstrated by Indian agile employees.
RQ3: Does experience in agile environment effect behavioral characteristics of an agile team?	Effect of years of experience of Indian employees on agile team behavior characteristics.

1.6 Summary

- This chapter provides brief description about our Research motivation, Research methodology, Aims and objectives of this research which were followed by Research questions.
- In the later section, expected outcomes of the following research study have been mentioned.

2 BACKGROUND

This research work is related to agile team behavioral characteristics and cultural dimensions. Hence, it will be helpful to acquire as much knowledge as possible before beginning the study. The primary purpose of this chapter is to get an overview of behavioral characteristics of self-organized agile teams in detailed way and understand the effect of cultural dimensions proposed by Geert Hofstede at work place. These are further used to explore the influence of culture on agile team behavior through a literature review and an empirical study. This chapter starts with a short description of behavior in effective agile teams. After that, the essential characteristics of agile team which makes agile software development successful are presented. Next, description of each cultural dimension is described in an elaborative way. Finally, chapter closes with a summary.

2.1 Behavior in effective agile teams

2.1.1 Introduction

Agile software development has gained re-known position in the research community, software industry as well as in educational institutes [2, 79, 95, 112, 116]. During late 1990's it has gained approval into the mainstream of software development [2].

The word "agile" means "flexible", so agile methods itself entails to survive in conditions where atmosphere constantly changes and becomes apparent with success [115]. The reasons which makes agile extremely popular are leadership which is being shared in the team, continuous informal communication and collaboration with the customer and organization's formal structure [77, 81, 82]. The quality of the end product and the pace with which it is developed improves with communication and collaboration [2, 72, 106, 116]. A survey conducted in USA and Europe proclaims that about 14% of industries are actively using agile methods and 49% of industries are aware of these practices [116]. The definition of agile software development is present in the form of agile "manifesto"[55].

- "Individual interactions over process and tools"
- "Working software over comprehensive documentation"
- "Customer collaboration over contract negotiation"
- "Responding to change over following a plan"

The term "individual interactions over process and tools" emphasizes on people and their creativity rather than processes [3, 14, 57, 81, 82]. Individual interactions are important and all the team members in a software team must work together towards a common goal [86].

The term "working software over comprehensive document" focuses on reduced documentation. Document produced in software project describes the software. This documentation should be produced only when needed [86]. On the other hand developers should write well defined code, as it is used as a primary source of information.

The term "customer collaboration over contact negotiation" emphasizes on needs and satisfaction of the customer which is achieved by close and constant communication with him [86]. In order to get the contract, the requirement of the customer needs to be fulfilled. His needs are better understood only if there is a close communication with him.

At last,” the term responding to change over following plan” underlines changes in requirement specification because of increasing business demands and better understanding of the customer or developer [86]. There were times, when a project could have been started and completed with an outdated plan and missing information but now for a successful software project, it is imperative to have a well advised and careful plan [86].

2.1.2 Agile teams are self-organized teams

A “team” is the most important ingredient for successful implementation of agile methods. A team is defined as “a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable” [80]. Agile teams are called as self-organized teams or self-managed teams [40]. Guzzo and Dickson’s idea of self-organized teams is as follows: “Autonomous work groups consist of teams with employees who typically perform highly related or interdependent jobs, who are identified and identifiable as a social unit in an organization, and who are given significant authority and responsibility for many aspects of their work, such as planning, scheduling, assigning tasks to members, and making decisions with economic consequences” [77, 40].

Self-managed teams have the authority to make decisions, manage their own workload and increase speed of problem solving [40, 77, 81, 94, 95]. They do not need the approval from the management. In order to achieve its goals, the team takes full responsibility for resource allocation [80, 81, 82]. An Employee in agile environment care about his work and hence there is a greater job satisfaction, higher productivity and quality [82]. Agile development says that teams should not only have a common focus, respect, and interpersonal skills but also should have a considerable amount of trust among them [116]. A case study conducted on a scrum team says that there is considerable negative effect on team performance due to insufficient trust among the teammates. They are not ready to share information when teams are trying to function as self-organized [80]. So, organizations must take great care while giving teams the responsibility to function as self-organized. Agile teams should use a collaborative quick decision-making process and should be able to deal with ambiguity [3, 95]. Co-located agile teams efficiently communicate and focus on quality [10]. If teams are distributed then constant communication, coordination, and trust between the team members become very essential. Majority of studies indicate the benefits of self-organized teams in an organization; although some studies claim mixed results [80]. It must be implemented in the organization with the utmost care by providing enough support and leadership [80].

2.1.3 Agile team behavioral characteristics

From [40, 78] following mentioned characteristics are necessary for effective functioning of agile teams

- Autonomy
- Shared leadership
- Redundancy
- Learning
- Team orientation

2.1.3.1 Autonomy

Autonomy is the degree to which an individual or group of individuals have substantial freedom to define their own task and to solve them [15,81]. Basically, it is the responsibility and authority of a team during their work. Literature suggests that autonomy will result in increased motivation, better job satisfaction, increased feedback, and performance [15, 81]. If organization grants autonomy to a group then the decision on how to use group autonomy may arrive at number of ways such as voting system etc [81]. As a result of regular meetings, team members get to know each other's strength, weaknesses and try to endeavor those weaknesses. The only disadvantage of autonomy will be the lack of specialized skill and corresponding division of work [82]. Autonomy can be defined in three levels which are external autonomy, internal autonomy, and individual autonomy [40, 81].

2.1.3.1.1 External autonomy:

External autonomy is the involvement of management and other individuals who are not in the team but have a direct influence on team activities [40, 82]. Sometimes external influence is good for team activity as it provides important feedback and helps in completion of the project. Certain specific types of external influence are considered as baleful for team activity [40, 82].

2.1.3.1.2 Internal autonomy:

Organization of work within a team is called as internal autonomy [40]. Internal autonomy refers to an extent to which all the team members share joint responsibilities and decision authority [40, 82]. Rather than centralized decision where only one person (team lead) has the authority to make all the decisions, it is more like a decentralized structure where all team members makes important decisions with respect to their work independent of other teams [40,82].

2.1.3.1.3 Individual autonomy:

Level of coordinating nature of individuals with all the members in the organization is called as individual autonomy [81]. It's the amount of freedom and discretion with which an individual has to decide his own work process and carry out assigned tasks [40, 81, 82]. Autonomy of individuals may conflict with group autonomy when an individual gives more priority to their goals compared to team goals [82]. Strong individual autonomy considerably affects the ability of self-organized teams which weakens the shared leadership [82]. Very high individual autonomy is a threat to the team as it influences group autonomy [40].

2.1.3.2 Shared leadership

Leadership in agile teams is supposed to be light touch [94, 95]. Shared leadership is shown by the self-organized agile teams [40, 60, 80, 82, 94, 95]. In these teams, leadership should be shared among team members based upon a particular problem at particular instance. It is routed from person to person with the key knowledge, ability and skills [40, 82, 95]. Leadership aligns well with good agile practices [60]. Xie's scenario analysis and rough set mode (R-S mode) is an efficient analysis method which helps agile teams during unconventional emergency decision making situation [125]. Agile supports NDM that is "natural decision making" which is characterized by evaluation of all the alternatives in dynamic and turbulent situations [20].

2.1.3.2.1 Role of team leader:

A Team leader should be responsible for selecting members in the team, clarification purpose, allocating resources, articulating the vision, providing feedback and to coordinate with people [82, 94]. Decision making in this environment is considerably more difficult than the traditional approach [112]. According to Lynne Ralston, right kind of leadership in the team can lead to success [60]. A good leader must continuously refine his leadership qualities [73]. They have to actively engage in day-to-day activities and encourage whole team in order to leverage their complementary skills to produce quality solutions [41, 60]. Organizational structure may have influence on certain leadership behavior [30]. Leadership behavior has positive as well as a negative impact on the team, so team lead should not change the culture of the organization [30]. The main concern of a leader is to build both hard and soft skills related to specific functions [30]. A model was proposed by Paul Hersey which says that agile leader must adapt his behavior to fit the willingness and ability of the team [61]. Otherwise, lack in the competence makes shared leadership difficult [82].

2.1.3.2.2 Managers in agile:

Agile project manager is more into providing leadership then to provide management to a team [61]. Agile methodology favors leadership-collaboration style of management [40, 57, 82, 102, 112]. Manager should support team members by closely working with them, providing critical reviews and discussing with the team members. With the help and support from the management side, agile teams can be more productive [41].

2.1.3.3 Redundancy

Ability of doing other team member's task is often referred as backup behavior in the literature of teamwork [40, 80]. Team members should have a collective ownership of their work which increases redundancy. For example, code ownership is uniformly shared by all team members. Anyone can change or modify the code. By collective ownership each team member apart from being responsible about his own work must be responsible for work of his teammates [40]. Thus, the quality of the end product increases. Team members must have the same complementary skills as other members and know the task; possibly help or assist each other's work [40]. It is reverse to individualism in which each person is specialized in some area in which he is working [40]. Thus, it seems to be an efficient way of organizing work but sometimes it can harmful for an organization. Flexibility of team depreciates as it becomes more vulnerable [40].

2.1.3.4 Learning

2.1.3.4.1 Single/double loop learning:

Learning can be a single loop or double loop. In the single loop learning, feedback is given based on observation. On the basis of feedback one tries to correct or improve actions to avoid or solve the mistakes [82]. In double loop learning one tries to improve not solely the observed effect or feedback but also tries to identify the cause behind the problems [82]. Self-organized agile team requires double loop learning [80]. From shared leadership and team orientation, team members learn from each other [40].

2.1.3.4.2 Regular meeting:

Agile team practicing reflection can learn more effectively as team members not only get to know and help each other but also resolve conflict. Thereby teamwork, productivity and level of trust are increased [66]. Usually, in these meetings each team member contemplate what type of obstacles they are facing, how they are going to proceed further and provide feedback [103]. Daily status meetings not only help to keep track of the project but also help

in knowledge sharing [73]. Thus, regular meetings are said to be an important part of learning.

2.1.3.4.3 Knowledge sharing:

According to M.Kashif long term learning not only makes organization endorse current success but also helps to develop dynamic team leaders [73]. Self-organized teams help to improve employee skills and inter team knowledge sharing [73]. It is interesting to note that knowledge sharing is an important part of learning in agile software development therefore productivity can be improved by effectively managing knowledge [67]. Thus, knowledge management is critical for an organization [112]. Knowledge is of two types: tacit and explicit. Tacit knowledge consists of beliefs, values, perspectives and perceptions [67] whereas explicit knowledge can be documented and can be stored in a book, database or other media. Knowledge in agile development is tacit, embedded in the minds of individual team members [112]. This knowledge is transferred between teammates [106]. Team members share their knowledge which also helps in reducing the communication problems between them [73]. Environment of agile software development can be seen as a platform for extracting tacit knowledge from the employees [67]. The success of team's motives mainly depends upon a knowledge friendly organizational culture.

2.1.3.4.4 Continuous learning:

Agile requires continuous learning [114]. Collaboration and honesty makes learning easier during the project. Existing literature suggests that training and learning are success factors for agile [114].

2.1.3.4.5 Job rotation:

According to Fægrietal job rotation among agile team members could improve general knowledge in the team members [117]. In self-organized teams general knowledge or common knowledge is considered as an important factor which can be built by job rotation [117].

2.1.3.4.6 Impression management:

Impression management is hindrance to learning. When the team tries to impress, they try to show that they are better what they actually are [80]. These actions may cause behavioral issues between team members.

2.1.3.4.7 Feedback:

Feedback is an important part of learning. It's an ability to get relevant response to your efforts [15].

2.1.3.5 Team orientation

Team orientation refers to the general perception and attitude which one member of the team has towards the other. Current available literature suggests that individuals should give priority to team goals over their own goals [40, 80, 81, 100]. It is strongly related to goal setting, so goal prioritization is important. Team members should willingly participate in all relevant team activities. On one side reduced individual autonomy is a threat for an individual's motivation; on another side too much individual autonomy is harmful for team orientation [40].

2.1.4 Communication and coordination

The above core characteristics of agile team won't be complete without efficient communication and coordination among team members. For the success of agile team, active communication and coordination is important [40]. Thus, for effective autonomy, shared leadership, learning, team orientation, redundancy, is a prerequisite. Communication is the way of sending and receiving the information whereas coordination is actively working together in order to deliver work product [3]. Organizations which are practicing agile methodologies should communicate more effectively. It promotes more open and direct communication [20, 67, 72, 124]. Abrahamsson et.al states that agile practices increases both informal and formal communication [72]. According to Dybå et al. agility supports informal communication [116]. Researchers suggest that effective communication is achieved by pair programming, daily meetings, and project reviews [72]. Mishra suggested that a small team enables effective communication and leads to success by fast decision making [106]. Thus, increased informal communication among members decreases the need of documentation and build considerable amount of trust [72]. In collocated teams, feedback between the team members is improved which supports more collaboration [40, 64]. When working in larger teams, team members are not able to coordinate properly which in turn leads to misunderstandings, unsynchronized personal perception and conflicts [99]. It takes ample amount of time for an organization to build trust, culture, collaboration and mutual respect [112]. Communication has an impact on team member's behavior [102]. Team members experiencing communication problems are likely to experience the same when coordinating their work [80].

2.2 Hofstede's cultural dimensions at work place

The below mentioned cultural dimension model was proposed by Hofstede. Following are the description of each dimension in terms of its granularity.

2.2.1 High power distance / Low power distance

It is a known fact that inequality prevails in any society. Any ordinary society has social barriers in them. Cultural aversions may also occur between members of a team while working in an organization. Inequalities such as stronger, weaker, powerful, smarter do exist between the team members. These types of inconsistencies become problematic in some environments and actions are raised against them to restrict these types of situations. Some parts of societies truly accept these inequalities and they prefer being unequal assuming it in a positive note [35, 122]. Such a situation occurs in a cultural dimension known as power distance.

Power distance is defined as the "extent to which the less powerful members of organizations within a country expect and accept that power is distributed unequally" [31, 35]. Organizations are divided into both categories namely high power and low power distant cultures. Behavior, values and morals differ depending on both these variations. This variance of behavior in a team also has high impact on the team's productivity and effectiveness.

High power distance allows bossism and autocratic nature [35, 36]. Inequality between roles and behavior is accepted by all of the team members. Subordinates are expected to work as per the choice of their supervisor [35]. Supervisor has full authority to finalize the decisions without the consent of the subordinates [28]. Negotiation towards higher officials, violating formal rules and procedures without their consent is strictly avoided in these organizations.

Teams in organizations which have low power distance follow equality and consultative style of decision making [28, 31]. Subordinates expect their superiors to consult them before taking a final decision. Likewise, in high power distance final decision is taken by superiors themselves but consulting and decision seeking from other team members is also followed. Contradiction to higher officials and limited dependence on them is allowed. Organizations follow decentralized hierarchy with a limited number of supervisory personals. Boss is treated as the resource to develop their own skills by which they can perform tasks in a better way. Roles can be switched and changed easily depending upon skills but not on level of experience and age [35].

2.2.2 Individualism / Collectivism

Team consists of individuals who are from various backgrounds and have different behaviors. People who choose one's own interests over the group's interests are known as individualists. Individualism prevails in various environments like family, education, workplace etc. Individualistic people tend to have their own personal space and freedom to define their own work [35]. Employees, who are individualistic, work in a route of their self interest [69]. Relationships, emotional nature is given second preference in these types of environments as they think these are undesirable. Relationship between colleagues in a team is perceived as a calculative relationship or as a business transaction [35]. Incentives and rewards are given based on the solo performance.

Collectivistic employees are expected to work according to the team's interest though it doesn't coincide with his/her interests. Relationships, emotional nature are given first preference. While hiring the employees in an organization, high preference is given to members who have a relationship with already existing workers as they think it reduces risks in future [35]. Rewards, bonus and incentives are shared among all the group members. Team members don't like to discuss their weak points publicly as it may lead to loss of face [35]. Personal respect is given to each other while dealing with issues related to substandard performance. Collectivistic people follow subtle ways to provide feedback to other team members.

2.2.3 Masculinity / Femininity

All human societies are divided into men and women. But based on the social behavior, roles played by them are unique. These gender roles differentiate according to social behavior but not according to the biological variation. Gender roles are divided into two type namely feminine and masculine nature [122]. Men can also have feminine nature and vice versa. These behavior and gender role variations bring statistical difference between performance and effectiveness in a team of an organization.

Team members who have masculine nature are more concentrated towards earning, recognition and challenges. These members always admire qualities such as achievement, ambition, performance, money and assertiveness [31]. Unequal treatment is given to both genders. People from masculine nature follow "live in order to work" concept [35]. Rewards for the other team members are given based on the equity. These people encourage stronger to win. Conflict resolution is based on the strength to fight and win. They generally possess assertiveness, competitive nature and are ambition [31]. Members from this culture always aspire for career advancement and prefer to work in larger organizations.

Feminism refers to the societies in which social gender roles overlap [31]. Members who belong to feminine nature are very cooperative, value quality of life, help others and strife to maintain good relationships with other group members [53]. People from this society believe

in “work in order to live” concept [35]. They always tend to be modest and both the genders from this culture are less career oriented. Focus on career advancement is an option for these people. Conflicts between team members are resolved by compromising. Rewards to the team members are based on equality. These people are comfortable working in smaller organizations.

2.2.4 Uncertainty avoidance

It is the measure of the degree to which a given culture copes up and adapts with ambiguity and uncertain conditions [31, 32, 122]. Team behavior and performance varies according to the difference in the level of uncertainty avoidance. Teams with weak uncertainty avoidance have the courage to face any type of risk which may be known or unknown. They will be ready to move into new jobs easily and adopt change quickly. Team members follow rules only if they are necessary [31]. Creativity is admired and encouraged in teams having strong uncertainty avoidance. Problems are solved on their own without usage of these formal rules. Members of these teams work hard only when necessary and relax in the remaining time. Focus of the team members and organization is on the decision process but not on the end result [35].

Teams with strong uncertainty avoidance are subjected to various formal and informal rules which are mandatory to follow though they are not necessary. As these people strictly follow rules, it has sheer effect on their innovation. Less creativity can be seen in these people. Work is more or less under control of these regulations in these teams [35]. Members in the team urge to work hard and like to be busy with work all the time. Time is precious for these members. Focus of the team members and organization is on the decision content rather than the process.

2.2.5 Long term / Short term orientation

Organization and team cultures can be also divided on the basis of their orientation. Some of the organizations think long term and some may think short term. This dimension shows the depth of a society for pragmatic and future oriented perspective rather than historic, conventional, or short term point of view [31].

Organizations and teams which are long term oriented believe in the future. People who are long term oriented value perseverance, thrift and prioritizes general purposes over individual interests [31]. Primary focus will be on the profits which come in future e.g. ten years from now. Employees in these teams have synthetic way of thinking and main focus will be on organization’s market position. Value is given to adaptive nature, learning, honesty, accountability and self discipline by the team members. Generally team members here have less time for leisure activities.

Teams with short term orientation value freedom and achievement. People believe and work for today. Employees who follow short term orientation focus on quick results, honors traditions, personal standpoints and social obligations [31]. Focus will be on profits which are gained this year or this month. Employees in the teams have analytical way of thinking [35]. Generally team members give priority to have time for their leisure activities.

2.3 Summary

- This chapter provides a brief overview of agile software development, its definition and principles. Next, the characteristics which are important for self-organized teams were explained.
- The behavioral characteristics were explained in a detailed way.
- For any team to function well, communication and coordination between team members is necessary. Therefore, the importance of communication and coordination in agile teams has been described.
- Next section, lists the possible behavior of team members based on each of the cultural dimension where each dimension has been classified into higher and lower level.

3 LITERATURE REVIEW

The purpose of this chapter is to present the design for findings of a literature review that aims at exploring the influence of culture on behavior. We first explain the steps which were followed during literature review. After that, literature review results are presented which are the relationships between agile team behavioral characteristics and cultural dimensions, described in the form of relationship enabler/hinderer. After the results, cultural profile demonstrated by India is described. Last section deals with expected influences on agile team behavior characteristics which are predicted by us. Following is the description of literature review, along with its steps. Chapter finally, closes with a summary.

3.1 Literature review design

Word ‘Literature’ itself defines the body of writing and work produced by scholars and researchers in a particular field. It plays an important role to obtain knowledge in a specified area and study of reported findings of other researchers [47]. This study starts with a literature review which is then followed by the survey questionnaire to know the results of research questions.

Steps which were used while performing the literature review were systematically done according to Kitchenham guidelines [11]. Therefore method like systematic literature review was not considered. Other method like snowball sampling was not appropriate to this research, as it was not much useful to the fields which are currently evolving (Concepts together like agile and culture).

Literature review is done to achieve quick and wide knowledge about our current study. It plays an important role to know related work and necessary concepts of a specific study [47]. It also helps to identify the key papers which are useful for this thesis and to build background knowledge, state of art and scope of the present study [47]. After considering all the above factors, literature review was performed with proper planning and searching techniques.

3.1.1 Motivation

This thesis is based on two different areas, culture and agile. We aimed to identify the influence of cultural dimensions on behavioral characteristics necessary for effective functioning of agile teams. To the best of our knowledge, very few studies have been performed on the combination of topics. Literature review method is chosen to gather as much information as possible from the resources which help answering the research question, RQ1.

3.1.2 Search

In the initial phase theoretical knowledge has been acquired from well established sources like books and journals from academia and industry to build background knowledge. Knowing the current state of knowledge in specific research field is the most significant step for any research [47]. Thus, background study was done to design the scope, objective of the current research and to gather information about the state of art on agile and culture. It covers all the concepts like Hofstede’s cultural dimensions at the work place and behavioral characteristics of agile teams in detail, which are described in chapter 2.

The focused literature review discussed in this chapter is conducted to investigate the relationships between agile team behavior characteristics and Hofstede’s cultural

dimensions, which is the answer to the first research question. The primary focus was to find latest books, journals, conferences, web sites and articles which support and are related to this study. Combinations of keywords were used to search and gather literature published in databases.

Before beginning literature review, foremost step is to identify keywords. For this objective, research questions were broken down into individual facets. Thereafter, lists of alternative spellings, synonyms, abbreviations were designed [11]. Boolean OR and AND operator were used to join alternative words and main terms. The resulting search string is provided in Table 2.

For conducting the literature review from different sources, following databases were used to gather information:

- Google Scholar
- IEEE Xplorer
- Springer link
- Engineering village
- ACM Digital Library

We followed specific selection criteria. Databases were only selected based on the following attributes [84]. Other databases were not selected as they were unfamiliar for both the authors.

- Coverage: The Database should be able to provide efficient number of articles in software engineering field.
- Familiarity: It should be familiar to the user and easy to use.
- Reputation: The database should be frequently used for literature reviews.
- Advanced Search: It should facilitate the usage of complex search strings and various inclusion and exclusion criteria to expand the search.

Blekinge Tekniska Högskola (BTH) electronic library was also used to search for articles related to the research topic. Articles published before 1999 were not considered in this search as agile methodology mostly evolved in 21st century. Thereby, this literature search helped in obtaining relevant articles from 1999 to 2011.

Table 2: Search string

Search String	Purpose
(Autonomy OR "Shared leadership" OR "Collective leadership" OR redundancy OR "Team orientation" OR learning) AND (cultur* OR "cultur* dimension*" OR "National culture" OR Geert Hofstede*) AND ("Power distance" OR PDI OR "Individualism" OR IDV OR Collectivis*OR "Long term orientation" OR "Long- term orientation" OR LTO OR "Short term orientation" OR STO OR "Short-term orientation" OR Masculinity OR Femini* OR MASOR "Uncertainty avoidance" OR UAI) AND (team)	For obtaining the answer for RQ 1

After finalizing the search string, to know the capability of search terms a pilot search was performed. After the pilot search, we noticed that some databases like IEEE Xplorer and ACM were unable to accept the search string formed above. From the expert's opinion search string was modified slightly according to the database acceptance.

3.1.3 Selection

After selecting the list of databases, inclusion and exclusion criteria were defined for selecting the articles. Here below inclusion criteria, procedure for selection of articles and analysis of agreement between the two researchers are briefly described.

The selection of articles was done based on following criteria.

- Documents which were published in English text.
- Articles which discuss information related to this study.
- Articles published after 1999.
- Articles which contain related keywords in their abstract.
- Articles which cover our research question issues.
- Type of the documents which are books, conference proceedings and journal articles.
- Articles which were available in the full text.
- Duplicate articles were excluded.

Table 3: Primary studies selection

S.No	Searched Database	Count	Count after advanced search	Selected articles
1.	Google scholar	16,900	1,170	22
2.	IEEE Xplorer	1986	529	11
3.	Springer link	1,16,186	10,567	2
4.	Engineering village	36	34	21
5.	ACM Digital Library	806	103	4
Total number of selected papers before removing duplicates				60
Total Number of articles selected after removing duplicates from all the databases.				38
Total number of articles after reviewing the full text				20

3.1.3.1 Study selection procedure:

The procedure of selecting the articles according to its relevance is described below. Selection of final list of articles is divided into three stages. Literature review was stopped in the starting week of May. Articles which were published after June 2011 were not considered. Each stage is described below in detail.

Table 4: Detailed study selection procedure

Stage	Relevance	Selection criteria	Total number of papers found
1	By Advanced Search	-Published in English text. -Publication date 1999: Till date. -Availability of full text. -Contains search string	12,403 articles
2	By title and abstract	-Related keywords in abstract -Related to our area of study	60 articles
		-Remove duplicates	38 articles
3	By full text	-Focus on the articles which cover our research question issues. -Focus on the articles which contain information about our study.	20 articles

Search is performed by both the authors together in the above mentioned databases based on the pre-defined search string. The resultant articles are refined in three stages.

Stage 1: For the list of articles obtained, authors applied the inclusion criteria and then the articles were selected together based upon the search string, publication date, papers which were published in English and availability of full text. After applying inclusion criteria, we found 12,403 articles from all the databases. When the search string is entered, lot of variance in the resultant number of articles is observed in each database. This may be due to the vast coverage of the respective databases used.

Stage 2: In this stage, articles were selected by the authors together which contain related keywords in abstract and papers which are related to our study. By reviewing the abstracts of the papers the resultant new list is prepared. Finally a list of articles is prepared which consisted of 60 articles. From the found 60 articles duplicates were removed and final list of 38 papers were obtained in the stage 2.

Stage 3: Both authors individually skimmed through the whole text of the articles which are obtained from stage 2 individually and finally came up with the list which included 20 primary studies. Primary studies were selected based upon the articles which cover the related research question issues and which discuss information about our study. In order to measure the argument between the authors in this stage the kappa co-efficient was calculated. The calculated kappa coefficient in the stage 3 assessments was 0.52 which is characterized as “Moderate agreement” [50]. Procedure of calculating kappa coefficient can be seen below. Finally 20 articles were selected after following the detailed selection procedure.

3.1.3.1.1 Kappa coefficient

“Statistical measure to evaluate the nominal scale agreement between the fixed pair of rater is known as kappa coefficient” [50]. This measure evaluates the agreement level between a fixed numbers of researchers where each of the subjects or items are rated on a nominal scale by the same number of researchers. Variability of the observers is found out through kappa coefficient [50]. In this study, kappa coefficient is calculated in the final stage of the study selection criteria, as the both the researchers have evaluated the articles separately.

The Kappa k , can be stated as,

$$k = \frac{\bar{p} - \bar{p}_e}{1 - \bar{p}_e}$$

Where,

$\bar{p} - \bar{p}_e$ indicates the degree of argument attained in excess of chance and $1 - \bar{p}_e$ represents the degree of argument attainable over and above what would be predicted by chance [50]. The value k represents the strength of agreement level between the observers [50] which are shown in the table below.

Table 5: Kappa statistics scale

Kappa statistics	Strength of argument
<0.00	Poor
0.00-0.20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Almost perfect

3.1.3.1.2 The steps involved in calculation of k are explained below

Table 6: Calculation of kappa coefficient

Author 1	Author 2			Total
		Yes	No	
Yes		a	b	m1
No		c	d	m0
Total		n1	n0	N

a - Number of times the two observers agree

d - Number of times the two observers disagree

c - Number of times observer 1 agrees while observer 2 disagrees

b - Number of times observer 1 disagrees while observer 2 agrees

The \bar{p} is calculated as $\bar{p} = \frac{1}{n} [a + d]$

The \bar{p}_e is calculated as $\bar{p}_e = \left[\left(\frac{n1}{n} * \frac{m1}{n} \right) + \left(\frac{n0}{n} * \frac{m0}{n} \right) \right]$

3.1.3.1.3 Calculation of kappa coefficient for the stage 3 in our study selection criteria:

In the stage 3 of the study selection criteria articles were selected by reviewing the full text. In this stage total 20 papers were selected by the researchers, where author 1 selected 20 papers, where as the author 2 selected 21 papers which cover the research question issue according to their perspective. From the total 38 papers, 20 papers were included in this stage. As there was a difference in the result of included papers by both the researchers kappa coefficient was calculated by comparing the included papers of both the authors.

Table 7: Order of agreement / disagreement by both the others for calculation of kappa coefficient

Author 1	Author 2			Total
		Yes	No	
Yes	16	5	21	
No	4	13	17	
Total	20	18	38	

$$k = \frac{0.763 - 0.501}{1 - 0.501} = 0.525$$

To make this research more successful, all the literature resources were utilized well with good search queries. By following the above enlisted criteria, 20 articles related to the influence of cultural dimensions on agile team behavior characteristics were found. Selection criteria were applied and advanced search was performed by both researchers to select the final resultant papers and were equally distributed among them to analyze the data. Kappa coefficient was calculated to solve the disagreements. Level of agreement was obtained as ‘Moderate’, when kappa coefficient is calculated. While selecting, on total 9 articles both the authors had differed opinions. Disagreements occurred were mutually solved by explaining the motive to each other for selecting and not selecting the respective articles. Therefore by mutual agreement of each other 4 articles from 9 were selected and final list of 20 articles was made. Duplicates were removed by sorting manually and by using Mendeley’s reference management software.

3.1.4 Data extraction strategy

Next important step was to design data extraction strategy and to extract information from the literature [11]. Following factors were considered for data extraction.

- Article title
- Date of publication
- Aims and objectives of the article
- Focus on both agile teams and cultural dimensions concepts
- Focus on influence of agile team behavior characteristics on cultural dimensions
- Summary

Data extraction was performed by taking all the above factors into consideration by both the researchers in parallel. Data extracted by both the researchers was compared and disagreements occurred were mutually solved. Results in this procedure were finalized with the mutual consent of both the authors.

3.1.5 Data synthesis

The procedure of collating and summarizing the data from the selected primary studies is known as data synthesis [11]. Resultant research articles were collected and summarized in this step. Data in the research articles would be in various forms with respect to methodology, outcomes and context. These types of studies are known as heterogeneous studies. To synthesize the data which is in heterogeneous in nature, qualitative synthesis is performed by the authors [11]. Qualitative synthesis involves reading, interpreting, summarizing and analyzing the information present in the literature which is obtained through the literature review [11]. This involves the studies that results after the analysis of theoretical grounds, language results and conclusions. Under Qualitative synthesis we have many other methods from which narrative synthesis method was chosen for the data synthesis. Narrative synthesis is a method in which findings of various studies are included,

summarized and explained with the help of words and text [49, 24]. This synthesis follows story telling approach with the help of words and text to summarize the findings in the studies. It comprises of four steps which are explained below [49]:

- Develops a theory which describes in detail about how the intervention works, why and for whom.
- Preliminary synthesis of the findings of the studies included in the literature review.
- Investigates relationships between the findings.
- Evaluates the robustness of the conducted thesis.

3.1.5.1 Rationale for choosing narrative synthesis:

The reasons for choosing narrative synthesis are mentioned below.

- Applicable to the reviews of qualitative and /or quantitative research [24].
- It helps to increase transparency and trustworthiness [24].
- It is the most sophisticated approach which involves integration and interpretation of results from multiple studies with aim of producing a new knowledge [49].

Thus, the results are documented and are used according to suitability of the research question. This data is also used to design the questionnaire for the survey. Synthesized data from the literature review is presented in next section.

3.2 Literature review results

The following is the final list of papers selected from the above mentioned databases. From these 20 papers data was analyzed and answer for RQ1 is obtained.

Table 8: Resultant list of articles after the literature review

S.No.	Ref.	Title of the article
S1	[1]	Leadership styles and cultural values among managers and subordinates: a comparative study of four countries in the former Soviet Union, Germany and the US.
S2	[12]	The impact of team members' cultural values on productivity, cooperation, and empowerment in self-managing work teams.
S3	[123]	The cross-cultural impact on organizational learning: A comparative study between China and the Netherlands.
S4	[68]	The Impact of the National Culture on Team Learning.
S5	[46]	The greatly exaggerated demise of heroic leadership: Gender, power, and the myth of the female advantage.
S6	[54]	Autonomous work teams: an examination of cultural and structural constraints.
S7	[87]	Research on management and organizations.
S8	[98]	Effects of culture on control mechanisms in offshore outsourced IT projects.
S9	[76]	Women, men and management styles.
S10	[83]	Collective enactment of leadership roles and team effectiveness: A field study.
S11	[119]	Cross-cultural communication, media and learning processes in asynchronous learning networks.
S12	[21]	Cultural diversity and work group effectiveness.

S13	[53]	A cultural feminist approach towards managing diversity in top management teams.
S14	[17]	Varying Team Composition to Examine the Effect of Cultural Diversity on Team Process and Cultural Adaptability.
S15	[35]	Cultures and organizations: software for the mind.
S16	[44]	Shared leadership in teams: An investigation of antecedent conditions and performance.
S17	[48]	The development and implementation of shared leadership in multi-generational family firms.
S18	[18]	Leadership and gender: a dangerous liaison?
S19	[37]	Long term orientation: Implications for the entrepreneurial orientation and performance of family businesses.
S20	[74]	Perception of Chilly IT organization Contexts and their Effect on the Retention and Promotion of Woman in IT.

The following sub-chapters contain discussions based on the synthesized data which was extracted from the 20 papers. This section aims to demonstrate the relationship between agile team characteristics with each cultural dimension. Hofstede's cultural dimensions are divided into high and low levels according to their proximity. Descriptions listed in the below tables show the analysis of each agile characteristics with cultural dimensions in the form of relationships with hindrances [-] and enablers [+].

3.2.1 Relationship between autonomy and cultural dimensions

The table below describes the relationship between the agile characteristic "Autonomy" with each cultural dimension. From the literature, it becomes evident that autonomy is supported by low power distance, individualism, low uncertainty avoidance, masculinity and long term orientation. Thus, description of relationship is presented in the following table.

Table 9: Relationship between Autonomy and cultural dimensions

Cultural Dimension	Enabler [+]	Hindrance [-]	Description
Power Distance	Low Power Distance	High Power Distance	Autonomy of a team member describes the freedom of choosing their own task. [-] This is not possible for the cultures having higher power distance. As team members with high power distances are comfortable working in a leader oriented environment, autonomy might not be suitable for these types of cultures. According to [+] Hofstede [12], autonomy should be granted only to those employees who work in a less power distance cultures as they have their own freedom to define their tasks [54, 87].
Individualism /Collectivism	Individualism	Collectivism	[+] According to Triandis [21], characteristics of individualistic culture consist of personal freedom, independence, and individual

achievement. Therefore, it can be finalized that autonomy is supported by high individualism [21, 83].

Uncertainty Avoidance	Low uncertainty avoidance	High uncertainty avoidance	<p>[-] High uncertainty avoidance cultured people are more rule oriented. They deal with ambiguity based on written or unwritten set of rules. They are more dependent on expert guidance or supervision as they feel safe.</p> <p>[+] Low uncertainty avoidance cultures are more enthusiastic and open to change. Hence, low uncertainty avoidance culture does not make any strict rules regarding employees and uses socialization as means to announce their opinion to other team members. Hence, it supports team autonomy to a greater extent. Considering the above example it can be said that team working in low uncertainty avoidance culture will be more suitable for autonomy [54, 98].</p>
Masculinity/ femininity	Masculinity	Femininity	<p>[-] According to [74] autonomy is less available in a culture which is female dominated.</p> <p>[+] From [74] we also came to know males in IT organizations often work in extended work schedules and emphasis more on individual innovation rather than on team work. Hence it is known that autonomy is characteristic which is mostly supported by masculine people.</p>
Long Term Orientation/ Short term orientation	Long Term Orientation	Short Term Orientation	<p>[+] “Long term orientation is said to be positively associated with innovativeness, pro-activeness and autonomy “[37].</p>

3.2.2 Relationship between shared leadership and cultural dimensions

The table below describes the relationship between the agile characteristic “shared Leadership” with each cultural dimension. From the literature, it becomes evident that shared leadership is supported by low power distance, collectivism, high uncertainty avoidance, femininity and long term orientation. Thus, description of relationship is presented in the following table.

Table 10: Relationship between Shared leadership and cultural dimensions

Cultural Dimension	Enabler [+]	Hindrance[-]	Description
Power Distance	Low power distance	High power distance	[+] Shared leadership thrives and develops in a culture which has low power distance [44]. In low power distance, every member in the team takes on a certain amount of responsibility. Whatever may be the consequence, positive or negative every person in the team is held accountable.
Individualism /Collectivism	Collectivism	Individualism	[+] Shared leadership assesses distribution of leadership collectively among team members. Team members possessing collectivistic ideas have a strong inclination towards shared leadership behavior. Therefore, shared leadership is likely to be affected by cultural value of collectivism [1, 44, 83].
Uncertainty Avoidance	High uncertainty avoidance	Low uncertainty avoidance	[+] This mapping explains the impact of the cultural dynamics on the timelines of team's decision in a team. Quick decision making is said to be one of the characteristics of shared leadership. Teams which have high uncertainty avoidance are said to be faster in decision making as compared to the teams which have weak uncertainty avoidance [17]. [-] As teams with weak uncertainty avoidance try to gather information within all possible dynamic environments, decision making time will also increase. [+] Conversely, teams with high uncertainty avoidance gather information from the possible scenarios and are contended with it [17]. As agile environment always supports quick decision making, high uncertainty avoidance is said to be suitable for the agile methodology.
Masculinity/ Femininity	Femininity	Masculinity	[+] Shared leadership is said to be a collaborative process with less hierarchical interactions between the leaders and other team members. In this scenario, leaders create environments which support collective learning and continuous improvements in a team. Main characteristics of shared leadership are empathy, capacity for listening, relational ability which are generally subscribed by women [46]. These characteristics are socially depicted towards feminine behavior. Therefore, by this study it can

be said that feminism supports shared leadership in an agile team.

Long Term Orientation/ Short Term orientation	Long Term Orientation	Short Term Orientation	[+] “Long term orientation enhances the development and implementation of shared leadership in multi generational family firms” [48].
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3.2.3 Relationship between redundancy and cultural dimensions

The table below describes the relationship between the agile characteristic “Redundancy” with each cultural dimension. From the literature, it becomes evident that redundancy is supported by high uncertainty avoidance and femininity. There is not enough literature evidence to map the remaining the three dimensions power distance, individualism and long term orientation with agile core methodologies. Thus, description of relationship is presented in the following table.

Table 11: Relationship between redundancy and cultural dimensions

Cultural Dimension	Enabler [+]	Hindrance [-]	Description
Power Distance	Unknown	Unknown	No evidence found
Individualism /Collectivism	Unknown	Unknown	No evidence found
Uncertainty Avoidance	High uncertainty avoidance	Low uncertainty avoidance	[+] A team in an organization can be homogenous work group or it may be a mixture of people with various cultures, experiences and backgrounds. Cultural composition of a team plays an important role in providing back up behavior and support to the remaining colleagues of the team. As per the author Burke propositions, tolerance of ambiguity of a team has a profound impact on backup behavior and support provided to a team. According to his assumptions, homogenous teams with high uncertainty avoidance strongly support providing back up behavior to the remaining team members than homogeneous teams with low uncertainty avoidance. This moderately supports providing back up behavior [17]. These assumptions are considered to be mapped though they are not proven empirically.
Masculinity/ Femininity	Femininity	Masculinity	[+] Communication is said to be the common trait of feminism. It also plays an important role in providing feedback to other team members. They procure unique ability to solve disputes, manage conflicts and are said to be more likely to provide positive feedback to

other team members [53].

Long/Short Term Orientation	Unknown	Unknown	No evidence found
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3.2.4 Relationship between learning and cultural dimensions

The table below describes the relationship between the agile characteristic “Learning” with each cultural dimension. From the literature, it becomes evident that learning is supported by low power distance, collectivism, low uncertainty avoidance, femininity and short term orientation. Thus, description of relationship is presented in the following table.

Table 12: Relationship between learning and cultural dimensions

Cultural Dimension	Enabler [+]	Hindrance [-]	Description
Power Distance	Low power distance	High power distance	[+] Team learning is said to be a part of organizational learning. This has a profound impact on organizational hierarchy and structure. Team members from low power distant cultures have power of autonomy to define their own task and have a capability of performing their tasks with more empowerment. Therefore, it is likely that individuals from low power distance cultures have a higher proximity to learn things [123]. Thus, we can say that team learning is promoted more in low power distance culture than in high power distance cultures. To overcome such situations researchers suggested providing adequate training, autonomy and resources to employees in high power distance cultures [68].
Individualism / collectivism	Collectivism	Individualism	[+] Characteristics of effective team learning are smooth communication, coordination and collective activities among all the members of the team. As collectivism supports all the above characteristics, it is said to have a good influence on team learning [119].
Uncertainty Avoidance	Low Uncertainty Avoidance	High Uncertainty	[-] Every nation has different cope up mechanisms to deal with uncertain or unambiguous situations. Countries which belong to high uncertainty avoidance culture, tend to feel more nervous in uncertain situations, they are more fearful for any change. They are ready to work hard and follow common

			people. [+] On the other side, low uncertainty avoidance cultured people are less rigid and open to change. They don't feel the fear of change. Low uncertainty avoidance cultured employees are more innovative and willing to adapt to new situations. So, low uncertainty culture is good for team learning when compared to high uncertain culture [68, 123].
Masculine/ Femininity	Femininity	Masculinity	[+] Femininity encourages collaboration and team learning between team members at team level also shares learning at organization level [123].
Long/Short Term Orientation	Unknown	Unknown	Short term orientation helps members of the team to connect with the organizational environment and to share learning. By this study, it becomes evident that short term orientation is good for sharing learning among team members [123]. Long term orientation values honesty, learning adaptiveness, accountability and self discipline [35]. As per both studies it was difficult to decide whether learning supports LTO or STO.

3.2.5 Relationship between team orientation and cultural dimensions

The below table describes the relationship between the agile characteristic “Team orientation” with each cultural dimension. From the literature, it becomes evident that team orientation is supported by low power distance, collectivism, femininity. There is not enough literature evidence to map the remaining the two dimensions uncertainty avoidance and long term orientation with agile core methodologies. Description of relationship is presented in the following table.

Table 13: Relationship between team orientation and cultural dimensions

Cultural Dimension	Enabler [+]	Hindrance [-]	Description
Power Distance	Low Power Distance	High Power distance	[-] In high power distance culture higher officials makes all the decisions without discussing with subordinates and subordinates also feel comfortable with this process. [+] Team orientation requires members who are very collective in nature to perceive their group goal. Work,

			responsibilities, leadership is shared collectively among the team members for effective team orientation [12]. Hence, low power distance cultures can effectively share joint responsibilities as they perceive team goal over individual goal.
Individualism /Collectivism	Collectivism	Individualism	[+] The definition of collectivism itself entails that people who are highly collectivistic are more committed to their work keeping their self interests aside. This description about collectivism describes that high number of collectivists in a team increase cooperative behavior hence supports high level of interdependence which are the characteristics of the team orientation [12, 98].
Uncertainty Avoidance	Unknown	Unknown	No evidence found
Masculinity/ Femininity	Femininity	Masculinity	[+] Characteristics of femininity support inclination towards team orientation. Working together and understanding each other are the pillars for team orientation. Therefore, femininity supports these ideologies [18, 53, 76].
Long/Short Term Orientation	Unknown	Unknown	No evidence found

3.2.6 Summary of the findings

The diagrams below are the pictorial representations of relationship between agile team behavioral characteristics and Hofstede cultural dimensions which are obtained from the literature review results. These relationships are of two types i.e. positive and negative. “+” in the diagrams represents positive influence which indicates that it is an enabling factor and “-” represents negative influence which indicates that it is a hindrance factor. Literature evidence for each relationship is mentioned to enable the transparency and easy traceability of the findings.

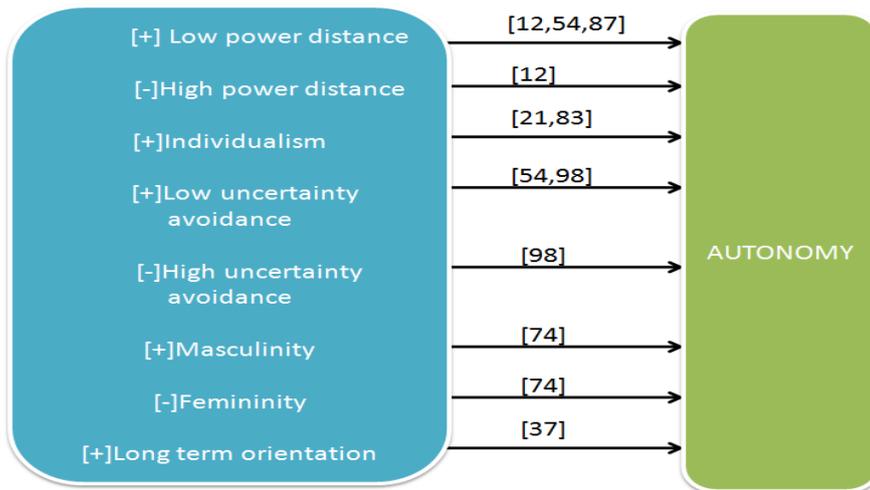


Figure 3: Relationship between cultural dimensions and autonomy

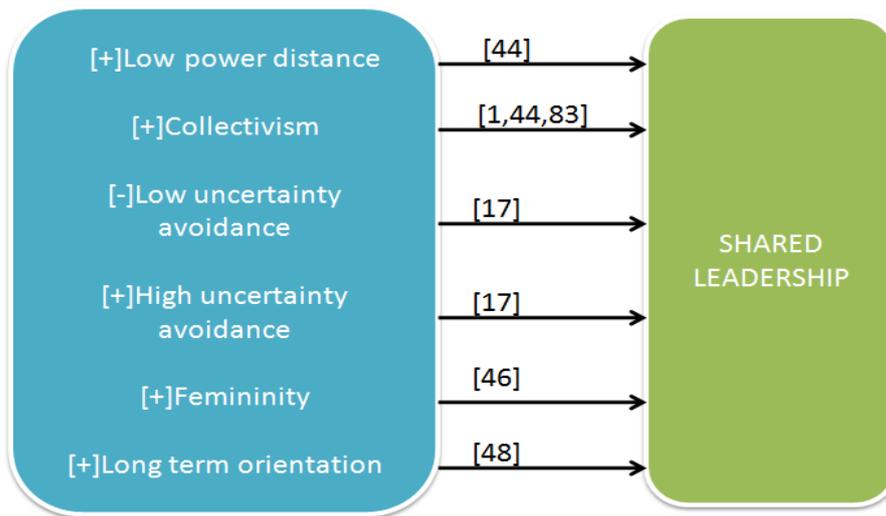


Figure 4: Relationship between cultural dimension and shared leadership

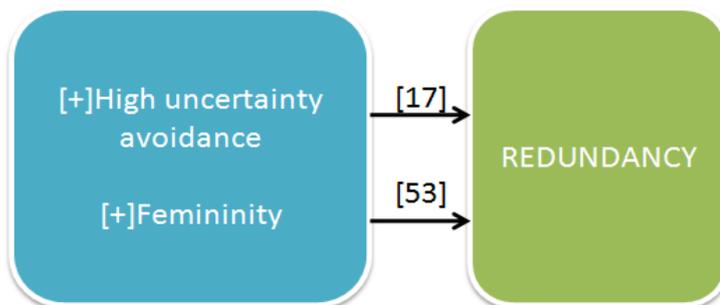


Figure 5: Relationship between cultural dimensions and redundancy

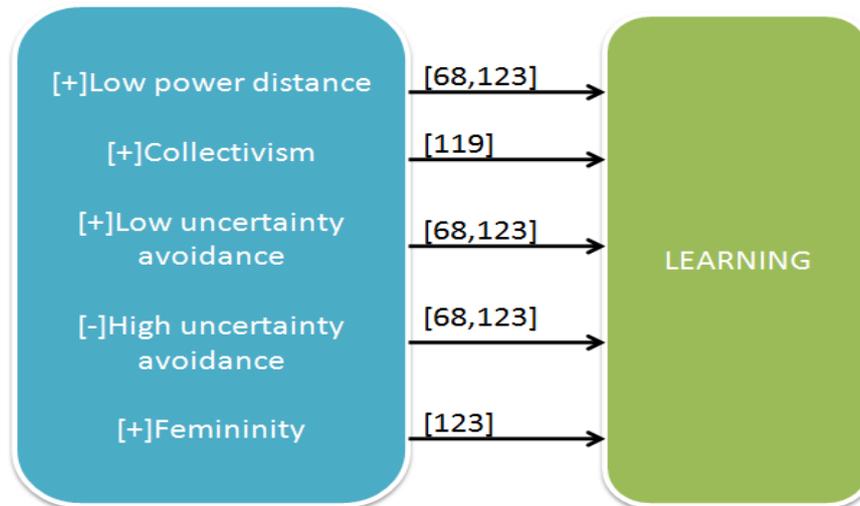


Figure 6: Relationship between Learning and cultural dimensions

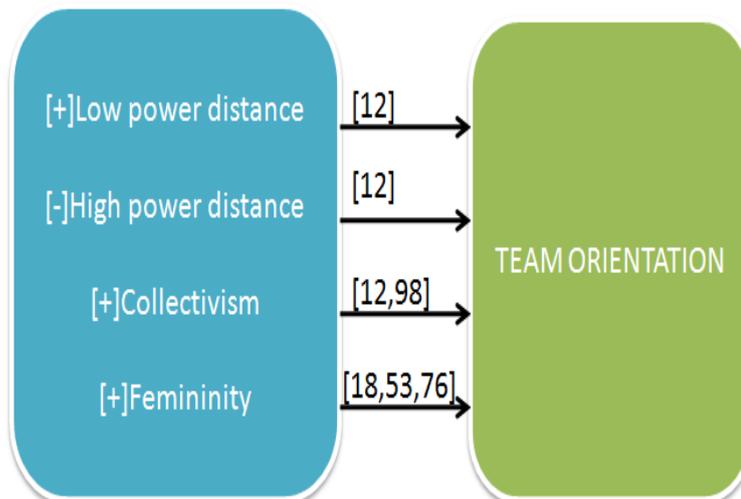


Figure 7: Relationship between Team orientation and cultural dimensions

3.2.7 Cultural Profile Demonstrated by India

The following thesis mainly deals with concepts like culture and its influences. To address the following, researchers need to focus on a specific culture as we have several cultures across the world. Indian culture was selected as the basis of this research as we are very keen and interested to know in depth about it, and also due to links with Indian industry that were utilized during the empirical part of the thesis. And also, from Hofstede's literature one can easily assume that agile can never be practiced in Indian culture. For testing the above mentioned scenario, Indian culture was selected as the bias of the research. Thereby, below section describes cultural dimensions of India which is proposed by Geert Hofstede. From, the below description cultural profile exhibited by India can be known.

3.2.7.1 High power distance

According to Hofstede, India exhibits high power distance [36]. This symbolizes high level of inequality of power in the society [31, 35]. Indian employees always consider the opinion of their bosses to get their job done. They also feel comfortable with the fact that they are being led and are a little fearful of their seniors. All this factors demonstrate that there is a hierarchical structure present in the Indian society.

3.2.7.2 Collectivism

According to Hofstede, Indian society exhibits collectivism [36]. This indicates that people in India have an inclination towards group goals as they are more collective in nature. They usually learn from their colleagues, give more priority to group goals and are reluctant to work individually [35]. When working in a group, decisions are made after consulting all the members in the group. Group identity is encouraged by these people.

3.2.7.3 Masculinity

Indian culture in general is masculine in nature according to Hofstede's data. This implies that they are more assertive, competitive and focus more on wealth and achievements [31]. Gender inequality exists in high masculine culture.

3.2.7.4 Low uncertainty avoidance

According to Hofstede's data, Indian culture demonstrates low uncertainty avoidance. People in less uncertainty avoidance cultures generally prefer taking risks. They are less focused on rules and regulations, are innovative in nature, exhibit risk taking ability, and they give less preference to organizational rules. These people don't resist or fear for changes [31,32].

3.2.7.5 Long term orientation

According to Hofstede's data India has much higher score in the long term orientation, indicating that people in India are oriented towards long term goals. "Long term orientation is said to be positively associated with innovativeness, pro-activeness and autonomy" [37]. Employees share similar objectives with their colleagues and superiors.

3.2.8 Expected influences on agile team behavior characteristics

Influence on the agile team behavior characteristics are divided into two categories, enablers and disablers, based on the evidence obtained from the literature. According to the ability of Indian agile developers, demonstration of autonomy, shared leadership, learning, redundancy and team orientation are expected to fit on the scale 'All the time-Most of the time-Sometime-Never'. These predictions are done based on our knowledge which was gained from the literature. According the study [85], the respective numerical ranges were assigned to each scale. Approach of assigning expected values is described below:

- If more than three cultural dimensions match with team behavioral enabler characteristics then it is assigned as 'All the time'.
- If three cultural dimensions match with team behavioral enabler characteristics then it is assigned as 'Most of the time'.
- If two cultural dimensions match with team behavioral enabler characteristics then it is assigned as 'Sometime'.

- If one or zero cultural dimensions match with team behavioral enabler characteristics then it is assigned as 'Never'.

The resultant predictions are there by shown in Table 11.

Rationale for the predictions made below:

Based on the literature evidence and background knowledge acquired, the ability of demonstrating the agile behavior characteristics by Indian developers are predicted.

Degree of having substantial freedom to define their own tasks for an individual is known as autonomy [15, 81]. Autonomy is possible in the cultures which provide substantial freedom to all the employees by choosing their own task. By having personal freedom and individual achievement, employees can demonstrate autonomy effectively. This characteristic is well demonstrated in cultures which accept risk and innovation [37, 54, 74, 75]. Employees may not have freedom to define their own task in leader oriented environments and in collectivistic cultures [54, 83]. Thus, demonstration of autonomy becomes difficult for the employees in the described scenarios. But when cultural profile of India is revisited cultural dimensions like masculinity, low uncertainty avoidance and long term orientation are said to enable autonomy. And dimensions like collectivism and high power distance disable demonstration of autonomy. As most of the cultural dimensions enable autonomy, thereby we predict autonomy is demonstrated 'Most of the time' by Indian agile employees.

Sharing responsibilities and leadership among themselves in a team is known as shared leadership. Characteristics of shared leadership possess empathy, capacity of listening and relational ability [46]. It thrives in a culture which supports quick decision making and where every member held mutually accountable for the positive and negative outcomes [17, 44]. Team members having collectivistic ideas and future orientation have positive inclination towards shared leadership behavior [48]. It is difficult to share responsibilities and leadership collectively by the employees where decision making is not quick, where employees are more assertive and in cultures where hierarchy is followed [17]. Thus, we can say demonstration of shared leadership is not possible in high power distant, masculine and low uncertainty avoidance cultures. When the above mentioned factors are compared to the cultural profile of India, cultural dimensions like collectivism and long term orientation enable sharing leadership and responsibilities among team members. As only few cultural dimensions enable demonstration of shared leadership, we can expect shared leadership is exhibited 'Sometimes' by Indian agile employees.

Learning is said to be one of the important characteristic in agile team behavioral characteristics. It is said to be a part of organizational learning. Employees can learn things from their own experiences, provided resources, from training programs, by communicating with colleagues, from unambiguous situations, by doing collective activities and from their superior officials [35, 68,119]. When the above mentioned scenarios are compared to the cultural dimensions demonstrated by India, cultural dimensions like collectivism and low uncertainty avoidance enable team learning. Thus, we can predict that Indian agile employees can exhibit 'Sometimes' team learning.

Ability of helping and assisting other team members in a team is known as redundancy which is also referred as back up behavior [40]. According to [17, 53] it can be well demonstrated in societies with high femininity and high uncertain avoidance. But India is masculine and low uncertainty avoidance culture. When the above mentioned factors are compared to the cultural profile of India, none of the cultural dimensions enable redundancy. Thus, redundancy is least or 'Never' expected to be demonstrated by the Indian agile employees.

Preferring team goals over individual goals is said to be team orientation. Employees who are team oriented are collectivistic in nature and are more committed to group goals rather than on individual interests and goals [12]. Team oriented employees collectively participate in decision making and discuss team oriented goals. But decision making is solely made by the higher officials in the high power distance cultures like India in which perceiving team goals may not be possible for the employees. Team orientation thrives in the cultures with high femininity, low power distance and collectivism [12, 31, 76, 98]. But India exhibits masculinity, collectivism and high power distance. When the above mentioned scenario is are compared to Indian cultural profile, only collectivism enable team orientation. Thus, it is ‘Never’ expected to be exhibited by Indian agile employees.

Table 14: Prediction on ability of demonstration of agile team behavior characteristics by Indian agile employees

Agile team behavioral characteristics	Enablers	Disablers	All the time (100%-75%)	Most of the time (74%-50%)	Someti mes (49%-25%)	Never (24%-0%)
Autonomy	+ Masculinity + Low uncertainty avoidance + Long term orientation	- Collectivism - High power distance		☐		
Shared leadership	+ Collectivism +Long term orientation	- Low uncertainty avoidance			☐	
Redundancy		-Masculinity -Low uncertainty avoidance				☐
Learning	+Collectivism +Low uncertainty avoidance				☐	
Team orientation	+Collectivism	-High power distance				☐

Influence of national culture may also present on the agile employees. But as years pass employees learn from their experiences and are molded into agile culture/corporate culture [43, 68]. From [40, 78], it is known that an effective agile team consists of characteristics like autonomy, shared leadership, learning, team orientation and redundancy. We expect experienced employees are more influenced by agile culture irrespective of their national culture. Therefore, we assume that experienced Indian agile employees demonstrate all the team behavior characteristics which help to build an effective team. All the above predictions are validated through a survey which is conducted on Indian agile employees. Survey is conducted in order to validate our predictions and explore the gap between the expected and demonstrated behavior of Indian agile employees, if identified.

3.3 Summary

- In this chapter, the procedure of conducting literature review was explained.
- Steps like formation of search string, selection of databases, inclusion/exclusion criteria, data extraction and data synthesis was followed in literature review to obtain the answer for RQ1. Resultant papers obtained from literature review are also mentioned.
- After that, the influences of cultural dimension on agile team behavioral characteristics were explored. Therefore, each cultural dimension was classified in the form of relations which either enable or hinder each characteristics of agile team. Relationships were explained both theoretically and pictorially.
- Next, Cultural dimensions demonstrated by India were explained.
- From the literature evidence, ability of demonstration of agile team behavior characteristics by Indian employees was documented according to our ideology. Predictions were built on the qualitative scale 'All the time-Most of the time-Sometime-Never'.

4 SURVEY

The aim of this chapter is to describe the design of the survey along with questions and present the purpose behind each question. The empirical research in this thesis study was conducted in the form of survey. Motivation behind the selection of the survey is explained in the next section. We divide agile team behavior characteristics and Hofstede cultural dimensions into various keywords according to its functionality. These were used to frame survey questions. Thereafter, pilot study and reliability of the survey is discussed. Finally, the chapter closes with a summary.

4.1 Empirical research design

In order to answer RQ2 and RQ3 the authors decided to conduct a survey by collecting information from a sample of the target population [92]. The resultant data can be used for both descriptive and analytical purpose [19]. Surveys are classified in three different ways. Descriptive surveys are used to gather and discover information, explanatory survey tries to exemplify a circumstance and explorative survey helps to solve comprehensive problems. Data is usually collected by face-to-face interviews, by telephonic interviews or by questionnaires in the form of web survey. It should be noted that there is no best survey method as every survey method has some benefits and some flaws. It can be beneficial to explore many variables at one time. On the other side, it may require a lot of time and money. It was decided to go for internet based descriptive survey for this research study. Reasons behind the selection of this type of survey are as follows:

- 1) We are going to observe societal culture, as “agile teams” comes under a common society. By the means of survey, the target could be easily reached.
- 2) Due to time constraint and budget, traveling to India was not a feasible option. Hence other empirical methods such as an experiment and case study were not suitable as these would have required physical presence.
- 3) Web based survey was conducted as it requires less capital intensive and is an easy process. It could easily reach target agile practitioners. On the other hand, it is simple to use, easy to build and analyze. The survey could be completed at the respondent’s convenience moreover they could forward the survey to their friends, family, and relatives working in agile methodologies. This helped in increasing the number of respondents. The biggest benefit of this survey was that the physical presence of the authors was not required for conducting the survey.
- 4) Another benefit of using web survey is that data is captured electronically; hence analysis could be done in a faster way [45].

4.1.1 Survey objective

It is important to identify and define questionnaire objective before framing the questions. Without a proper objective, we can end up collecting very little data and the collected data may not be useful. For this study, experience of software professionals who are currently working in an agile environment will possibly help. Some space was left for further comments so that respondents feel free to express additional views. Therefore, the following objectives were framed from the survey:

- 1) Gain information on agile team members.

- 2) Gain general information, whether the teams are practicing all of the essential agile team behavioral characteristics or not. This data were essential to analyze the answers.
- 3) To obtain the list of necessary agile team behavior characteristics demonstrated by the Indian agile employees.
- 4) Gain knowledge on the effect of years of experience of Indian agile employees on agile team behavior characteristics.

4.2 Sampling strategy

Our target was to obtain responses from Indian agile software employees. Sampling strategy was designed using inclusion and exclusion criteria. Non probabilistic convenience sampling method is chosen for sampling strategy [129]. Survey link would only be sent to the employees who are Indians and who work in agile software methodology. Link is excluded to the employees who are foreigners and who work on traditional software development. As the responses are from Indian agile software employees from this it is easy to know the influence of cultural dimensions on agile team behavioral characteristics as the respondents have Indian and agile background.

4.2.1 Questionnaire design

Questions for the survey were carefully designed after thoroughly reviewing the literature. The target was to get the response from software professionals working in India who have prior experience in an agile environment.

For a better understanding, the questions were structured in three main parts:

- Introduction part
- Demographic information part
- Close end part

The introduction part explains the purpose of the survey to the respondents.

The second part of the survey consists of demographic questions. It consists of general information about them and information regarding the organization for which they work. To make this part more clear, we have divided this part into two categories. Each category consists of a set of questions which possibly populate some interesting findings.

To provide quantified data by the respondents we included closed ended questions in the survey which would enable us to compare our findings with the quantitative study performed by Hofstede.

I. Category “about you”

In this category, the respondents were asked questions related to them.

	About you
	<input type="checkbox"/> Age
	<input type="checkbox"/> Gender
	<input type="checkbox"/> Years of experience in agile
	<input type="checkbox"/> Position
	<input type="checkbox"/> Team size
	<input type="checkbox"/> Have you ever been to foreign
	<input type="checkbox"/> Nationality

	<i>Purpose</i>
	Based on this data the findings can be easily correlated from different viewpoints.

II. Category “ about the organization”

In this category, the respondents were asked questions related to their organization.

	About organization
	<input type="checkbox"/> Name of the organization <input type="checkbox"/> Size of the organization
	<i>Purpose</i>
	This information can be used to analyze the type of organization.

Third part of the survey consists of questions which are related to the functioning of agile teams in the organization. The purpose of these questions is to understand the influence of cultural dimensions on agile team behavioral characteristics. Closed ended questions were chosen in order to receive direct answers.

After gaining information on agile team behavioral characteristics and cultural dimensions (through background knowledge), each of the agile team behavior characteristics and cultural dimensions are broken down into corresponding keywords. These keywords are framed according to their functionalities. Functionality generally refers to the service or the capability rendered by the specific object. From the background knowledge, gained from the literature these characteristics are broke down into the following keywords. The following division is done as it is helpful to frame the survey questionnaire. These help in framing the closed ended questions in a better way. These functionalities also help to analyze the corresponding behaviors in the survey analysis if the respondents mark the respective options from the listed questionnaire.

4.2.1.1 Division of cultural dimensions into following functionalities

- **Low power distance:** Management support, Equality, Decentralized decision making.
- **High power distance:** Inequality, Centralized decision making, Dependency.
- **High individualism:** Own interests, own goals, Freedom, Self-Independence, Independent identity.
- **High collectivism:** Group identity, Group interests, Value for relationships.
- **High masculinity:** Inequality of genders, Assertiveness, Ambitious, and Career oriented.
- **High femininity:** Relationships, Common goals, Quality of life, Equal treatment of genders, helping nature.
- **High uncertainty avoidance:** Rule oriented, frequent changes, Avoidance of risk.
- **Low uncertainty avoidance:** Less rule oriented, Tolerance of ambiguity, Innovativeness, Adaptive for change.
- **Long term orientation:** Belief in future, Long term goals, Long term commitments.
- **Short term orientation:** Quick results, Belief in present, short term commitments.

Division of agile team behavioral characteristics into following functionalities

- **Autonomy:** Independence / Freedom, Innovativeness, Authority.
- **Shared leadership:** Sharing responsibilities, Decision making.
- **Redundancy:** Backup behavior, Collective ownership, Understanding other team members tasks.
- **Learning:** Daily meetings, Redundancy, Team orientation, Shared leadership, Feedback

- **Team orientation:** Team goal over individual goal, dedicated teams, and Active participation in team activities.

These divided functionalities are therefore used in designing the survey questionnaire. Usage of all functionalities for each behavioral characteristic cannot be done as it may be ambiguous to the survey respondents'. Therefore single functionality is selected from the group and it is used in designing the survey questionnaire.

Functionality which mainly represents the behavioral characteristic and which is mostly used in the literature is given the first preference. For example, autonomy is divided into Independence, Freedom, Authority and Innovativeness. Functionality "Freedom" is selected at the end, as it is the primary functionality of autonomy and is extensively used in the literature. Here below, literature evidence is presented after every keyword for easy reference.

Selected Functionality for each team behavior:

Autonomy: *Freedom* [37, 40, 81, 82, 83].

Shared leadership: *Sharing leadership* [40, 44, 46, 80, 82, 83].

Redundancy: *Helping/ Assisting* [80].

Learning: *Learn* [40, 66, 68, 73, 80, 82, 106, 114, 123].

Team orientation: *Team goal over individual goal* [40, 81].

While answering the survey, two sets of questions appear in the closed end part. If the survey respondents select options I and II they will proceed to part A and if they select options III and IV it will proceed to part B. Part A exhibits all the enabler characteristics and part B exhibits all the disabler characteristics. The answers chose by the respondents are used to know the enabling and disabling characteristics empirically. These chosen answers serve as reasons to the gap demonstrated from the expected behavior which is mentioned in chapter 5. Detailed questionnaire is mentioned in appendix A.

4.2.2 Survey piloting

Survey piloting is divided into two phases. In the first phase, survey questions were designed and constructed out of it. In order to remove any ambiguities these questions were carefully designed and developed. In the second phase, they were tested and modified by the authors accordingly. To test the questionnaire, four students from BTH were approached who took global software engineering course and hold knowledge about culture dimensions and agile methodologies. These students were requested to fill the survey and give feedback in the form of checklist (see appendix C). Their feedback helped in determining and readability of the questions. Some of them faced difficulty while going through the survey and were confused by the terminology. Based on their feedback modifications were made. Terms like shared responsibilities were ambiguous to the students. To get a clear view this was changed to shared leadership. Based on feedback given by our supervisor more modifications/changes were done to the survey. Another two additional questions regarding nationality of the respondent and their learning\working experience abroad were included. In total, three changes were made after a pilot study.

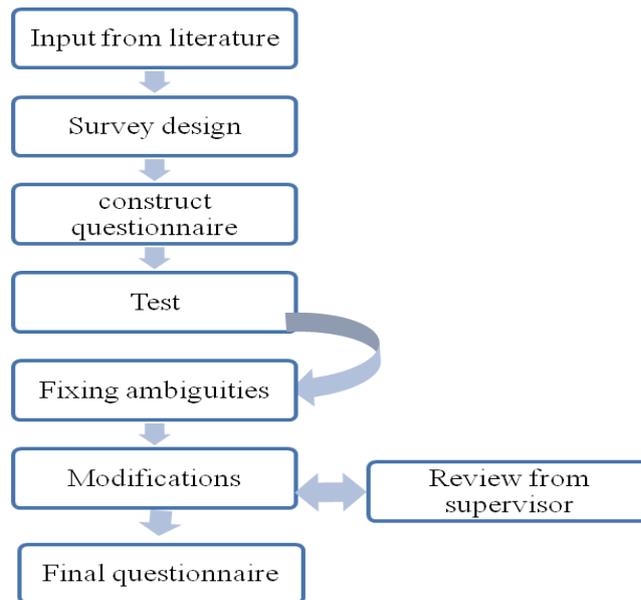


Figure 8: Survey piloting

4.2.3 Reliability

The statistical measure of survey's instrument data is called reliability [75]. While dealing with the cultural issues it is often important to conduct reliability testing [75]. Reliability testing was done immediately after conducting pilot study.

4.2.3.1 Test-retest

Test-retest reliability is measured to see the stability of the respondents. It is done by having the same set of respondents filling the survey at two different times [75]. Test to see whether the results are reproducible. To check test and retest reliability we had selected four people working in software firms in India. Long delays cause variation in results therefore the survey was conducted within a small gap of five days [16]. Correlation coefficient's (r) value comes around 0.82. This indicates good test-retest reliability. Reliability levels of 0.70 or above are usually accepted as good reliability [75].

4.2.3.2 Alternative form

When individuals became familiar with the items in the survey they simply answer based on their memory, this is called as practice effect [75]. This can be a threat to our study. Alternative-form of reliability provides the way to escape from practice effect [75]. In order to reduce practice effect, the order of the question set is changed without changing its actual meaning. This is a second test retest conducted with the same employees who participated in the test above (re-test) study. Again then correlation coefficient (r) is calculated 0.79 which indicates good alternative form of reliability [75].

4.2.3.3 Internal consistency

Internal consistence reliability of the survey is done by calculating Cronbach coefficient alpha which comes around 0.87 which indicates an acceptable level of reliability [75].

4.3 Summary

- This chapter defines the survey objectives and the design of the questionnaire. It was divided into introduction part, demographic part, and close end part.
- The close ended questions were framed with the help of agile team behavioral and culture dimension functionalities.

5 SURVEY ANALYSIS

The primary purpose of this chapter is to analyze the survey responses which help in answering RQ2 and RQ3. The procedures for data collection and data analysis are described. Statistical analysis was chosen to analyze survey data. Thus, the answer for the RQ2, demonstration of agile team behavioral characteristics of Indian employees and answer for RQ3, effect of years of experience of Indian employees on agile team behavior characteristics is presented. This chapter closes with a summary.

5.1 Data collection

In order to fulfill the aim of the research study a decision was made to conduct a web-based survey in Indian culture by asking a number of questions regarding team behavior that are related to cultural dimensions.

An online survey was chosen (survey methods, <http://www.surveymethods.com/Index.aspx?out=1>), a web-based tool for data collection. Through survey, more knowledge can be gained from huge set of employees in the target industry. Evaluation of huge number of variables can be done by it [45]. As the remaining research methods such as case study and experiment require physical presence of the researchers, these methods were not opted. Online survey was chosen as it was found to be the most suitable approach to gather data from different locations in India. It is much easier to collect data from different parts of the country by sending them the web link. Survey method is easy to use and it provides reasonable data for analysis. The survey was launched on 28th June, 2011 and was open for a week, closed on 4th July, 2011. The survey link will be active for one week time period. If respondent faces any type of technical errors, loss of data is not possible, they can reopen the link once again and answer it any time in the mentioned time period.

In the first section of the survey, eight questions were included (Q1-Q8) which provides basic information about the organization and the respondent.

Second part consists of a total of 13 questions (Q9-Q21). This part consists of two sub-parts related to agile team behavior and cultural dimensions. If the respondent selects agile team behavior enabler factors then first set of questions will appear and if they choose agile team behavior disabler factors then the second set of questions will appear.

5.2 Data analysis

After the data is collected from the survey, next step is to inspect the data and remove incomplete and ambiguous responses. In total, 36 people responded who were from 10 different organizations. Only those responses were to be considered which were fully filled. The data was reviewed manually and incorrect responses were omitted.

For answering RQ2 and RQ3, a statistical analysis was used. It is used to analyze the data which is obtained from the survey. Statistical analysis involves the calculation of the average, mean and standard deviation for the responses obtained from the survey [75, 92]. Statistical analysis was done to calculate the answer percentage for four questions (Autonomy, Shared leadership, Redundancy, Team orientation) which are based on agile team behavioral characteristics. One of the agile team behaviors factor 'learning' could not be quantified as it is not possible to statically analyze this factor (learning) according to experience level of employees. The reason for not being able to analyze 'learning' is that, it is a continuous process. Whenever an employee is hired he starts learning both formally and informally from the first day and this process continues till the organization and the employee decide to part ways. It cannot be quantified on a singular person as the process

involves more than one person in it. Both single loop and double loop learning are not measurable on individual basis. Questions on learning was also framed in such a manner assuming it to be present in between the employees in a default way. But the factors which enable or disable ‘learning’ are analyzed from the survey results. Alternative method for assessing learning can be redoing or reframing the survey questionnaire (Learning part) which cannot be done at this point of time.

5.2.1 Demographic data analysis

Ten different organizations were approached via emails and telephone for research and survey purpose. The objectives were discussed and based on the discussion; the emails id’s of professionals working in agile methodologies was given. The survey link was forwarded to 70 people, out of which 36 responded. This gives a response rate of 47.14%. Three responses were discarded as they were partially filled. Reminder was sent to other people who didn’t respond. Finally, 33 completely filled responses were selected. Three of the respondents chose not to disclose any company information. Based upon the individual responses the following data is summarized.

Table 15: Summary of the number of responses

Company Name	Size of the company	No of Recipients	No of Respondents	Response rate in each company
Brain Vista Technologies	Large Scale	3	1	33.33%
Infosys	Very large Scale	15	10	66.66%
Aricent	Large Scale	8	5	62.5%
Tata Elxsi	Medium Scale	3	1	33.33%
Intelligroup	Large Scale	5	1	20%
TCS	Very large Scale	16	8	50%
Staples	Large Scale	3	1	33.33%
United health group	Large Scale	2	1	50%
CTS	Large Scale	5	1	20%
Wipro	Large Scale	10	1	10%
Anonymous 1	Very large scale	----	1	----
Anonymous 2	Very large scale	----	1	----
Anonymous 3	Large scale	----	1	-----
Total:	-	70	33	47.14%.

5.2.2 Role of respondents

The survey was taken by people with various designations. All these roles were assigned to them based on their responsibilities. Demonstration of various agile team behavior characteristics also depends up on the role of an employee in the organization; it can be a project manager, scrum master, analyst, developer, test, team lead, architect or any other personnel working in the organization. This permits to gather data from a diverse number of participants working in agile development methodologies. From the obtained results as shown in the below table, varied results are obtained. Most of the respondents of the survey

are designated as developers, which is the reason for analyzing this demographic factor. Detailed analysis is explained in section 5.4.

Table 16: Role of respondents

Role of respondents	Number of Respondents
Project Manger	3
Scrum Master	0
Analyst	0
Developer	20
Tester	6
Team lead	3
Architect	1

5.2.3 Team size

There was a lot of variation in the team sizes of respondents. While the majority of the respondents work in a team size of 6-10, two of the respondents work in a small team of 1-5. One of the respondents has a team size of 11-15. Nine of the respondents work in a team of 16-20, while six work in a team which size is greater than 20.

Table 17: Team size of the respondents

Team size	Number of Respondents
Between 1-5	2
Between 6-10	15
Between 11-15	1
Between 16-20	9
Above 20	6

5.2.4 Respondents experience in agile

Variation in the experience of respondents working in an agile environment was also observed. Majority of the respondents are having experience between 1-5 years. One of the respondents has an experience of 6-10 years. From the below table we can say that the majority of the respondents are having more than one year experience in an agile environment. Three of the respondents have zero years of experience in agile. By contacting them again through email we came to know that they are getting trained on agile methodologies. We considered these responses as they are currently involved in an agile environment.

Table 18: Years of experience of the respondents in agile

Years of experience in agile	Number of Respondents
No experience	3
Less than 1 year	7
Between 1-5 years	20
Between 6-10 years	1

Majority of the respondents in the survey have less working experience abroad (three to six months). Only one of the respondents is a bi-coded individual (Bi-coded individuals are

those who have spent considerable amount of time in more than one culture due to the life choices they have made [28]) who has spent 1 year in Germany and 5 years in USA. Analysis is impossible to evaluate the impact of bi-coded individual's verses locals, since the category contains only one respondent. Thereby, the foreign work experience of all the respondents doesn't affect the stability of the survey results as maximum number of respondents has spent most of the time in Indian culture. Experience level of the respondents could create variation in the result. From the demographic data, experience of the agile team members is considered as it is useful to analyze the answer of RQ3.

5.2.5 Size of the organization

Size of the organizations varies from small to very large. Demonstration of the agile team behavioral characteristics may also depend on the size of the organization which is the reason for analyzing this factor. From the obtained results as shown in the table 19, varied results are obtained. Results show that zero employees are from small organization, 3 employees work in medium sized organization, 18 employees are from large and 12 respondents work in very large organizations. Obtained results are compared and further analyzed below.

Table 19: Size of the organization

Size of the organization	Responses
Small scale	0
Medium scale	3
Large scale	18
Very large scale	12

5.3 Analysis of team behavioral characteristics with respect to experience

In order to analyze the learning (Q9), autonomy (Q10), shared leadership (Q13), team orientation (Q16) and redundancy (Q19) level in overall respondents, experienced and inexperienced employees, weighted mean for the responses of the survey were calculated. We divide the category into two levels:

Inexperienced: 0-1 years of experience in agile

Experienced: 1-5 and above 6years of experience in agile

AT = All the time

MT = Most of the time

ST = Sometime

No = Never

N= Number of respondents responded

The table below shows the statistical calculation for each question.

Table 20: Analysis of autonomy, shared leadership and redundancy with respect to experience

	Question to analyze agile team functioning	Percentage of respondents answered				Weighted Mean	Standard deviation
		AT	MT	ST	No		
Q.10	Do you have freedom during your work to define your task? All	24.24% N=8	60.61% N=20	15.15% N=5	0 N=0	3.09	0.44694
	Experienced	28.57% N=6	57.14% N=12	14.29% N=3	0 N=0	3.14	0.57612
	Inexperienced	10% N=1	70% N=7	20% N=2	0 N=0	2.9	0.79162
Q.13	Do you share leadership with your team members? All	6.25% N=2	46.88% N=15	43.75% N=14	3.12% N=1	2.56	0.40218
	Experienced	9.52% N=2	52.38% N=11	38.1% N=8	0 N=0	2.71	0.50874
	Inexperienced	0% N=0	22.22% N=2	66.67% N=6	11.11% N=1	2.11	0.83728
Q.16	Do you help/assist other team members? All	43.75% N=14	56.25% N=18	0% N=0	0% N=0	3.43	0.52238
	Experienced	57.14% N=12	42.86% N=9	0% N=0	0% N=0	3.57	0.69208
	Inexperienced	11.11% N=1	88.89% N=8	0% N=0	0% N=0	3.11	0.90058

Table 21: Analysis of team orientation with respect to experience

	Question to analyze agile team functioning	Percentage of respondents answer			Standard deviation
		Group Goal	Individual Goal	Weighted mean	
Q.19	Which is more important to you? All	87.1% N=27	12.9% N=4	1.87	0.16060
	Experienced	95.24% N=20	4.76% N=1	1.95	0.21272
	Inexperienced	62.5% N=5	37.5% N=3	1.62	0.27485

Here weighted arithmetic mean was calculated taking the combination of average values from a sample of population of different size. The formula for weighted arithmetic mean is

$$\bar{x} = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}$$

The weights w_i represent the bounds of the partial sample. Weighted arithmetic mean is calculated to show the trends in response. The arithmetic mean which is higher than 2.5 gives a positive response. We have assigned AT as degree 4, MT as degree 3, ST as degree 2 and No as degree 1. And group goal is assigned as degree 2 and individual goal as degree 1. Degree 0 is not assigned since assigning 0 will make the product of $w_i x_i$ 0. Now the, Weighted mean = [(number of respondents for AT * degree for AT) + (number of respondents for MT * degree for MT) + (number of respondents for ST * degree for ST) + (number of respondents for No * degree for No)] / total number of responses [121].

For example consider question number 10 (0-1 year experience) the calculation goes as follows:

$$\begin{aligned} \text{Weighted mean} &= [(1*4) + (7*3) + (2*2) + (0*1)] / 10 \\ \text{Weighted mean} &= 2.9 \end{aligned}$$

Standard deviation represents the deviation from the norm which is calculated using the formula

$$S = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2}$$

Where,

S represents the standard deviation

$\{x_1, x_2, \dots, x_N\}$ Are the observed values

\bar{x} Is the mean value

The use of N-1 in place of N is called as Bessel's correction

For example for question number 10 we have calculated the standard deviation as follows,

The values for X_1, X_2, X_3 and X_4 are 4, 3, 2, and 1 respectively

We have calculated \bar{x} as 2.9

Number of respondents $N = 10$, therefore $N-1 = 9$

Standard deviation, $s = \sqrt{\frac{\{ \sqrt{(4-2.9)^2} + \sqrt{(3-2.9)^2} + \sqrt{(2-2.9)^2} + \sqrt{(1-2.9)^2} \}}{9}}$

This is equal to be 0.79

Standard deviation is a measure of variability or diversity [6]. If data points (i.e. calculated standard deviation) are very close to the average mean value then it indicates low standard deviation and if data points are very far to the calculated mean then it indicates high standard deviation. Low standard deviation indicates that there is lesser variation or dispersion and high standard deviation indicates more dispersion in data with high variability [6]. Results are discussed in detail in later sections.

From the survey result, we compared the agile team behavior characteristics of experienced and inexperienced employees working in an agile environment to the overall respondents. Total mean value of the overall respondents is obtained by summing the average mean of the experienced and inexperienced responses. If the respondent checks "All the time" we allot the highest value of 4, likewise if the respondent checks "Never" then the lowest value is allotted which is 1. 0 was never allotted since assigning 0 will make the product of $w_i x_i = 0$. This will make the calculations more difficult.

For team orientation the scale was different. The value 1 was assigned for checking "Individual goal" and the value 2 was assigned when the respondent checks "Group goal". We have divided the respondents into three categories based on their experience level. The first category comprises of all the respondents irrespective of their experience. Respondents who have 0-1 years of experience come under inexperienced category. Respondents who are having more than 1-10 years of experience come under experienced category.

For learning the values 1-4 was assigned for the scale ‘Never-Rare-Often-Always’. The mentioned scales were based on predictions which were made in chapter 3. We haven’t divided the respondents into any categories based on their experienced level. Responses of overall employees were only considered.

The green spot in the figure below shows the mean value of each category after analysis. In the desired situation all the agile behavioral characteristics are expected to reach 4, which would indicate the favorable behavior of the experienced agile team members. If in our survey these characteristics don’t reach the desired state then the difference between the values indicates a gap. One of the potential explanations of this gap may be related to cultural factors.

Demonstrated behavior {All – ◆, Experienced – ●, Inexperienced – ⊙}
 Favorable behavior which is required to build an effective agile team ⊗
 Expected behavior/ Predicted behavior for demonstration of team behavioral characteristics by Indian agile employees ★
 Total mean - - →
 Positive trend from inexperienced to experienced →

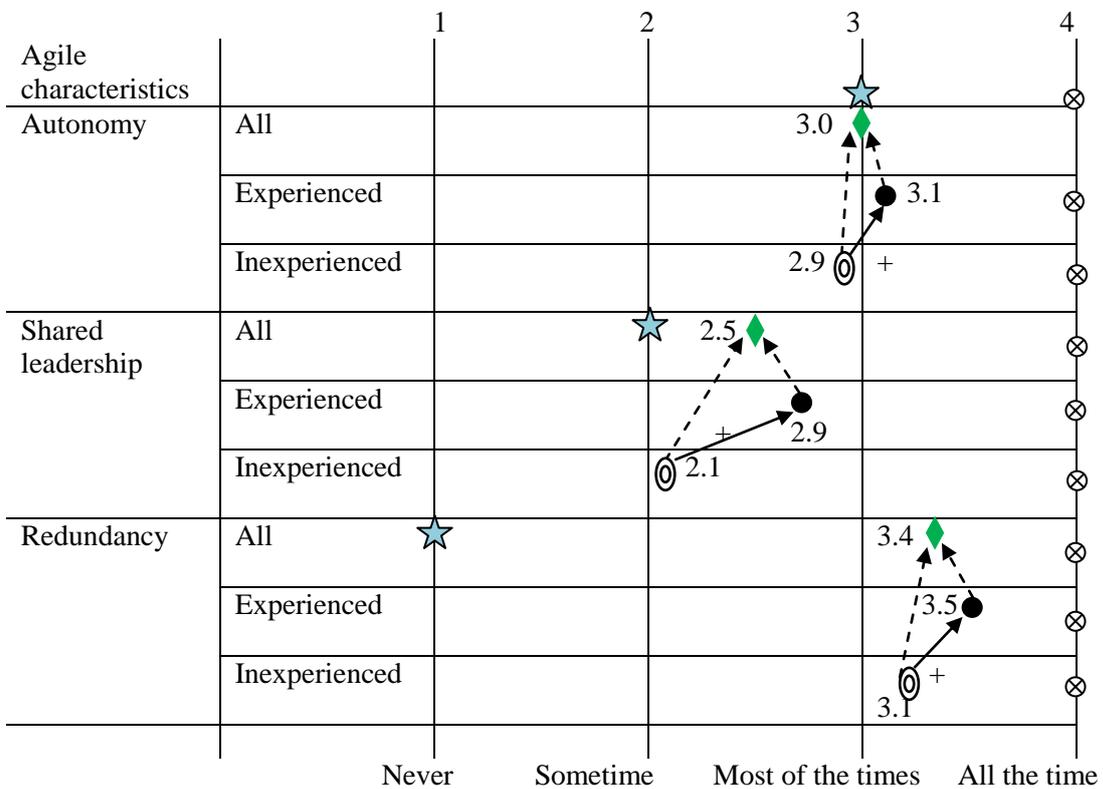
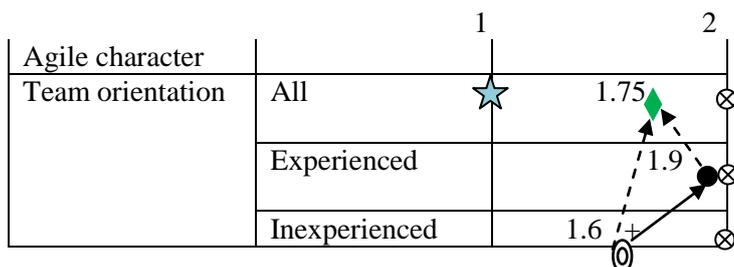


Figure 9: Diagrammatic representation of autonomy, shared leadership and redundancy with respect to experience level of the respondents after analysis.



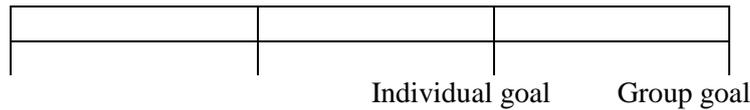


Figure 10: Diagrammatical representation of team orientation after analysis.

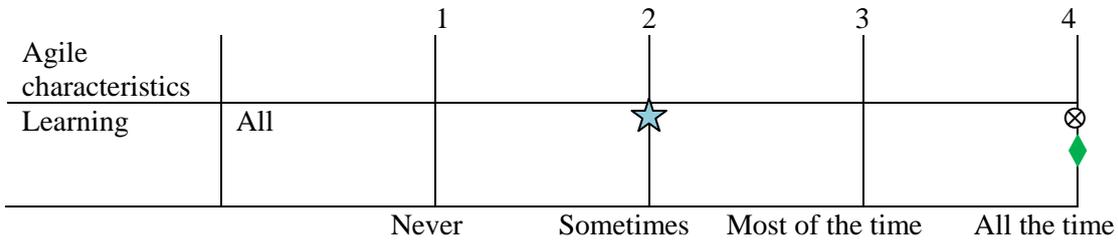


Figure 11: Diagrammatical representation of learning after analysis.

Autonomy: After the statistical analysis, the weighted mean for experienced respondents for autonomy was obtained as 3.1 while the weighted mean of inexperienced respondents for autonomy is 2.9 which give us a combined value of 3.0 for all the respondents. Standard deviation was also calculated for all the respondents, experienced respondents and inexperienced respondents separately. We obtained 0.57 for experienced employees and 0.79 for inexperienced respondents. From the obtained data we can see that standard deviation value is varying for both the set of employees. Low standard deviation is seen in experienced employees compared to that of inexperienced. It indicates most of the survey participants have same opinion towards demonstrating team autonomy. Less variance can be seen in their opinions. Compared to experienced responses, standard deviation value is more for inexperienced values. This infers that there are some differences in the opinion of the participants for demonstrating team autonomy. As their opinions are varied from each other, the values are spread on a large scale. From the above analysis we can observe that experienced survey respondents have consistent opinion on demonstrating team autonomy which is needed for an effective functioning of an agile team. For an employee working in an effective agile team the value should be 4.0 ideally. But from the results we can see that some of the employees did not show up to the expectations. According to our expectation, possible reason for this gap in autonomy may be due to the presence of high power distance and collectivism in them. The organizational hierarchy creates an unequal distribution of power among the team members [35]. In high power distanced organizations, organization arrangement is usually in the form of hierarchy where power is distributed unequally among subordinates. Another possible reason could be collectivistic nature of Indian employees. From the survey results we can see that 80% of the employees agree that because of high power distance they do not demonstrate autonomy and 40% of the employees agree due to collectivism they have less autonomy. The survey results mentioned above also say that collectivism and high power distance are the reasons for the obtained gap. Results also show masculinity, low uncertainty avoidance and long term orientation positively enable them for demonstration of team autonomy. From overall results, 60.61% of the respondents agree they demonstrate autonomy most of the time. Thereby, we can say Indian agile employees demonstrate autonomy despite of having few disabling factors. Thus, our predictions are validated from the survey results.

Shared leadership: The weighted mean of experienced respondents for shared leadership was obtained as 2.9 while the weighted mean of inexperienced respondents for shared leadership is 2.1 which give us a combined value of 2.5 for all the respondents. Standard deviation of experienced employees was 0.5 and inexperienced employees were 0.8. By comparing both the values we can say that experienced respondents have low standard deviation than inexperienced employees. This infers that respondents with low standard

deviation have same set of opinions and variation is less compared to that of respondents with high standard deviation. As variability of data increases uncertainty also increases [6]. Therefore, it is observed that employees who are experienced have less variance in their opinions. From above analysis, it is known that experienced employees are more willing to share leadership compared to inexperienced employees. For an experienced employee working in an effective agile team the value should be 4.0 ideally. According to our estimation, the possible reason for this large gap in shared leadership can be the presence of organizational hierarchy, masculinity and low uncertainty avoidance. Because of presence of organizational hierarchy the decisions making is done by senior members of the organization [35]. This may have an effect on the ability to share the leadership in a team. The junior members are not consulted while making big decisions. Masculinity induces competition [31, 35]. Because of competition everyone tries to move forward without thinking about other members of a group. Shared leadership supports quick decision making [17]. But quick decision making is not common among employees who demonstrate low uncertainty avoidance. People with low uncertainty avoidance have a tendency to make final decisions after considering each and every team members opinion which takes more time [17]. Thus, low uncertainty avoidance hinders shared leadership. Results from the survey demonstrate 73% of the respondents selected high power distance, 53% of the respondents selected masculinity and 6% of them selected low uncertainty avoidance as the reasons for not sharing leadership among them. From the survey results we can see that all the above mentioned factors could negatively contribute to the above identified gap. Respondents of the survey indicated collectivism and long term orientation as reasons which positively contribute for demonstration of sharing leadership. According to the results, majority of the respondents' i.e. 47% of the respondents agree that they have shared leadership most of the time and 6% of them say that they have shared leadership all the time. Therefore, majority of the respondents agree that shared leadership is demonstrated most of the time. From the above mentioned results we can say that predictions made by us are not matched with the actual results. Thus, we can say shared leadership is seen most of the time than expected in Indian agile employees.

Redundancy: The weighted mean for experienced respondents for redundancy was calculated as 3.5 while the weighted mean of inexperienced respondents for redundancy is 3.3 which give us a combined value of 3.4 for all the respondents. Standard deviation of experienced employees was 0.69 and inexperienced employees were 0.9. When the above results are compared we came to know that data points of experienced employees deviate more from the average mean. When standard deviation values of both experienced and inexperienced employees are compared with each other we can notice standard deviation for experienced respondents are less than inexperienced ones. Low standard deviation indicates less variability of data. This gives an idea that most of the experienced employees are willing to assist and help other team members. For an employee working in an effective agile team the value should be 4.0 ideally. Very few respondents disagree with it. Possible reasons for this small gap might be the demonstration of masculine and low uncertainty avoidance behavior by the employees. As discussed earlier, masculinity induces competition [31, 35]. People are more worried about their own goals and tasks. They lay less emphasis on cooperating and helping their team members out. Hence, masculinity is the probable reason because of which small gap mentioned above is obtained. Employees in low uncertainty avoidance cultures are said to provide less back up behavior [17]. Hence, low uncertainty avoidance is said to be hindrance factor for redundancy. Despite of existence of disabling factors, 56% of the survey respondents agree that they help and assist other team members most of the time. Though our predictions are not matched with the survey results, but from the results we can say that Indian agile employees demonstrate redundancy most of the time.

Team orientation: The weighted mean for experienced respondents for team orientation was calculated as 1.9 while the weighted mean of inexperienced respondents for team orientation is 1.6 which gives us a combined value of 1.75 for all the respondents. Standard deviation of experienced employees was 0.21 and inexperienced employees were 0.27. When values of standard deviations of two sets of respondents are compared to each other, unequal values were observed. Variability is less for the experienced respondents compared to inexperienced. Less data points were obtained (low standard deviation) for experienced employees, which infers respondents who have experience emphasis more on team goals rather than on individual goals. Data of Inexperienced employees infers to high standard deviation which indicates more deviation from the actual value. For an employee working in an effective agile team the value should be 2.0 ideally. The possible reasons for this deviation from ideal behavior can be high power distance and masculinity. People who are masculine in nature, like to receive a predefined role in a team. They are more comfortable when their roles and goals are already defined [97]. In high power distance cultures employees are expected to act according to the superiors decisions which may or may not support teams objectives. From survey results we can see that 100% of the respondents feel high power distance is the reason for not having team goal and 53% of the respondents selected masculinity as the reason for not pursuing team goal. From results, collectivism can also be seen as a factor which positively contributes for possessing team orientation. Despite of the disabling factors, 87% of the respondents agreed that they have team goal. Survey results are not consistent to the expectations we made above. Thus, from the results we can say Indian agile employees demonstrate team orientation all the time.

Learning: Detailed analysis of the respective agile team behavioral characteristic was not done, as this factor was assumed to be present in each agile employee in a default way. But from the survey results, characteristics which enable and disable learning are obtained. From the survey results we can notice 63.64% of the respondent’s selected low power distance as the reason through which learning was possible. This indicates that ‘learning’ is rarely seen in cultures which have high power distance. In the same manner 96.97% of respondents selected collectivism and 60.61% of them selected low uncertainty avoidance. This indicates most of the respondents feel collectivism and uncertainty avoidance are enabler factors for learning. Results indicate learning is possible all the time in collectivistic cultures and mostly possible in cultures with low uncertainty avoidance. Very less respondents i.e. 12.12% of respondents selected femininity as the enabler characteristic for learning. When overall survey results are observed, we can see 100% of the employees agree they demonstrate learning through various ways. Despite of disabling factors like high power distance, respondents feel that they learn from various situations. Learning may also be possible from senior employees and from their suggestions. Thus, from the survey results we can say Indian agile employees all the time demonstrate learning which does not match with our prediction made above.

5.4 Analysis of team behavioral characteristics with respect to developers

As most of the respondents are developers, our results may be influenced by the role of the employees. To check these influences results of all the respondents are compared to set of developers. Below table analyzes team behavioral characteristics with respect to developers.

Table 22: Analysis of (Developers) Autonomy, Shared leadership and Redundancy with respect to experience

	Question to analyze agile team functioning	Percentage of respondents answered				Weighted Mean	Standard deviation
		AT	MT	ST	No		
Q.10	Do you have freedom during your work to define your task? Developers All	30% N=6	55% N=11	15% N=3	0 N=0	3.15	0.578
	Experienced developers	28.57% N=6	57.14% N=12	14.29% N=3	0 N=0	3.333	0.606
	Inexperienced developers	10% N=1	70% N=7	20% N=2	0 N=0	2.875	0.742
Q.13	Do you share leadership with your team members? Developers All	5% N=2	33.33% N=15	55% N=14	5% N=1	2.4	0.396
	Experienced developers	9.52% N=2	52.38% N=11	38.1% N=8	0 N=0	2.66	0.489
	Inexperienced developers	0% N=0	22.22% N=2	66.67% N=6	11.11% N=1	2.0	0.816
Q.16	Do you help/assist other team members? Developers All	50% N=14	50% N=18	0% N=0	0% N=0	3.5	0.530
	Experienced developers	57.14% N=12	42.86% N=9	0% N=0	0% N=0	3.75	0.715
	Inexperienced developers	11.11% N=1	88.89% N=8	0% N=0	0% N=0	3.125	0.845

Table 23: Analysis of (Developers) team orientation with respect to experience

	Question to analyze agile team functioning	Percentage of respondents answer			Standard deviation
		Group Goal	Individual Goal	Weighted mean	
Q.19	Which is more important to you? Developers All	78.95% N=15	21.05% N=4	1.789	0.608
	Experienced developers	91.67% N=11	8.33% N=1	1.916	0.728
	Inexperienced developers	57.14% N=4	42.86% N=3	1.571	1.098

When results of all the survey respondents table (19, 20) and developers (table 21, 22) are compared, results are obtained in the same range with very little variation of ± 0.2 decimal points. But large difference is seen for characteristic 'Team orientation'. From the analyzed results it is seen that employees who are developers exhibit team orientation more than that of employees with other designations.

5.5 Analysis of team behavioral characteristics with respect to organization size

Most of the respondents belong to large and very large organizations, it is important to see whether results are influenced by the size of the organization. As responses from small and medium organizations are very few, analyzing those results statistically were not considered. To check these influences results of all the respondents from large and very large organizations are compared. Below table analyzes the team behavioral characteristics with respect to size of the organization.

Table 24: Analysis of Autonomy, Shared leadership and Redundancy with respect to large organization

	Question to analyze agile team functioning	Percentage of respondents answered					Standard deviation
		AT	MT	ST	No	Weighted Mean	
Q.10	Do you have freedom during your work to define your task? All large organization	22.22% N=4	61.11% N=11	16.67% N=3	0% N=0	3.05	0.604
	Experienced	30% N=3	60% N=6	10% N=1	0% N=0	3.2	0.860
	Inexperienced	14.29% N=1	57.14% N=4	28.57% N=2	0% N=0	2.85	1.215
Q.13	Do you share leadership with your team members? All large organization	5.56% N=1	44.44% N=8	50% N=9	0% N=0	2.55	0.542
	Experienced	10% N=1	50% N=5	40% N=4	0% N=0	2.7	0.757
	Inexperienced	0% N=0	28.57% N=2	71.43% N=5	0% N=0	2.28	0.927
Q.16	Do you help/assist other team members? All large organization	44.44% N=8	55.56% N=10	0% N=0	0% N=0	3.44	0.7079
	Experienced	60% N=6	40% N=4	0% N=0	0% N=0	3.6	0.845
	Inexperienced	14.29% N=1	85.71% N=6	0% N=0	0% N=0	3.14	1.0488

Table 25: Analysis of team orientation with respect to large organization

	Question to analyze agile team functioning	Percentage of respondents answer			Standard deviation
		Group Goal	Individual Goal	Weighted mean	
Q.19	Which is more important to you? All large organization	82.35% N=14	17.65% N=3	2	0.6123

	Experienced	90% N=9	10% N=1	1.9	0.845
	Inexperienced	66.66% N=4	33.33% N=2	1.6	1.283

Table 26: Analysis of Autonomy, Shared leadership and Redundancy with respect to very large organization

	Question to analyze agile team functioning	Percentage of respondents answered					Standard deviation
		AT	MT	ST	No	Weighted Mean	
Q.10	Do you have freedom during your work to define your task? All very large organization	33.33% N=4	50% N=6	16.67% N=2	0 N=0	3.33	0.8290
	Experienced	30% N=3	50% N=5	20% N=2	0 N=0	3.1	0.8459
	Inexperienced	-	-	-	-	-	-
Q.13	Do you share leadership with your team members? All very large organization	9.09% N=1	63.64% N=7	27.27% N=3	0% N=0	2.81	0.7321
	Experienced	10% N=1	60% N=6	30% N=3	0 N=0	2.8	0.7712
	Inexperienced	-	-	-	-	-	-
Q.16	Do you help/assist other team members? All very large organization	54.55% N=6	45.45% N=5	0% N=0	0% N=0	3.25	0.8508
	Experienced	60% N=6	40% N=4	0% N=0	0% N=0	2.6	0.7483
	Inexperienced	-	-	-	-	-	-

Table 27: Analysis of team orientation with respect to very large organization

	Question to analyze agile team functioning	Percentage of respondents answer			Standard deviation
		Group Goal	Individual Goal	Weighted mean	
Q.19	Which is more important to you? All very large organization	100% N=11	0% N=0	2	0.774
	Experienced	100% N=10	0% N=0	2	0.8164
	Inexperienced	-	-	-	-

We dint analyze the response of inexperienced employees from very large organization as we received only one response from it. Irrespective of the organization size i.e. large or very large organization, results for all the experienced employees are almost equal.

When responses from large and very large organizations are compared, results show that all the employees who are working in very large organizations demonstrate agile team behavior characteristics well than the employees who work in large organizations. These days agile is also practiced in large organizations which may be the reason for exhibition of high redundancy by the employees from very large organizations [128].

5.6 Summary

- In this chapter, methods used to for analyzing survey results are explained in detail.
- Analysis of demographic factors, agile team behavioral characteristics and analysis of team behavioral characteristics with respect to experience of respondents are described.
- Description of validation of predicted results with survey results are given.
- Analyses of team behavioral characteristics with respect to developers are described.
- Analyses of team behavioral characteristics with respect to organization sizes are described.

6 VALIDITY THREATS

Regardless of how good the research study was conducted, there is always a mere possibility of a factor which can impact the accuracy and reliability of the study. The authors did their best to describe and minimize all possible threats which can affect this research study. The various validity threats are described below:

6.1.1 Internal validity

From data gathered internal validity assesses whether accurate findings are obtained or not [19]. Internal validity threats can be reduced by making multiple references subjected to the topic of interest.

For literature review, the primary aim of classification of papers was done on mutual understanding of both the authors. Hence, subjective nature can't be ruled out which are threats to the study. Publication bias is a threat that needs coping up while doing the literature review. This threat is minimized by strictly following the defined selection criteria and using well known databases. By following this approach, the authors have tried to minimize the internal validity threat.

Validity threats can also be caused due to the type of questions which were used in an online survey tool. Questions were divided into two categories which are demographic questions-relating to respondents' personal information and information about the organization. The second type of questions is closed ended questions which relate to team behavior and underlining cultural dimensions. There is a threat that some of the industrial practitioners may not want to disclose any information out of confidentiality. We have minimized this threat by removing mandatory option links with these questions and ensured them that confidentiality will be maintained.

6.1.2 External validity

External validity is associated with generalization of the specific study results. In general it is related to how well the study findings are related to the general population [19].

Literature reviews on agile team behavior characteristics and cultural dimensions was done for the years 1999-2011. After running the search string few relevant articles were obtained which were published before year 2001. Publications before 1999 were not considered in the study. So there may be a possibility that the authors would have missed some important papers before 1999. This threat was minimized by the preliminary running of the search string to find out the frequency of papers before 1999. The authors couldn't find any relevant papers, as agile methods were not popular before 1999.

During industrial surveys some potential threats were identified like approaching Indian organizations which follow agile methodologies. Therefore, validity threat occurs. To mitigate this, the authors decided to opt for web based online questionnaire. Invitation was send via email to the respondents.

When the questionnaire was sent by individuals after completion of the survey, it was found that some of the respondents did not complete the survey. Authors approached them again to complete all the questions as their contribution would have been helpful for us to improve the findings. A decision was made not to include unambiguous responses in the analysis in order to avoid above mentioned threat.

Another threat to external validity which is prominent is the number of respondents which are very few. In order to make any kind of generalization it is imperative to have a large number of responses. Authors have done their best to collect more responses but constraints of time and resources hinder this objective. Authors were successful in getting responses

from 10 different organizations. It creates a threat to generalization of the study. Authors are not trying to make any kind of arguments and conclusion based on survey data. There can be a probability that they have missed some important relationships which has influence on culture and agile team.

6.1.3 Construct validity

The construct validity assesses the appropriate use of accurate definition and measures associated with the variables [19]. The construct validity that is search string appropriateness for literature review was well defined and reviewed by the supervisor and senior Software Engineering students. Thus, it forbids any threats related to construct validity.

6.1.4 Conclusion validity

Conclusion validity is related to research study and findings. It is also known that this study topic is reliable. It makes sure that collected results lead to appropriate findings and conclusions [19].

To show the reliability of literature review, pilot search was performed. This was done using different search strings in different databases.

In the survey, if any important questions were misinterpreted by the respondents, this may greatly affect the result of the survey. To avoid this we approached four students at BTH who took global software engineering course and have appropriate knowledge about cultural dimensions and agile methodologies. These students were requested to fill the survey and give feedback. Their feedback helped us to determine the readability of the difficult and easy questions. It also helped in finding the unclear questions and helped in improving them. Based on their feedback modifications were made.

6.1.5 Face validity

Face validity of the survey is based on general review of the survey items by untrained judges [75]. It is done to get an overview of survey items [75]. To assess face validity we consider same four students who helped us in doing pilot study.

6.1.6 Content validity

“Content validity is a subjective measure of how appropriate the item seems to a set of reviewers who have some knowledge of the subject matter [75].” The authors selected same students to assess the survey items and to validate it with considerable knowledge regarding agile methodologies and cultural dimensions.

6.1.7 Questionnaire design

For designing questionnaire for our survey, we divided agile team behavior characteristics and Hofstede cultural dimensions into various keywords according to its functionality. Each characteristic was divided into several keywords. But while framing the questions in the survey, all the keywords obtained for each characteristic was not used. This may be a threat to our study as each keyword may depict some important functionality related to the respective characteristics. But usage of all keywords for each characteristic was not a feasible option as there is a possibility of confusion rising in the respondents of the survey regarding each characteristic. This threat was minimized by using the related keyword which

is commonly used in the literature and which suits to the situation. Keywords were finalized based on the literature evidence, supervisor guidance and author understanding.

7 DISCUSSION

7.1 Usefulness of Hofstede's cultural profiles

After synthesizing the data in the literature review, relationships between agile team behavior characteristics and Hofstede cultural dimensions were obtained. Literature evidence was not obtained for some of the relationships and only few evidences were obtained for the identified relationships. Thus, we feel, other researchers need to focus on the relationships of agile team behavior characteristics and Hofstede cultural dimensions which help in acquiring more accurate results.

While predicting the ability of Indian agile employees to demonstrate agile team behavioral characteristics, information on national culture and cultural profile of the respective country was useful and misleading at the same time. Using the cultural dimensions exhibited by India we divided them into enabler and disabler factors with the help of literature evidence. Significance of each cultural dimension and its relation to each agile characteristic was understood individually. According to the national culture, occurrence of each agile team behavioral characteristic is predicted. Predicted behavior were confirmed in few cases but failed in most of the cases. Reason for the failure of our expectations in most of the cases might be due to the misleading or fragmented existing knowledge on the influence of culture on behavioral characteristics. As the data collected by Hofstede is almost 40 years old this may render the model obsolete, as culture is viewed as dynamic and constantly changing by many researchers [101].

7.2 The impact of experience

After the analysis of the survey results we came to know that agile team behavioral characteristics are demonstrated well by the experienced employees than that of the inexperienced employees. Employee experiences are useful both in professional and personal scenarios. "Past experience is not meant for forgetting, but it is said to be a guide for the future" [123]. Experienced employees possess characteristics like knowledge of competition, technical skills, inter personal skills, writing skills, work ethics, personal ethics, likelihood of success and realistic expectations [111].

From our data analysis, it is clear that the employees who are new to the agile environment take ample amount of time to adapt to the methodology and principles followed by both the organization and teams. Adapting to the respective organizational culture might be one of the reasons for this. At the same time organizational culture plays an important role which affects successful adoption of agile methods [110]. In the day to day life, employees are expected to bring their attitudes, beliefs and their personal values to the work place with them [89]. As time passes, the employer tries to fit their own personal values into ones organizational culture and move according to it.

8 CONCLUSION AND FUTURE WORK

8.1 Conclusion

In this research study, we studied the impact of national culture in agile software methodology. From the both the areas, state of art and state of practice were studied to know the influence of cultural dimensions on agile team behavioral characteristics. The research methodology used in this thesis was mixed methodology i.e. literature review and web survey. The literature review was conducted to know the relationship between the agile team behavior characteristics and cultural dimensions demonstrated by India, whereas the survey was conducted in order to find out whether Indian employees demonstrate the necessary behavior which is required for the effective functioning of agile team or not. From survey, the effect of the experience of the employees on agile team behavioral characteristics was also found.

In response to RQ1, we conclude that, yes there is an influence of cultural dimensions on agile team behavioral characteristics. The influence persists in both ways i.e. positive and negative ways. Next, for answering RQ2 & RQ3 a web survey was conducted. From survey results, we can see that 60.61% of the employees have team autonomy most of the time. When each characteristic is analyzed individually high results are obtained for the scale 'most of the time' for the remaining agile characteristics, which shows majority of the survey respondents demonstrate agile team behavior characteristics which helps them to build an effective team. Results in detail, can be viewed in chapter 5 (Table 16, 17). In response to RQ2, we come to the conclusion that the agile team behavior characteristics like autonomy, shared leadership and redundancy is often demonstrated by Indian employees and characteristics like learning and team orientation are always demonstrated by Indian agile employees.

One more interesting thing which came into our attention, after analyzing the survey is that years of experience of agile employees do have an effect on the employees which influences the demonstration of team behavior characteristics. From the results, it was vivid that employees with more years of experience demonstrate team behavior characteristics well than compared to the employees who have less years of experience in agile environment which is the response for our RQ3. Learning was not quantified with respect to years of experience because of insufficient data. It was clear that demonstration of these characteristics were not only dependent on individual's nature but also on the years of experience in agile environment.

Other factors like organization size and role of the respondents were also analyzed to check whether these factors influence the overall results or not. Results of the respondents who were developers are compared to all the responses. After analyzing the results, we found that respondents who are developers exhibit all the agile team behavioral characteristics in the similar range as the employees with other designations. Variance was observed for the characteristic 'Team orientation'. We observed employees who are developers demonstrate team orientation more than the respondents with other designations.

To know the organizational size effect, responses from different organizations are compared. As response rate was high from the large scale and very large scale organizations only these results were considered and compared. After the comparison of both the sets it is observed that employees who are working in very large organizations demonstrate agile team behavioral characteristics well than the respondents who are working in large organizations. Varied response was observed for the characteristic 'Redundancy'. It was seen to be

demonstrated well by the employees working in large organizations compared to the employees working in very large organizations.

From all the knowledge gained till date, we can say demonstration of behavior which is required for effective functioning of an agile team not only depends on individual personality and years of experience but also on lot of factors like cultural dimensions demonstrated by the specific country, years spent in the specific culture, size of the organization, age of the employee, structure and standard of the organization etc.

There were mainly two research contributions made by this thesis which is mentioned below.

Contribution 1: A consolidated list of relationships between agile team behavioral characteristics and Hofstede cultural dimensions based on existing research evidence.

Contribution 2: Effect of years of experience of agile employees on the demonstration of team behavior characteristics which are required for an effective functioning of a team.

Contribution 3: A gap between expected (on the basis of the literature findings) and empirically obtained behavior.

From the above study we come to know that team behavioral characteristics can be demonstrated more effectively by the experienced agile employees.

8.2 Future work

Agile is an emerging field which is being widely recognized in western countries, now-a-days its practice is being adopted by Eastern countries. Potential difficulties related to culture arise while implementing agile practices as every culture is different from another culture. Culture context is a wide topic. We assume, in future, focus will be more on this topic which will keep researchers occupied for a longer period. We strongly believe still more aspects of culture context related to agile will be investigated in future. From the context we provide few topics that would be hold potential research.

In this thesis we have explored the influence of cultural dimensions on the functioning of agile team.

- 1) The same research can be conducted in another culture and findings from the literature can be validated.
- 2) The same research can be done by means of interviews to identify the particular phenomenon of team behavior could be evaluated.
- 3) Based on other cultural theories such as Hall agile team behavior can be evaluated.

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APPENDIX A: QUESTIONNAIRE FORMULATION

1. How often do you have freedom to define your task?
- I. All the time
 - II. Most of the time
 - III. Sometimes
 - IV. Never

Proceed to Que. A if you choose I, II

Proceed to Que. B if you choose III, IV

	Select the reasons below
A	<input type="checkbox"/> Management support <input type="checkbox"/> Self interest to do the task <input type="checkbox"/> Because you prefer to do challenging tasks <input type="checkbox"/> Because of your innovative nature <input type="checkbox"/> Because you and your superiors share same objectives / aspirations <i>(multiple choices possible)</i>
	<i>Purpose</i>
	<p>The purpose is to find out the underlining link between autonomy and cultural dimensions. We already know that autonomy supports <i>low power distance, individualism, masculinity, low uncertainty avoidance, and long term orientation</i>. The options were framed based on relationships which enable autonomy with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p><input checked="" type="checkbox"/> Management support: <i>low power distance</i> (Reason: Management support is expected in order to acquire freedom and define their own task.)</p> <p><input checked="" type="checkbox"/> Self interest to do the task: <i>Individualism</i> (Reason: As self interest is a primary characteristic of individualistic culture, people are more resistant to autonomy aspects of the team.)</p> <p><input checked="" type="checkbox"/> Because you prefer to do challenging tasks: <i>masculinity</i> (Reason: It is one of the feature of Masculinity.)</p> <p><input checked="" type="checkbox"/> Because of your Innovative nature: <i>low uncertainty avoidance</i> (Reason: Low uncertainty avoidance people are more innovative which is needed for autonomy.)</p> <p><input checked="" type="checkbox"/> Because you and your superiors share same objectives / aspirations: <i>long term orientation</i> (Reason: Long term supports goals which are also shared by managers and employee.)</p>
	Select the reasons below
B	<input type="checkbox"/> Lack of management support <input type="checkbox"/> You are more group oriented <input type="checkbox"/> Less preference to do challenging tasks <input type="checkbox"/> Because you believe more in implementation then innovation <input type="checkbox"/> Because you and your superiors have different objectives / aspirations

	(multiple choices possible)
	<i>Purpose</i>
	<p>The purpose is to find out, underlining link between autonomy and cultural dimensions. We already know that <i>high power distance, collectivism, femininity, high uncertainty avoidance, and short term orientation</i> are hindrance to autonomy. The options were framed based on relationships which hinder autonomy with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p>[X] Lack of management support: <i>high power distance</i> (Reason: As management support is less in high power distance cultures, therefore autonomy is less granted.)</p> <p>[X] You are more group oriented: <i>collectivism</i> (Reason: As people from collective nature are less supportive towards self defining tasks.)</p> <p>[X] Less preference to do challenging tasks: <i>Femininity</i> (Reason: Challenging tasks are less preferred by feminine people.)</p> <p>[X] Because you believe more in implementation then innovation: <i>High uncertainty avoidance</i> (Reason: As people have less belief in creativity compared to implementation in high LTO culture.)</p> <p>[X] Because you and your superiors have different objectives / aspirations: <i>Short term orientation</i> (Reason: As quick results may have less creativity, short term orientation may be considered as a hindrance to autonomy.)</p>

Further comments
<i>Purpose:</i> Respondents can jot down other factors which they feel should be included.

2. Do you share leadership with your team members?
- I. () All the time
 - II. () Most of the time
 - III. () Sometimes
 - IV. () Never

Proceed to Que. A if you choose I, II
 Proceed to Que. B if you choose III, IV

	Select the reasons below
A	<p>[] Your organizational structure</p> <p>[] Decision is made collectively by all the members in the team</p> <p>[] Because you have compromising nature</p> <p>[] Because you believe rules are mandatory</p> <p>[] Because of your adaptiveness</p> <p>(multiple choices possible)</p>

	<i>Purpose</i>
	<p>The purpose is to find out the underlining link between shared leadership and cultural dimensions. We already know that shared leadership supports <i>low power distance, collectivism, femininity, high uncertainty avoidance, and long term orientation</i>. The options were framed based on relationships which enable shared leadership with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p>[X] Your organizational structure: <i>Low power distance</i> (Reason: Supportive supervisors share responsibilities with sub-ordinates irrespective of their positions.)</p> <p>[X] Decision making is done by considering whole team: <i>Collectivism</i> (Reason: Collectivism gives more priority to group goals and they have a strong inclination towards sharing responsibilities among them.)</p> <p>[X] Because you have compromising nature <i>femininity</i> (Reason: Feminine cultures maintain relationships which are important in sharing responsibilities between team members.)</p> <p>[X] Because you believe rules are mandatory: <i>High uncertainty avoidance</i> (Reason: High uncertainty avoidance follows strict rules and quick decisions.)</p> <p>[X] Because of your adaptiveness: <i>Long term orientation</i> (Reason: Employees in the long term orientation value adaptiveness)</p>

	Select the reasons below
B	<p><input type="checkbox"/> Your organizational hierarchy</p> <p><input type="checkbox"/> Decision making is done based on one's own experience and skills</p> <p><input type="checkbox"/> Because of your competitiveness</p> <p><input type="checkbox"/> Because you won't support quick decisions</p> <p><input type="checkbox"/> Because you and your superiors have different objectives / aspirations</p> <p>(multiple choices possible)</p>

	<i>Purpose</i>
	<p>The purpose is to find out the underlining link between shared leadership and cultural dimensions. We already know that <i>high power distance, individualism, masculinity, low uncertainty avoidance, and short term orientation</i> are hindrance to shared leadership. The options were framed based on relationships which hinder shared leadership with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p>[X] Your organizational hierarchy: <i>High power distance</i> (Reason: Subordinates are expected to follow their superiors in high PD cultures.)</p> <p>[X] Decision making is done based on one's own experience and skills: <i>Individualism</i> (Reason: Individualistic people work in the root of their self interest and self goals.)</p> <p>[X] Because of your competitiveness: <i>Masculinity</i> (Reason: Masculine culture people are more competitive which disables sharing responsibilities among them.)</p> <p>[X] Because you won't support quick decisions: <i>Low uncertainty avoidance</i> (Reason: Low uncertainty avoidance culture don't support quick decision making while</p>

	sharing responsibilities.) [X] Because you and your superiors have different objectives / aspirations: <i>Short term orientation</i> (Reason: Sharing responsibilities is not possible when both the members have different objectives.)
--	---

Further comments
<i>Purpose</i> Respondents can jot down other factors which they feel should be included.

3. Do you help/assist other team members?
- I. All the time
 - II. Most of the time
 - III. Sometimes
 - IV. Never

Proceed to Que. A if you choose I, II
 Proceed to Que. B if you choose III, IV

	Select the reasons below
A	<input type="checkbox"/> Because you value relationships <input type="checkbox"/> Because you want to avoid risks and changes <i>(multiple choices possible)</i>
	<i>Purpose</i>
	<p>The purpose of this question is to find out underlining link between redundancy and cultural dimensions. We already know that redundancy supports <i>femininity, high uncertainty avoidance</i>. As we don't have enough literature evidence to support remaining dimensions we have not included them as options. The options were framed based on relationships which enable redundancy with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p>[X] Because you value relationships: <i>Femininity</i> (Reason: Feminine cultured people value relationships which enables them to help others.)</p> <p>[X] Because you want to avoid risks and changes: <i>High uncertainty avoidance</i> (Reason: Regular feedback reduces ambiguities.)</p>

	Select the reasons below
B	<input type="checkbox"/> Because your focus is on self ambition <input type="checkbox"/> Because you are bold enough to face any kind of risk <i>(multiple choices possible)</i>
	<i>Purpose</i>
	<p>The purpose is to find out the underlining link between redundancy and cultural dimensions. We already know that <i>masculinity and low uncertainty avoidance</i> are a hindrance to redundancy. As we don't have enough literature evidence to support</p>

	<p>remaining dimensions we have not included them as options. The options were framed based on relationships which hinder redundancy with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p>[X] Because your focus is on self ambition: <i>Masculinity</i> (Reason: Self ambition leads to the accomplishment of individual tasks which doesn't allow assisting others.)</p> <p>[X] Because you are bold enough to face any kind of risk: <i>Low uncertainty avoidance</i> (Reason: Risk facing and changes are accepted in weak uncertainty avoidance cultures.)</p>
--	--

Further comments
<i>Purpose</i> Respondents can jot down other factors which they feel should be included.

4.	In which of the following way do you think you learn?
	<input type="checkbox"/> By communicating and coordinating with seniors <input type="checkbox"/> Learning from your colleagues <input type="checkbox"/> By focusing on relationships <input type="checkbox"/> By supporting risk taking ability of the organization <i>(multiple choices possible)</i>
	<i>Purpose</i> The purpose of this question is to find out the underlining link between learning and cultural dimensions. Learning supports <i>low power distance, collectivism, femininity, low uncertainty avoidance and short term orientation</i> . The options were framed based on relationships which enable learning with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons: <p>[X] By communicating and coordinating with seniors: <i>Low power distance</i> (Reason: These people actively communicate with senior members of the team.)</p> <p>[X] Learning from your colleagues: <i>Collectivism</i> (Reason: Effective learning can be acquired through collective tasks.)</p> <p>[X] By focusing on relationships: <i>Femininity</i> (Reason: Focusing on relationships is one of the traits in feminism which enables learning among them.)</p> <p>[X] By supporting risk taking ability of the organization: <i>Low uncertainty avoidance</i> (Reason: Employees can learn from new things by taking risks.)</p>

Further comments
<i>Purpose</i> Respondents can jot down other factors which they feel should be included.

5. Which is more important to you?

- I. Group goal
- II. Individual goal

Proceed to Que. A if you choose I
 Proceed to Que. B if you choose II

	Select the reasons below
A	<input type="checkbox"/> Organizational structure <input type="checkbox"/> Because you prefer group identity <input type="checkbox"/> Because you believe in equality of genders <i>(multiple choices possible)</i>
	<i>Purpose</i>
	<p>The purpose of this question is to find out underlining link between team orientation and cultural dimensions. We already know that team orientation supports <i>low power distance, collectivism and femininity</i>. As we don't have enough literature evidence to support remaining dimensions, so we have not included in options. The options were framed based on relationships which enable team orientation with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p><input checked="" type="checkbox"/> Organizational structure: <i>Low power distance</i> (Reason: In low power distance culture, people effectively share responsibilities by emphasizing on team goals.)</p> <p><input checked="" type="checkbox"/> Because you prefer group identity: <i>Collectivism</i> (Reason: Collectivistic culture supports group goals.)</p> <p><input checked="" type="checkbox"/> Because you believe in equality of genders: <i>Femininity</i> (Reason: Feminists value equality which enables effective understanding between team members which is good for team orientation.)</p>

	Select the reasons below
B	<input type="checkbox"/> Organizational hierarchy <input type="checkbox"/> You value individual identity <input type="checkbox"/> You prefer defining individual roles in your team <i>(multiple choices possible)</i>
	<i>Purpose</i>
	<p>The purpose is to find out the underlining link between team orientation with cultural dimensions. We already know that <i>high power distance, individualism and masculinity</i> are hindrance to redundancy. The options were framed based on relationships which hinder team orientation with cultural dimensions, as described in chapter 3. These options were chosen because of the following reasons:</p> <p><input checked="" type="checkbox"/> Your organizational hierarchy: <i>High power distance</i> (Reason: In high power distanced culture decisions making is mostly done by superior employees which is a barrier for team orientation.)</p>

	<p>[X] You value individual identity: <i>Individualism</i> (Reason: Individualism is a hindrance for team orientation as they focus more on self goals.)</p> <p>[X] You prefer defining individual roles in your team: <i>Masculinity</i> (Reason: People in masculine culture are more comfortable when individual objectives are defined.)</p>
--	--

Further comments
<p><i>Purpose</i> Respondents can jot down other factors which they feel should be included.</p>

APPENDIX A: QUESTIONNAIRE

Cultural impact on functionality of agile team

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1. Name of the organization

2. Size of the organization

- Small scale
- Medium scale
- Large scale
- Very large scale

3. Nationality

4. Have you ever been to foreign, if yes please specify number of years and country name

- Yes
- No

5. Age

- 20-30
- 31-40
- 41-50
- 51-60

6. Position

- Developer
- Tester
- Scrum master
- Team lead
- Analyst
- Project manager
- If other, please specify

7. Years of experience in agile

- 0
- <1
- 1-5
- 6-1

8. Your team size

- 1-5
- 6-10
- 11-15
- 16-20
- >20

9. In which of the following way do you think you learn?

- By communicating and coordinating with seniors
- Learning from your colleagues
- By focusing on relationships
- By supporting risk taking ability of the organization
- If other, please specify

10. Do you have freedom during your work to define your task?

- All the time
- Most of the time
- Sometime
- Never

11. If you have freedom to define your task then select the reasons below (multiple options possible)

- Management support
- Self interest to do the task
- Because you prefer to do challenging tasks
- Because of your innovative nature
- Because you and your superiors share same objectives / aspirations
- If other, please specify

Next

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12. If you had selected Sometime and Never,select the reasons below (multiple options possible)

- Lack of management support
- You are more group oriented
- Less preference to do challenging tasks
- Because you believe more in implementation then innovation
- Because you and your superiors have different objectives /aspirations
- If other, please specify

1000

13. Do you share leadership with your team members?

- All the time
- Most of the time
- Sometime
- Never

14. If you share leadership with your teammates, select the reasons below (multiple options possible)

- Your organizational structure
- Decision is made collectively by all the members in the team
- Because you have a compromising nature
- Because you believe rules are mandatory
- Because of your adaptiveness
- If other, please specify

1000

15. If you shared leadership Sometime or Never, select the reasons below (multiple options possible)

- Your organizational hierarchy
- Decision making is done based on one's own experience and skills
- Because of your competitiveness
- Because you won't support quick decisions
- Because you and your superiors have different objectives
- If other, please specify

1000

16. Do you help/assist other team members?

- All the time
- Most of the time
- Sometime
- Never

17. If you help other teammates, select the reason below (multiple options possible)

- Because you value relationships
- Because you want to avoid risks and changes
- If other, please specify

1000

18. If you had selected Sometime or Never,select the reasons below (multiple options possible)

- Because your focus is on self ambition
- Because you are bold enough to face any kind of risk
- If other, please specify

1000

19. Which is more important to you?

- Group goal
- Individual goal

20. If GROUP GOAL,select the reasons below (multiple options possible)

- Organizational structure
- Because you prefer group identity
- Because you believe in equality in genders
- If other, please specify

1000

21. If INDIVIDUAL GOAL, select the reasons below (multiple options possible)

- Organizational hierarchy
- You value individual identity
- You prefer defining individual roles in your team
- If other, please specify

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Cultural impact on functionality of agile team

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Cultural impact on functionality of agile team

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APPENDIX C: CHECK LIST FOR PILOT TESTING

Check list for pilot testing are derived from [2]

- Are there any typological errors?
- Are there any misspelled words?
- Does the survey is too long to answer?
- Is there any grammatical errors and misspelled words?
- Is the vocabulary suitable for the respondents?
- Does the survey is in suitable language for the respondents?
- Does flow of the survey format is well?
- Which questions are easy to understand?
- Which questions are difficult to understand?
- Are the skipped patterns too difficult to follow?
- Is there any data which is cultural sensitive?