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EVALUATION OF TEAM QUALITY

By

Shiva Rama Krishna Murthy Bhagavatula

A THESIS

Presented to the Faculty of
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EVALUATION OF TEAM QUALITY

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University of Nebraska, 2013

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The ever-increasing competitive pressure and sizes of the global markets have forced organizations from both manufacturing and healthcare sectors to rely more on teams. Therefore the success or the failure of an organization depends largely on the overall quality of the teams within that organization. This increased attention towards teams has forced many organizations to focus on improving the overall quality of their teams. This study has three main objectives. The first objective is to structure a comprehensive list of attributes affecting the overall quality of a team in manufacturing and healthcare sectors. The second objective is to use a survey tool to determine significant attributes affecting a team's overall quality from an employee's perspective. The third objective is to compare the manufacturing and healthcare sectors and to identify differences among the attributes affecting a team's overall quality across the two sectors.

The data gathered were from employees working in teams and were primarily from two countries: The United States and China. A one-way analysis of variance (ANOVA) and stepwise regression analysis was performed on the responses that were gathered to find out the significant team quality attributes from an employee's perspective and also to identify the relation between the final outcome measure "Team Quality" and their respective attributes.

The ANOVA results for attributes versus teams revealed *team efficacy*, *team trust*, *personality and skills & knowledge* as significant for teams. While the ANOVA results for attributes versus teams from United States showed *training & support and performance feedback* as significant, the ANOVA results for attributes versus teams from China revealed *team leadership*, *team efficacy and team trust* as significant.

The stepwise regression analysis for team quality versus other attributes (for all the teams combined) showed that *job satisfaction and team trust* were significantly affecting the overall team quality. However, the stepwise regression analysis for team quality versus other attributes for teams from China showed that *job satisfaction and team efficacy* were significantly affecting the overall team quality.

To Amma & Nana

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CHAPTER 1

INTRODUCTION

1.1 Background

For very long time economists have divided the entire economic activity into two sub categories: goods and services respectively. Service sectors create services while manufacturing sectors produce tangible goods. Furthermore, there is distinctness in the operational style of teams in each of these sectors, for instance, teams in manufacturing sectors are cost-oriented whereas teams in service sectors are profit-oriented (Ming et al, 2007). Regardless of the sector considered, teamwork has an enormous impact on the overall success of the organization. Therefore, the concept “team quality” is very specific to the sector for which it is applied, and is complicated especially because of the multifaceted nature of the working of teams (Denison et al, 1996).

Hoegl et al (2001) addressed the concept of teamwork quality in service sectors as a complete collaboration of teams. The framework chosen was very much pertinent to McGrath’s (1964) input-process-output model. This is also known as the “team effectiveness framework” and is one of the most extensively used frameworks by researchers for studying team effectiveness or performance. The inputs are comprised of factors such as the individual’s skills, personality and character. The processes include attributes such as team’s trust, cohesion and interdependency. The outcomes can be, but are not limited to, the team’s performance, effectiveness, success or team’s overall quality.

1.2 Scope of the research

Studies have shown that input parameters influence the output or the performance of a team through the interaction of processes. Therefore, it can be inferred that, the quality of a team can be significantly improved through the proper selection of input parameters and by constantly improving the process parameters. Also, there is enough evidence to prove that team quality is very specific to the sector for which it is applied (Yacine Rezgui, 2007). This necessitates a comparison between service and manufacturing sectors. Therefore, the core objective of this research is to apply these concepts and also further investigate other attributes that could possibly affect the overall quality of teams operating in manufacturing and healthcare sector.

To begin with, a comprehensive literature review was conducted to determine the potential factors that are most likely to affect a team's effectiveness, performance and overall quality. Subsequently, a survey questionnaire was developed specifically for employees working as a part of team based on the factors determined. This survey was used to gather responses from employees from the manufacturing and healthcare sectors. Statistical analysis was performed on the responses gathered in order to determine the factors affecting a team's overall quality.

1.3 Outline of chapters

The thesis is presented in the following chapters. Chapter 2 reviews the literature on the concepts of team, framework for team effectiveness and team quality. Chapter 3 describes the rationale of this research. Chapter 4 presents the research methodology, aggregation of historical data for attributes and the survey. The results of the analysis are compiled in the chapter 5. Chapter 6 summarizes the major findings of this research and

provides few recommendations. The limitations and future work of this study are also presented in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Quality

Over the past few decades the concept of “Quality” has received continuous attention and the world has already arrived into what Dr. Juran said would be the “Century of Quality” Borawski (2013). But even today the vocabulary and the concept of quality is quite elusive. While quality is an important aspect for all businesses it can be quite challenging to define. American Society of Quality defined quality as a “subjective term for which each person or sector has its own definition”.

The American society of Quality (ASQ) defines the concept of quality as follows:

- 1.) “The characteristics of a product or a service that bear on its ability to satisfy stated or implied needs”.
- 2.) “A product or service free of deficiencies”.

Juran (1974) defined quality as “suitability for use”, Crosby (1979) as “conformance to requirements”, Taguchi (1979) as “loss imparted to the society from the time the product is shipped”. Deming (1970) defined quality as the ratio of the total work efforts to the total cost. Cooper (2002) defined quality as “the degree to which a process, product or service satisfies a specified set of attributes or requirements”.

Quality can be broadly categorized under the clutches of the following two groups:

- 1.) Service Quality
- 2.) Product Quality

These are further discussed in the following sections.

2.2 Service Quality

Deming (1970) once stated that “the only entity which matters is the customer’s definition of quality”. In service industries, the definition of quality is “meeting or exceeding customer’s expectation”. Therefore, the primary source of measure of service quality is the customer satisfaction. Having said that, unlike product quality it is difficult to define and measure service quality because of its intangible nature.

Voss (1985) classified the service quality into two categories: Hard and Soft. Hard measures are those which are measurable or objective, for example, laptop downtime or the fraction of phone calls answered. Soft measures are those which are subjective and intangible and are based on perceptual data, for example, customer’s satisfaction with speed of service. Soft measures of service quality are mainly applicable to the measurement of the quality of impalpable facets of service (Voss, 1985).

2.3 Product Quality

The dictionary definition of product quality is as follows:

“Product Quality is the degree of fineness or absence of defects, deficiencies and substantial variations. It can be achieved by strict and consistent commitment to certain standards that achieve uniformity of a product in order to fulfill specific customer or user requirements”, BusinessDictionary.com.

The characteristics that define a products’ quality may vary from product to product. For instance, for products that are manufactured in a pharmaceutical company, characteristics such as shelf life and medicinal effect may be critical whereas for products manufactured in an automobile industry, characteristics such as performance and safety may be vital.

Therefore, an organization's major responsibility is to ensure that all the manufactured products conform to the specifications. Total quality management (TQM) and quality function deployment (QFD) are some of the management approaches, when used effectively can help the organizations in improving the overall quality of their products right from the design stage till the final assembly of the products.

Other techniques which are widely used for monitoring manufacturing processes are Statistical Quality Control (SQC) and Statistical Process Control (SPC). These techniques make use of methods such as control charting and capability studies. While control charts show us whether or not the process is in control, capability studies tells us if the current process is capable of producing products within the specifications.

So, the discussions from the above two sections (Service Quality and Product Quality), gives us an idea of how challenging and crucial it is for an organization to improve and sustain their quality standards in order to survive and succeed in today's competitive market. For this reason, organizations from both service and manufacturing sectors have become more flexible and dynamic than ever before. Also, globalization and competitive pressures have forced organizations to rely more on teams and the use of teams has been implemented intensely in response to competitive challenges. For example, eighty-two percent of companies with 100 or more employees reported that they use teams (Gordon, 1992). 68% of Fortune 1000 companies reported that they used teams (Lawler, Mohrman, & Ledford, 1995). In examining data on 56,000 U.S. production workers, Capelli and Rogovsky (1994) found that one of the most common skills required by new work practices is the ability to work as a team. So, it is apparent that the success or the failure

of an organization depends largely on the overall quality of the teams within that organization.

Therefore, in order to improve the overall quality of a team it is very important to define and understand the terms “Teams”, “Team Quality” and also the “metrics that affect a team’s overall quality in both service and manufacturing sector”. Additionally among service sectors, there is more need to improve healthcare teams, in order to reduce the ever growing healthcare costs and improve patient safety. These are discussed in the following sections.

2.4 Teams

Following the literature, a team can be defined as a group of three or more people with a full set of complementary skills, who collaborate on a common task and operate with a high degree of interdependence towards a common goal (Hackman 1987, Guzzo and Shea 1992). Teams have become an essential aspect of the workplace structure in order to get work done; they prevail at all layers of organizations and accomplish a wide range of tasks (Katzenbach & Smith, 2003). Teams have become the line of attack when organizations are confronted with complex and demanding tasks. Teamwork can help accomplish a given task at a faster pace primarily due to two reasons; Firstly, many individual contributions add up and thereby reducing the overall workload and secondly, problem solving becomes easy when each individual presents a unique idea to arrive at the best solution. For this reason, teams are vastly used when failures can lead to severe results; when the job intricacy exceeds the capability of an individual; when the task environment is imprecise, uncertain, and stressful; when numerous and prompt decisions are needed.

Teams are used in aerospace, the military, health care, financial sectors, nuclear power plants, engineering problem-solving projects, manufacturing, and countless other domains; as the complexity of the workplace continues to grow, organizations increasingly depend on teams (Eduardo et al. 2001).

2.5 Team Quality & Metrics that affect the Quality of a Team

The concept “team quality” is very subjective and varies depending upon the sector it is applied to. Hoegl et al (2001) conducted a study on software development teams and proposed “teamwork quality as a comprehensive concept of the quality of interaction in teams”.

The spotlight of their study was entirely on the quality of teams’ synergetic work (i.e., how efficiently the team members interacted or communicated with each other). In order to capture the essence of team members’ collaborative work they proposed six attributes that would affect the teamwork quality (TWQ). Those six aspects are – communication, coordination, balance of member contributions, mutual support, effort and cohesion. The data for their study was obtained from 575 interviews with members, leaders, and managers of 145 software development teams in Germany, from which a valid and reliable measure of TWQ construct was developed. The results from their research yielded a positive influence of TWQ on team performance. Team performance was measured in terms of effectiveness and efficiency. Effectiveness here is referred to as the extent to which the team met its expectancy and efficiency is evaluated in terms of adherence to schedules.

In the past few decades, a vast amount of research has been conducted in order to understand the functionality of teams and there is an extensive body of literature available, which indicates the importance & role of teams in organizations (Mathieu et al, 2008). Given the existence of the extensive literature on team work, even today the factors that comprehensively measure the concept “Quality of Teams” have not been proposed to the full extent.

The only initiative taken towards developing the metrics to measure the quality of teams was by Hoegl et al (2001). The six metrics which were developed are communication, coordination, balance of member contributions, mutual support, effort, and cohesion. The focus of their research was solely on the quality of interactions within teams. Moreover, these metrics were developed specifically for the software industry and did not consider other sectors. Therefore, there is a need to develop metrics for healthcare and manufacturing sectors. However, in order to develop the new metrics it is critical to understand the roles played by teams in these sectors and also the challenges faced by them. These are further discussed in the sections below.

2.6 Role of Teams in Manufacturing and Healthcare Sectors

Teams have been a significant part of the industry for very long. Benders et al (1999) stated that tracing back to the history of teams would lead us to the mammoth hunting time. For instance, operation research teams were a part of manufacturing practices since the late 1940's. However, the concept of teamwork emerged as a vital subject in the United States only in the early 1970's, with the ever-increasing competition and size of the global markets, especially with the entry of Japanese-style quality circles into U.S

companies.

Manufacturing firms have since then made substantial changes in the way a firm operates, in order to increase output and quality and eventually, lower operating costs (Bursic, 1992). Since then teams have been an indispensable part of initiatives such as Total Quality Management programs (Flynn et al, 1995), Just -in-Time production where teams are used to fight waste, reduce set-up times and help reduce inventory from the system (McLachlin, 1997) and in supply chain integration. Recently a study by Bikfalvi (2010) on a sample of 1,298 manufacturing companies from Germany showed that almost two-thirds of those companies used teamwork in production and at least fifty percent of the teams had 4-9 employees each.

Juran (1991) accredited continuous improvement within teams to be one of the major factors behind companies winning the Malcolm Baldrige National Quality Award. Lately, with the increase in awareness of new process improvement techniques such as Six Sigma and Lean Manufacturing, various manufacturing industries such as aerospace, automotive and electronics have started employing these techniques thereby achieving success in their respective areas. Even though Motorola originally developed Six Sigma in 1986, it gained popularity only in 1995 after being a huge success at General Electric. The goals of a Six Sigma team are to increase the overall quality by eliminating manufacturing errors/defects and thereby reduce the cost and also minimize the variability in production.

Teams have also been a crucial part of complex manufacturing systems where in the design and quality issues have to be addressed right from the early planning stage until

the final product release stage. This is even more challenging especially in the case of new product development teams (NPD), where the challenge basically is to create a supreme quality product in the shortest time (Amy et al, 2009). Acknowledging the competition that exists at the global market and also with the constant and rapid growth of knowledge in scientific fields, the need for highly specialized teams in such areas is even more critical.

Therefore each team, regardless of it being a design team or a process implementation team or a manufacturing team, has an important role to play in the overall development of the product. It has been identified that in such demanding situations a systematic integration of teams and machines will help reduce confusion and boost the yield of complex systems (Azadeh, 2000).

For example, in semiconductor industries where the information that underpins semiconductor manufacturing is distinctive and comes from organization level R&D, teams have to incorporate indigenous methods that facilitate problem solving while developing new process technologies (Jeffrey et al, 2009). In the recent years, manufacturing firms have approached a more structured way of deciphering the talent and skills of their employees; thereby creating teams comprising of employees of varied skill set, which was not the case few decades back when there was no well thought-out procedure to form teams. Scott et al (2009) in their investigation consisting of 56 capital projects from 15 Fortune 500 companies found out team efficacy, which according to them is a team's "can do" attitude, as a crucial element in reducing the overall project cost performance.

Considering the fact that there exists a high degree of turbulence, uncertainty in demand and fierce rivalry across the international market, operating global manufacturing firms is quite complicated. Moreover, organizations have to constantly reorganize their manufacturing enterprises along with integrating human resources with technical resources so as to maintain their very existence in the highly competitive climate (Luis et al, 2009). This calls for collaboration and cross functionality of teams across different geographical regions to share resources for the purpose of cost effectiveness. In what is called as networking today, many teams from one organization exchange information with their counterparts from other organizations for mutual benefit.

2.7 Challenges faced by Teams in Manufacturing and Healthcare

Sectors

Considering the fact that teams are widely employed across different sectors, amidst various complex projects, it is apparent that they face rough challenges and encounter several problems at work place. Few of them are discussed below:

The success of an organization in accomplishing its goals depends on various factors such as its mission, values, strategy, technology, employees and management style. Critical amongst them is the employee factor and the role it plays at team level and organizational level. In fact, the success of any organization thrives upon how well the team's goals and strategy mesh with the organization's goals and strategy (Kaplan et al, 2000).

Coordination between employees of a team is vital and can have a huge impact on the end result. For instance, lack of coordination (or) clarity in communication within a

manufacturing team can sometimes lead to the failure of the product or rework in certain cases. Such failure or rework can be problematic, mostly in later developmental stages and more frequently leads to delays and further added costs (Hegazy et al, 1996). Following the literature, there is sufficient evidence to prove that poor communication between team members hinders teams' problem solving capability, thereby reducing its efficiency and effectiveness. In turn, these consequences may influence the team's cohesion and trust.

The stress levels experienced by the hospital personnel are quite high. For example, shortages in recruitment and retention of nurses in Australian hospitals have been associated with increased job stress and decreased job satisfaction among nurses. Social support and team empowerment were considered to be the two factors to alleviate job stress among nurses (Bartram et al, 2004).

Due to the ever-increasing interdisciplinary fields and requirement for shorter product life cycles, teams have become a crucial part of many manufacturing industries; even more critical is the role of leadership. Wei-Ku et al (2010) conducted a study in order to understand the effects of abusive supervision on team level outcomes and identified that abusive supervision indeed had a negative effect on team effectiveness. Moreover, it is observed that such differences between team members and leader can lead to conflict within the team, reduced commitment and also decreased job satisfaction among team members. All of this directly or indirectly affects the overall technical and financial success of the organization.

Also, there is always a question regarding how teams should be formed i.e., whether it should consist of people with vast experience or with long tenure? Should there be an expert involved? In an attempt to answer these questions, Gladstein et al (1984) conducted a study to determine the effects of team diversity on the team's performance. They concluded that even though the diversity within a team improves the problem solving ability by bringing in creativity from people having different kinds of experiences, it disrupts execution because there is not as much potential for teamwork here than there is for homogeneous teams. Also in many occasions industries rely extensively on culturally diverse teams. To understand the role of such collaborative technologies and culture on team's success, Ilana et al (2008) conducted a lab study consisting of 190 participants. Participants were mostly American, Chinese and Taiwan born. Their findings show that participants faced difficulty in establishing common grounds, attributing to the varying communicative styles and differing interpretations of the task.

Murray et al (1998) made an effort to understand the relationship between team composition and team viability through a study on fifty-one teams composed of 652 employees. Here team composition referred exclusively to the personality and ability of the team members. Their results showed that teams with low levels of extraversion and emotional stability exhibited lower levels of team viability. Teams' viability is also impeded when team members are subjected to higher amounts of stress. Ellis (2006) made use of information-processing theory as a descriptive framework and examined the effects of acute stress in teams. Results indicated that acute stress had negative effects on the mental models (psychological map or organized structure of teams), thus clarifying

the reason why teams performed poorly under stress. Moreover, stress tends to narrow one's attention or focus, resulting in swing in perspective from a broad team perspective to a more narrow or individualistic self-focus thus degrading team performance.

Over the years there have been several attempts where researchers have tried to develop various frameworks in order to study the team effectiveness; few of them are discussed in the section below.

2.8 Team Effectiveness Frameworks

Amongst the literature available till date, the Input – Process – Output framework proposed by McGrath (1964) stands out to be the most often used framework for studying team effectiveness and has functioned as a principal model for researchers over the decades (Wei-ku et al, 2010). Figure 2.1 is an adaptation of McGrath's model.

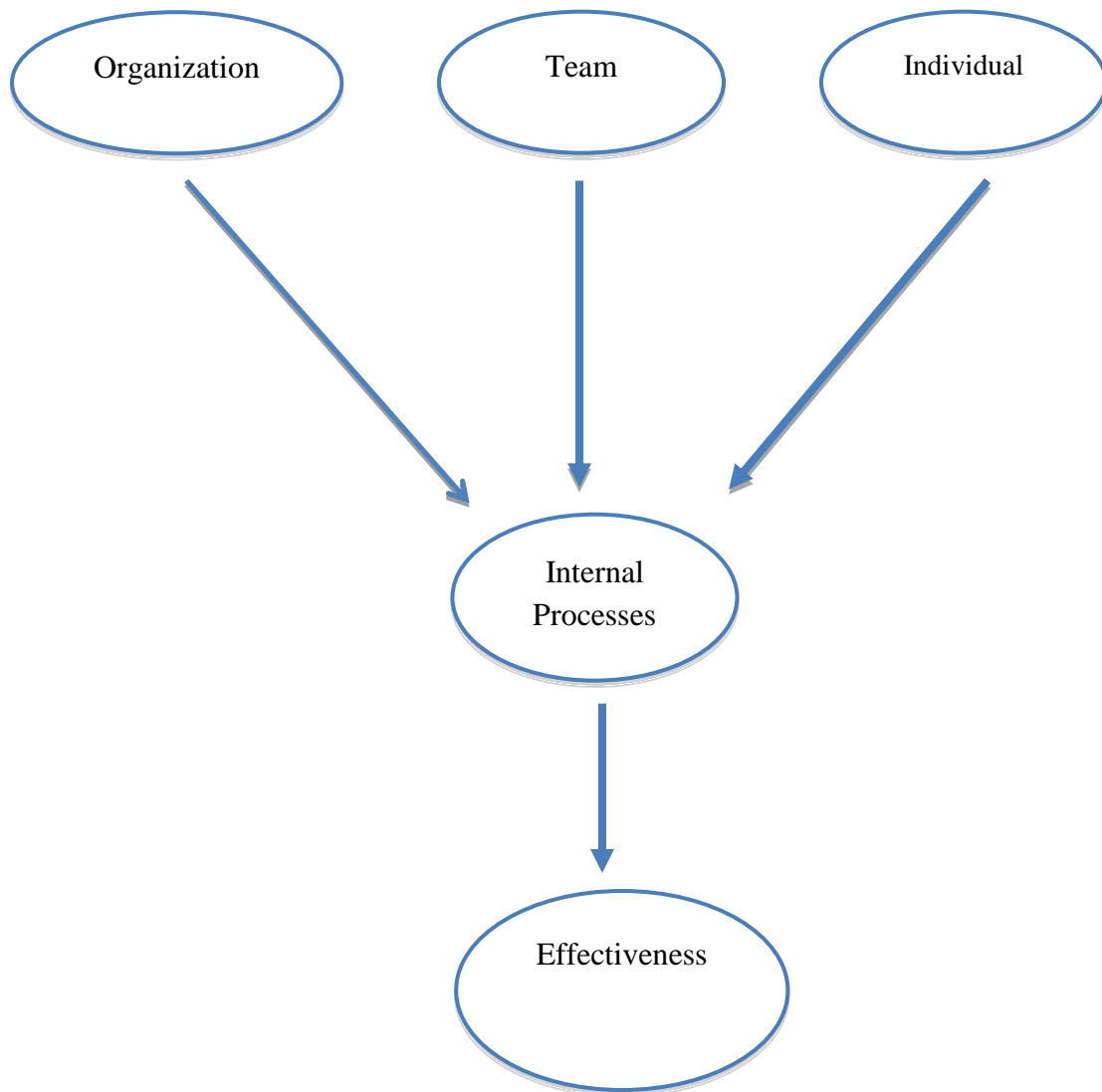


Figure 2.1: Input-Process-Output Team Effectiveness Framework (McGrath, 1964)

Inputs can be defined as those factors or attributes that moderate team members' synergy.

These inputs can be classified into three sub-categories (Mathieu et al, 2008):

- Uniqueness of each individual in a team (e.g., personality, skills)
- Characteristics of a team (e.g., team diversity, team trust)
- Organizational related factors (e.g., training & support)

Processes (e.g., team confidence, cohesion) are driven by inputs, which in turn get transformed, into outcomes. Outcomes are consequences and by-products of team activity (e.g., performance, quality, satisfaction).

Over the decades this framework has been modified and revised in many ways. For example, Cohen and Bailey (1997) emphasized a nested model; where in the individual members of a team are enclosed within the team itself, and the teams are in turn enclosed within an organization. In other words, there is always an influence from the outer layers on the inner layers. Figure 2.2 is a visual representation of the same.

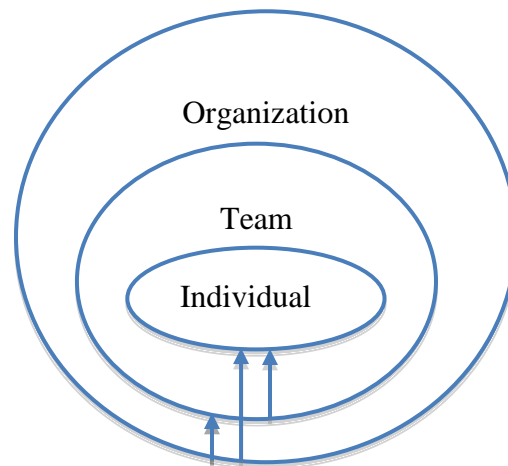


Figure 2.2: Flow of influence within an organization (Cohen and Bailey, 1997)

The discussions from this chapter reveal the fact that teams form the core of an organization and are ultimately responsible for the overall performance of the organization as a whole. Therefore, it is obvious that any attempt made in order to improve the overall quality of a team will inevitably lead to the success and improved performance of the organization.

CHAPTER 3

RATIONALE OF THE RESEARCH

3.1 Summary and Critique of the Literature

This section briefly summarizes the literature review discussed in the previous chapter along with the shortcomings of the literature:

Gladstein et al (1984) conducted a study on 47 new product development teams from 5 manufacturing industries. They stated that diversity within a team brought more creativity but at the same time impeded the capability for teamwork. Their entire study focused only on one single attribute, which is “Team diversity”. Moreover, there is a lack of evidence in their assumption that input variables affected process variables.

Lynn et al (2006) cited that teamwork was strongly dependent on the learning strategies of each individual within the team. However, their whole research was targeted on only one manufacturing company in Thailand. These results cannot be interpreted and extended to other manufacturing companies because of the fact that each manufacturing company has its own structure, managerial practice and ethos.

It has been a long standing misconception that leadership is centered around a single person but research shows that it is more about the team-leader interaction. Although there is existing work that demonstrates the relationship between leadership and team’s success, there is lack of substantiation on areas such as communication and leader-team exchange (Friedrich et al, 2009). Reader et al (2009) in their study of developing framework for team performance in Intensive Care Units stated that the conduct of senior

physicians significantly affected the perceptions of other team members. Also discussed, is the need of further research to fully understand the leadership role in healthcare.

Mark et al (2002) conducted a study to investigate the factors affecting team effectiveness in a production system. They suggested four key factors that influenced team effectiveness: team's task load, chance for informal communication, organizational trust in teams and challenging job roles. However, since their emphasis was only on operational setting, their study prevented them from isolating and discussing other factors which might affect the team's effectiveness such as group rewards, individual skills etc.

Majority of the studies related to healthcare research supported the relationship between teamwork and the hospital's performance. However, on the contrary, number of papers reported non-significant relationships. It is therefore important to consider aspects such as these and conduct further studies in order to better understand the impact of teams in healthcare sectors.

Michael et al (2010) investigated the impact of senior-management policies on the marketing to manufacturing involvement and on overall product success. Their data was from a sample of 146 U.S marketing companies and 185 Japanese marketing companies. They concluded by stating that senior-management policies boosted the level of involvement and thereby increased the likeliness of product success. However, they recommended further research in other Asian countries, especially in China because Chinese collectivism is perceived to be hierarchically based, in comparison to peer-group equivalence observed in Japanese collectivism.

3.2 Motivation

Over the past few years, significant amount of research has been conducted in order to understand the functionality of teams and there is an extensive body of literature available, which indicates the importance & role of teams in organizations. Given the existence of the extensive literature on team work, even today there is no empirical evidence in the entire body of literature, which effectively addresses the concept “Team Quality”.

Considering the various roles, the challenges in day-to-day work and the multifaceted nature of working of teams in manufacturing and healthcare sectors, there is a need to develop metrics that are descriptive indicators of the concept “Team Quality”. Additionally, it is also important to understand the perspective of each employee working within a team while developing those metrics. Therefore, the intent of this research is to propose a model through which team quality can be measured from an employee’s perspective.

3.3 Objectives

1. To structure a comprehensive list of attributes affecting the overall quality of a team in Manufacturing and Healthcare sectors.
2. To identify the significant attributes affecting a team’s overall quality from an employee’s perspective.
3. To compare the manufacturing and healthcare sectors and to identify differences among the attributes affecting a team’s overall quality across the two sectors.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Overview

The primary intent of this research is to build a comprehensive list of attributes affecting a “Team’s Overall Quality” in Manufacturing and Healthcare sectors. This Chapter presents the methodology involved in probing the historical data for attributes affecting a team’s quality and the steps taken to design a survey questionnaire suitable for employees working in a team across both Manufacturing and Healthcare sectors.

4.2 Aggregation of Historical Data for Attributes

In order to investigate the attributes that were most likely to affect a Team’s Quality, a comprehensive literature review was conducted on literature studies published from 1997 to 2012. This study identified 17 attributes that have multiple occurrences in various research articles. An illustration of the attributes that have received significant attention during the past few decades is summarized in Table 4.1. As seen from Table 4.1, Team Leadership and Conflict Management showed their presence in seven out of the 18 research articles. Communication and Cohesion had their presence in 6 articles. Performance feedback showed up in 5 articles and Team Efficacy and Personality had their presence in 4 articles. Training & Support, Individual Roles, Team Trust and Skills & Knowledge showed up in 3 articles. Job Satisfaction, Team Diversity, Gender & Ethnic Differences had their presence in 2 articles. Lastly Team Competence, Team potency and Cross Functionality had 1 presence each.

Table 4.1: Attributes (total 19) that have received significant attention

Name of the Author	Tao et al (2009)	Wei et al (2010)	Mark et al (2002)	Dianne (1999)	Shen et al (2007)	Murray et al (1998)	Scott et al (2009)	Beverly et al (1997)	Amy et al (2009)	Lynn et al (2006)	Friedrich et al (2009)	Jeffery et al (2011)	Alexander et al (2009)	Yun et al (2009)	Salas et al (2008)	Hoogh et al (2008)	David et al (2011)	Stephen et al (2001)	Total
Attributes																			
Job Satisfaction	X			X															2
Team Leadership		X			X		X		X		X					X		X	7
Communication			X	X		X		X	X		X								6
Cohesion				X	X						X	X			X			X	6
Training & Support				X										X	X				3
Team Diversity															X		X		2
Conflict Management				X	X	X		X	X						X		X		7
Individual Roles										X	X	X							3
Team Efficacy		X					X	X					X						4
Performance Feedback			X			X	X							X		X			5
Gender & Ethnic Differences	X																X		2
Team Trust			X		X						X								3
Personality						X		X		X		X							4
Skills & Knowledge										X				X	X				3
Team Competence			X																1
Team Potency													X						1
Cross Functionality												X							1

Of the above 17 attributes; the 14 most frequently occurring attributes were considered in order to develop the survey questionnaire. The attributes which were not considered are team competence, team potency and cross functionality. The definitions of the 14 attributes that were considered for developing the survey questionnaire are given in Table 4.2 and align with the descriptions given in the research papers.

Table 4.2: Definitions of the 14 attributes considered in this study

Attributes	Definition
Job Satisfaction	An overall emotional feeling employees have about their job as a whole.
Team Leadership	One who provides guidance, instruction and direction to the team for the purpose of achieving a key result or group of aligned results.
Communication	Any act by which one employee gives to or receives from another employee information about that person's needs, perceptions, knowledge, or affective states.
Cohesion	The tendency for a team to be in unity while working towards a goal or to satisfy the emotional needs of its members.
Training & Support	Aids, devices, equipment, and services provided to teams for their efficient operation.
Team Diversity	The degree of heterogeneity among team members on specified demographic dimensions.
Conflict Management	To enhance learning and group outcomes by limiting the negative aspects of conflict and by increasing the positive aspects of conflict.
Individual Roles	The characteristic and expected behavior of an individual based on his/her job position/function.
Team Efficacy	Team's shared belief that it can successfully perform a specific task.
Performance Feedback	A system through which organizations assess the performance of employees.
Gender & Ethnic Differences	To show differentiation between employees of different genders or ethnic backgrounds.
Team Trust	The firm belief an employee has in the reliability, truth, ability, or strength of another employee
Personality	Personality is the particular combination of emotional, attitudinal, and behavioral response patterns of an individual.
Skills & Knowledge	Knowledge is information we already have and skill is the ability to use knowledge to actually accomplish something.

4.3 Development of Survey Questionnaire

Since the primary intent of this research is to determine those attributes which affect the “Team’s Overall Quality” and subsequently illustrate their influence in Manufacturing and Healthcare Teams, the subsequent move would be to obtain information from the employees. Data collection can be done in many ways such as face to face interviews, phone interviews, survey etc. This study incorporates the survey method as the tool for

gathering the data from manufacturing and healthcare sectors. Survey is one of the most popular tools used for gathering quality data. Also, along the course of obtaining information from the employees, it is important to ensure that the privacy of the employees is maintained. Survey questionnaires are excellent tools for keeping the responses anonymous or confidential. Moreover, these questionnaires have the added advantage of being translated into various languages.

The development of the survey questionnaire is discussed below:

1. A generic survey was developed based on the 14 attributes such that each attribute was defined by a set of questions.
2. Additionally, there were 4 questions corresponding to the overall team quality.
3. The responses for each question was designed based on the 5-point Likert scale, which are “Strongly Disagree”, “Somewhat Disagree”, “Neither Agree nor Disagree”, “Somewhat Agree” and “Strongly Agree”.
4. The final survey comprised a total of 43 questions (see Appendix A). The survey questionnaire upon completion was submitted to the Institutional Review Board (IRB) at UNL for their approval. The approved survey questionnaire will be used to collect the data from the participating manufacturing & healthcare companies.

Table 4.3 shows the 14 attributes and their corresponding 43 questions from the survey questionnaire.

Table 4.3: Attributes and their corresponding Questions

Attributes	Corresponding Question Numbers
Job Satisfaction	Q1, 2, 3
Team Leadership	Q4, 5, 6
Communication	Q7, 8, 9
Cohesion	Q10, 11
Training & Support	Q12, 13, 14
Team Diversity	Q15, 16, 17
Conflict Management	Q18, 19, 20
Individual Roles	Q21, 22, 23
Team Efficacy	Q24, 25, 26
Performance Feedback	Q27, 28
Team Quality	Q29, 30, 31, 32
Gender & Ethnic Differences	Q33, 34, 35, 36
Team Trust	Q37, 38
Personality	Q39, 40, 41
Skills & Knowledge	Q42, 43

4.4 Procedure

The procedure for the data collection is discussed below:

- Initially a paper-based survey was used to gather the data from manufacturing teams working in China. The survey was sent electronically to their respective authorities, who subsequently distributed the survey to the interested participants. Upon completion of the survey, the survey questionnaire was scanned and sent back electronically.
- The drawback with this type of data collection was that it necessitated the presence and accessibility of scanners for all individual employees. Also, this process proved to be largely time consuming. Moreover, it was difficult to maintain the confidentiality of the employees and their responses. Therefore, in order to increase the speed and ease of data collection, an online survey was created at the website Survey monkey. This ensured that none of the responses given by an employee of a team were visible to the other employees within the team.
- Also, since most of the employees from China are not fluent in English language; the entire survey questionnaire will be translated into Chinese language with the help of a local translator, in order to obtain accurate responses from the employees.
- The link to the survey will be sent to all the interested employees from China and United States after obtaining approvals from the director's or other appropriate personnel's of the participating manufacturing and healthcare companies.

4.5 Plan of Analysis

Based on the responses gathered from the above discussed survey method, the survey data will be analyzed through the application of statistical methods.

A one-way ANOVA will be performed on all the 43 questions from the survey to reveal the significant questions. Similarly, one-way ANOVA analysis will also be used for identifying the most significant attributes out of the 14 attributes. Also, since the goal here is to identify a subset of the significant attributes among the 14 attributes, a stepwise regression analysis will be performed on the gathered data.

CHAPTER 5

RESULTS

This chapter discusses the results obtained from the analysis of the data gathered from the survey questionnaire.

5.1 Demographics

Due to issues of privacy and confidentiality, healthcare organizations refused to respond to the survey. Therefore, the scope of this study was limited to teams from manufacturing sectors only.

A total of 22 manufacturing teams comprising of 50 employees responded to the survey questionnaire. The number of female respondents was 18 (36%) compared to 32 (64%) male participants. There were 4 manufacturing teams comprising of 8 employees from the United States and there were 18 manufacturing teams comprising of 42 employees from China. Table 5.1 summarizes the data sets.

Table 5.1: Summary of Data sets

	United States	China	Total
Employees	8	42	50
Teams	4	18	22

5.2 Summary of ANOVA Results

5.2.1 Questions versus Teams nested within Groups

Table 5.2 Questions versus teams nested within groups

Questions	P value (Significance at $\alpha = 0.05$)	R-square value
Q5	0.004	68.01%
Q9	0.007	66.71%
Q15	0.046	64.55%
Q24	0.014	69.41%
Q25	0.016	63.78%
Q38	0.001	73.66%
Q39	0.012	67.03%
Q42	0.027	61.10%

Since there are 4 teams from the United States and 18 teams from China it is not possible to perform a regular two-way ANOVA because it is an unbalanced design. Therefore, a two-way ANOVA was performed by using the General Linear Model (GLM) for all the forty three questions from the survey questionnaire. GLM can be used to perform the analysis for both balanced as well as unbalanced designs. Table 5.2 summarizes all the statistically significant questions with their corresponding P-values and R-square values. Out of the forty three questions in the survey questionnaire 8 questions came out to be statistically significant.

The questions shown in Table 5.2 correspond to the attributes *Team Leadership*, *Communication*, *Team Diversity*, *Team Efficacy*, *Team Trust*, *Personality and Skills & Knowledge* respectively. These results are consistent with the results from section 5.2.3 *Questions versus Teams*. It is interesting to note that the two questions which are not statistically significant here but are statistically significant from section 5.2.3 *Questions versus Teams* are questions 26 & 37 (shown in Table 5.4) and correspond to the attributes *Team Efficacy* and *Team Trust*.

5.2.2 Attributes versus Teams nested within Groups

Table 5.3 Attributes versus teams nested within groups

Attributes	P value (Significance at $\alpha = 0.05$)	R-square value
Personality	0.023	68.62%
Team Efficacy	0.003	69.45%
Team Trust	0.002	71.62%
Skills & Knowledge	0.039	59.77%

Table 5.3 summarizes all the statistically significant attributes, P-values and the R-square values as generated by the MINITAB software. The results indicate that four out of the fourteen attributes considered are statistically significant while the rest being non-significant. The attributes which are not significantly affected by any of the independent variables are *Job Satisfaction*, *Team Leadership*, *Communication*, *Cohesion*, *Training & Support*, *Team Diversity*, *Conflict Management*, *Individual Roles*, *Performance Feedback and Gender & Ethnic Differences*. The level of significance, $\alpha = 0.05$.

5.2.3 Questions versus Teams

A one-way ANOVA was performed for all the forty three questions from the survey questionnaire. The teams are the independent variables and each of the forty three questions is a dependent variable. Table 5.4 summarizes all the statistically significant questions with their corresponding P-values and R-square values. Out of the forty three questions in the survey questionnaire only ten questions came out to be statistically significant.

Table 5.4: Summary of one-way ANOVA for Questions versus Teams

Question #	Questions	P Value (Significance at $\alpha = 0.05$)	R-square Value
Q5	The team leader provides encouragement to each member in applying his/her knowledge and skills to the job?	0.005	68.01%
Q9	Team members are receptive to feedback and criticism?	0.008	66.71%
Q15	How long have you been working for the company?	0.015	64.55%
Q24	The procedures followed are effective to guide team functioning?	0.003	59.42%
Q25	Your team believes and encourages in creative approach of doing things?	0.018	63.78%
Q26	Each individual of the team contributes effectively towards the common goal?	0.049	59.42%
Q37	Are members of your team dependable and committed to their work?	0.045	59.83%
Q38	Team members can be trusted upon what they said they will do?	0.001	73.66%
Q39	Do you feel really annoyed if management insists on a particular procedure?	0.007	67.03%
Q42	Do you think all the individuals in your team are rightly qualified for their position/role?	0.034	61.10%

Table 5.5: Means of Questions versus Teams

Questions	Teams																					
	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Team 8	Team 9	Team 10	Team 11	Team 12	Team 13	Team 14	Team 15	Team 16	Team 17	Team 18	Team 19	Team 20	Team 21	Team 22
Q5	4.00	4.50	3.00	4.50	4.00	4.00	4.00	4.67	4.33	4.50	4.33	2.33	3.67	2.00	4.50	4.50	4.50	4.50	4.50	5.00	5.00	4.00
Q9	3.50	4.00	4.00	4.50	4.50	2.50	4.00	3.33	4.33	4.00	4.00	2.00	2.33	4.50	4.00	3.50	4.50	4.50	5.00	3.00	5.00	2.67
Q15	1.00	1.00	1.50	3.00	2.50	4.00	4.00	2.00	3.00	2.50	3.33	2.00	2.67	3.00	2.50	2.50	4.50	1.50	2.00	2.50	2.00	2.67
Q24	2.50	2.50	1.50	4.50	4.00	3.50	4.00	3.67	4.00	4.00	4.00	2.33	2.67	3.50	3.50	4.00	4.50	4.50	5.00	4.50	4.00	4.33
Q25	3.00	4.00	3.00	4.50	4.00	3.50	3.50	4.00	4.67	5.00	4.67	2.00	2.33	3.50	4.00	4.00	4.50	4.50	4.50	5.00	4.00	4.67
Q26	4.00	5.00	4.00	5.00	4.00	4.00	3.50	4.33	4.67	5.00	5.00	2.33	4.00	2.50	4.00	4.50	4.50	4.50	3.00	4.00	3.50	4.00
Q37	4.50	5.00	4.50	4.50	4.50	4.00	4.50	4.33	4.00	4.00	5.00	3.00	3.00	3.00	3.50	4.50	4.50	4.50	4.00	3.50	4.00	5.00
Q38	4.50	4.50	4.00	4.00	5.00	4.50	4.50	4.33	4.33	5.00	4.33	2.00	2.67	3.00	4.50	4.00	5.00	4.50	4.50	4.50	4.00	4.00
Q39	2.00	3.00	1.00	3.50	4.00	4.50	3.50	2.33	2.67	2.50	3.00	2.67	4.33	3.50	4.50	2.00	2.50	3.50	2.00	4.50	2.50	3.67
Q42	3.00	5.00	3.00	5.00	4.50	4.00	3.50	3.33	4.67	4.50	4.67	4.00	2.67	3.50	3.50	4.50	5.00	4.50	2.50	5.00	3.50	4.67

Table 5.5 shows the means of the responses given by the 22 teams for each of the significant questions.

5.2.4 Attributes versus Teams

A one-way analysis of variance was performed to test for differences among the teams participating in this research. The independent variables considered in this analysis are the teams and each of the 15 dimensions is a dependent variable. The one-way ANOVA was performed using MINITAB 15 software.

Table 5.6 summarizes all the statistically significant attributes, P-values and the R-square values as generated by the MINITAB software. The results indicate that four out of the fourteen attributes considered are statistically significant while the rest being non-significant. The attributes which are statistically significant are *Team Efficacy*, *Team Trust*, *Personality and Skills and Knowledge*. The attributes which are not significantly affected by any of the independent variables are *Job Satisfaction*, *Team Leadership*, *Communication*, *Cohesion*, *Training & Support*, *Team Diversity*, *Conflict Management*, *Individual Roles*, *Performance Feedback* and *Gender & Ethnic Differences*. The level of significance, $\alpha = 0.05$.

Table 5.6: Summary of one-way ANOVA for Attributes versus Teams

Attributes	P Value (Significance at $\alpha = 0.05$)	R-square Value
Team Efficacy	0.003	69.45%
Team Trust	0.002	71.62%
Personality	0.004	68.62%
Skills and Knowledge	0.046	59.77%

Table 5.7: Means of Attributes versus Teams

Attributes	Teams																					
	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Team 8	Team 9	Team 10	Team 11	Team 12	Team 13	Team 14	Team 15	Team 16	Team 17	Team 18	Team 19	Team 20	Team 21	Team 22
Team Efficacy	3.17	3.83	2.83	4.67	4.00	3.67	3.67	4.00	4.44	4.67	4.56	2.22	3.00	3.17	3.83	4.17	4.50	4.50	4.17	4.50	3.83	4.33
Team Trust	4.50	4.75	4.25	4.25	4.75	4.25	4.50	4.33	4.17	4.50	4.67	2.50	2.83	3.00	4.00	4.25	4.75	4.50	4.25	4.00	4.00	4.50
Team Personality	2.83	3.33	2.33	3.83	4.00	3.83	4.17	3.56	3.56	3.50	3.56	3.56	4.22	3.33	4.33	3.67	3.83	4.33	2.83	4.00	3.33	4.33
Team Skills and Knowledge	3.25	5.00	3.00	5.00	4.50	4.25	3.50	3.67	4.67	4.75	4.67	4.50	3.50	3.25	4.25	4.50	5.00	4.25	3.50	5.00	3.75	4.50

Table 5.7 shows the means of the responses given by the 22 teams for each of the significant attributes. From the Table 5.7 it can be deduced that:

- Teams 4 and 10 had the highest *team efficacy* while Team 12 had the lowest.
- Teams 2, 5 and 17 had higher *team trust* among team members while Team 12 had minimum trust among them.
- Team members from the Teams 15, 18 and 22 ranked higher in showcasing positive attitude at work while members from Team 3 ranked the lowest.
- Employees from Teams 2, 4, 17 and 20 perceived their team members to be highly skilled and knowledgeable in the work they do while employees from Team 3 perceived their team members to be poorly skilled.

5.2.5 Questions versus Groups

A one-way ANOVA was performed for all the forty three questions from the survey questionnaire. Groups are the independent variables and each of the forty three questions is a dependent variable. Table 5.8 summarizes all the statistically significant questions with their corresponding P-values and R-square values. Out of the forty three questions in the survey questionnaire twelve questions were to be statistically significant.

Question 12 & 14 (shown in Table 5.8) correspond to the attribute *Training & Support* and questions 28 & 40 correspond to the attributes *Performance Feedback and Personality* respectively. These results are consistent with the results from section 5.2.6 *Attributes versus Groups*.

It is interesting to note that the other questions which are statistically significant here are questions 3, 15, 24 and 30 (shown in Table 5.8) and correspond to the attributes *Job Satisfaction*, *Team Diversity*, *Team Efficacy* and *Team Effectiveness* and questions 33, 34, 35 and 36 corresponding to the attribute *Gender & Ethnic Differences*; all of these attributes are not significant in section 5.2.6 *Attributes versus Groups*.

Table 5.8: Summary of one-way ANOVA for Questions versus Groups

Question #	Questions	P Value (Significance at $\alpha = 0.05$)	R-square Value
Q3	Team members are satisfied with the priorities and direction of the department or group they are working with ?	0.031	9.37%
Q12	Overall how satisfied are you with the training provided in your company?	0.005	15.56%
Q14	Management and team members support your efforts to work on your weaknesses and convert them into your strengths ?	< 0.001	24.68%
Q15	How long have you been working for the company?	0.007	14.13%
Q24	The procedures followed are effective to guide team functioning?	0.005	15.40%
Q28	Members find team meetings efficient and productive and look forward to this time together?	0.043	8.30%
Q30	Team members complete the given task in a timely manner ?	0.006	14.79%
Q33	Do management authorities behave consistently in front of team members of all ethnic backgrounds ?	0.039	8.59%
Q34	Do management authorities behave consistently in front of team members of different genders ?	0.029	9.57%
Q35	Some of the team members assume themselves to be better skilled than others because of their ethnicity ?	< 0.001	25.44%
Q36	Do you think working with a team member of the same ethnicity as you is more beneficial ?	0.004	15.85%
Q40	Do you feel satisfied by overcoming resistance in order to get team members do what they are supposed to do ?	< 0.001	25.00%

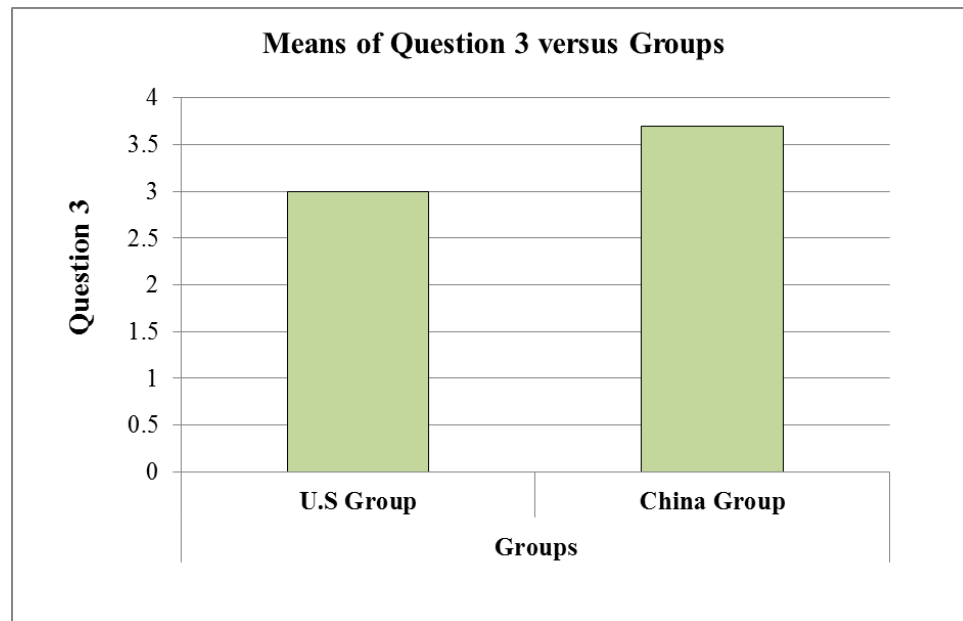


Figure 5.1: Means of Question 3 versus Groups

Question 3 (shown in Figure 5.1) “*Team members are satisfied with the priorities and direction of their group*” was significant with the two groups: United States and China. Results show that there is a significant difference between the satisfaction levels of teams from the two groups. Teams from China were more satisfied with the priorities and direction of the group they work with than the teams from United States.

Question 12 (shown in Figure 5.2) “*Overall how satisfied are you with the training provided in your company*” was significant with the two groups: United States and China. Results show that there is a significant difference between the satisfaction levels of teams from the two groups. Teams from China were more satisfied with the training provided by their respective company than the teams from United States.

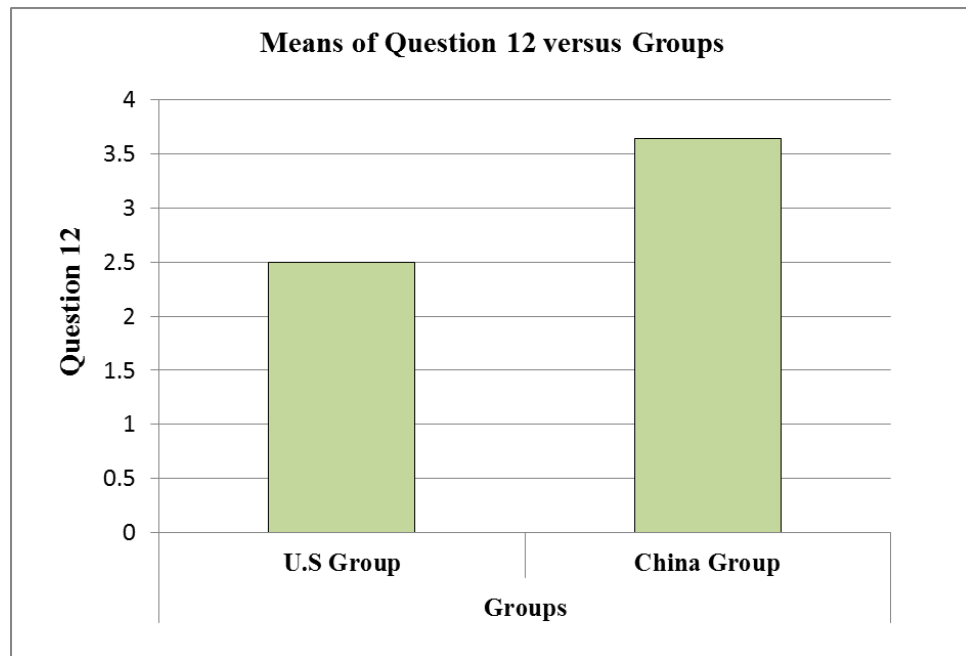


Figure 5.2: Means of Question 12 versus Groups

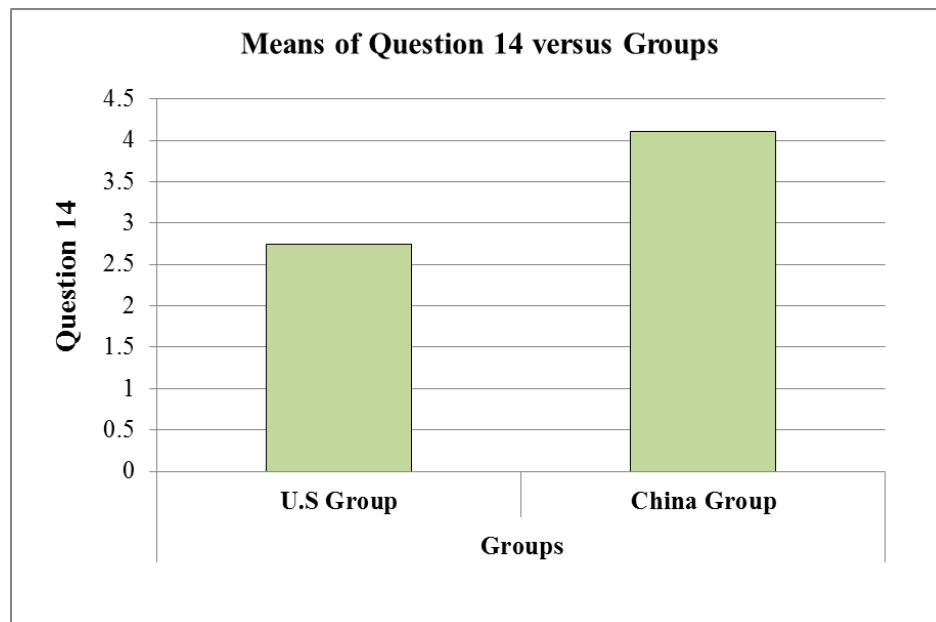


Figure 5.3: Means of Question 14 versus Groups

Question 14 (shown in Figure 5.3) “*Management and team members support your efforts to work on your weaknesses and convert them into your strengths*” was significant with the two groups: United States and China. Results show that there is a significant difference between the agreements of teams from the two groups. Teams from China gave higher ratings for this question than their U.S counterparts implicating those teams from China were more in agreement with the above statement than teams from United States.

Question 15 (shown in Figure 5.4) “*How long have you been working for the company*” was significant with the two groups: United States and China. Results show that teams from United States had less work experience than their counterparts from China.

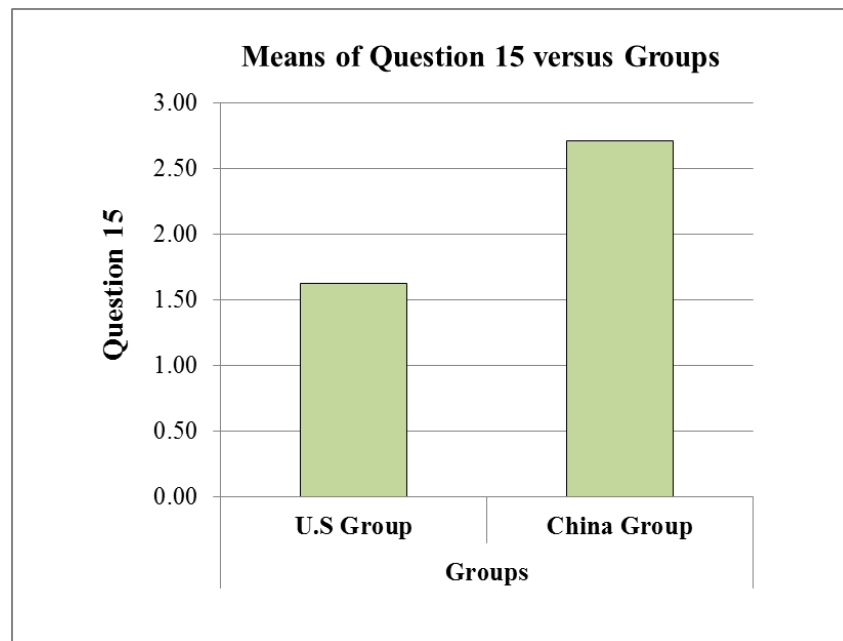


Figure 5.4: Means of Question 15 versus Groups

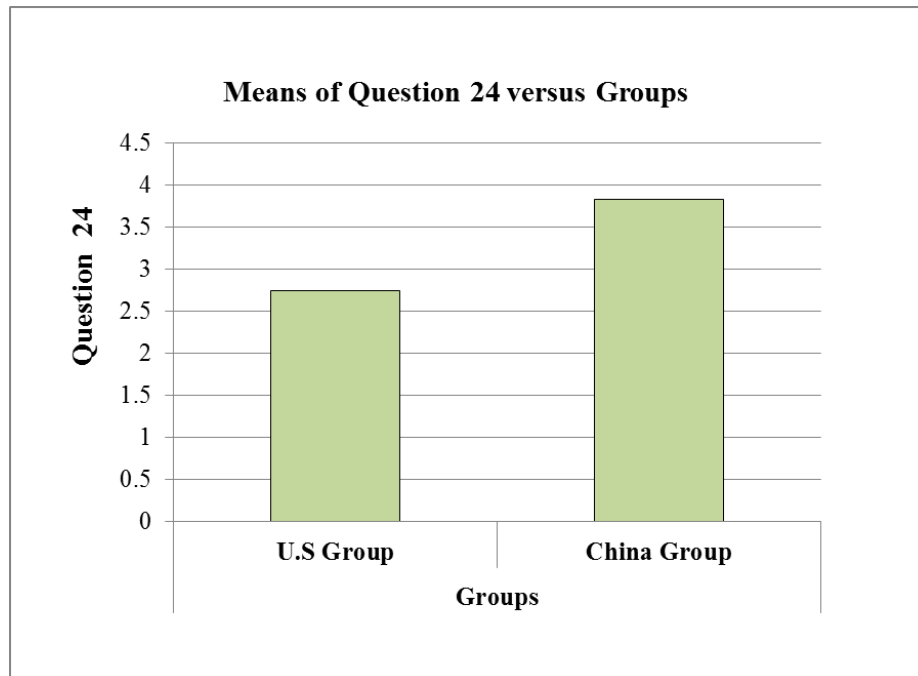


Figure 5.5: Means of Question 24 versus Groups

Question 24 (shown in Figure 5.5) “*The procedures followed are effective to guide team functioning*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups denoting that teams from China perceived their procedures to be far more effective in team functioning than the teams from U.S.

Question 28 (shown in Figure 5.6) “*Members find team meetings efficient and productive*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups. Also, higher ratings given by the teams from China indicate that teams from China found their team meetings to be more effective and productive than their U.S counterparts.

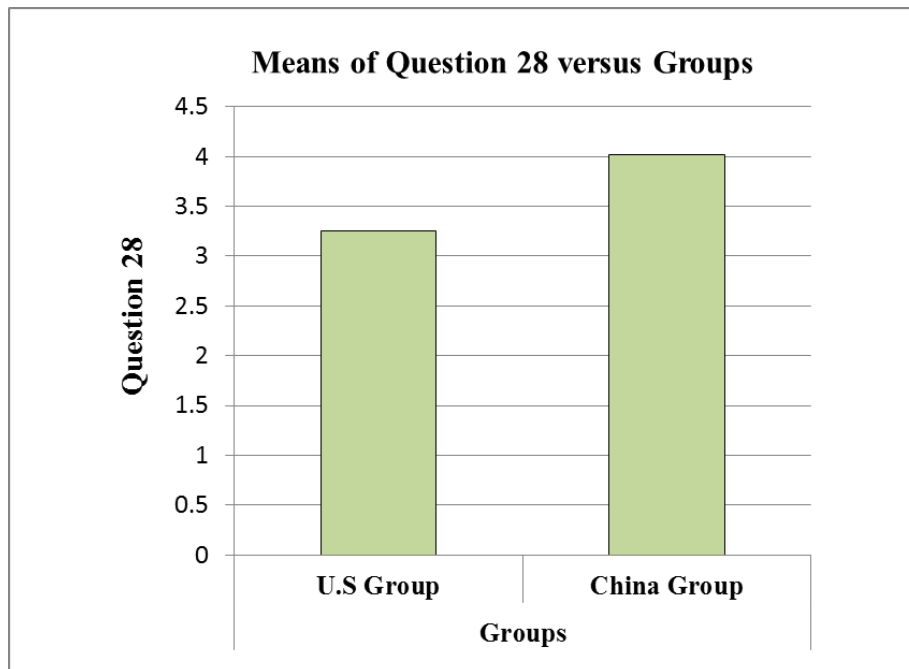


Figure 5.6: Means of Question 28 versus Groups

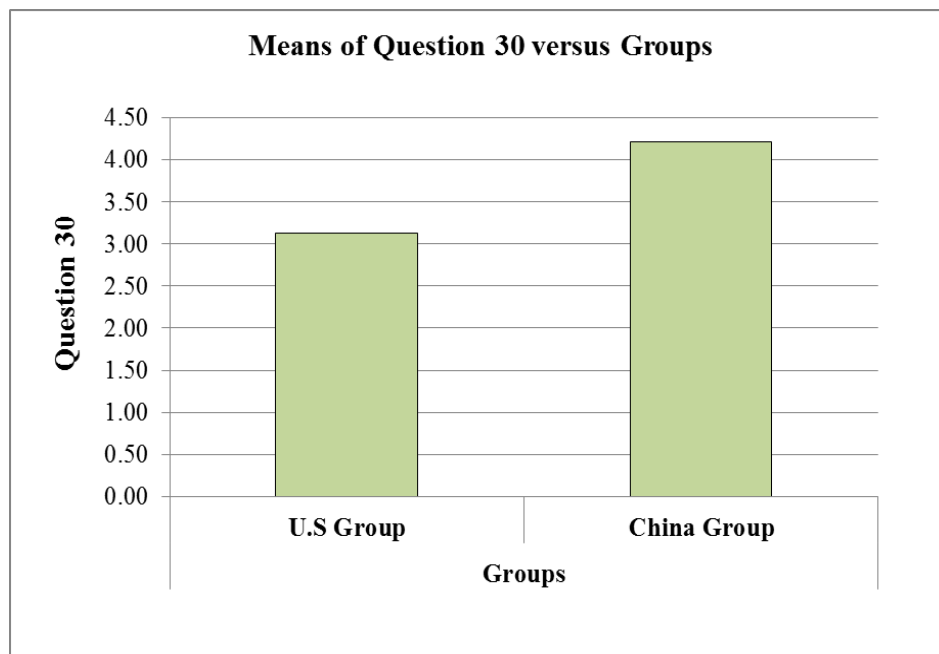


Figure 5.7: Means of Question 30 versus Groups

Question 30 (shown in Figure 5.7) “*Team members complete the task in a timely manner*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups. Also, higher ratings given by the teams from China indicate that teams from China perceived their team members to be more effective in completing a task than U.S counterparts.

Question 33 (shown in Figure 5.8) “*Management authorities behave consistently in front of team members of all ethnic backgrounds*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups. Also, higher ratings given by the teams from United States indicate that management authorities in the U.S companies treated employees of all ethnic backgrounds equally, and the lower ratings given by the teams from China imply that management authorities from the Chinese companies showed some discrimination among the employees of different ethnic backgrounds.

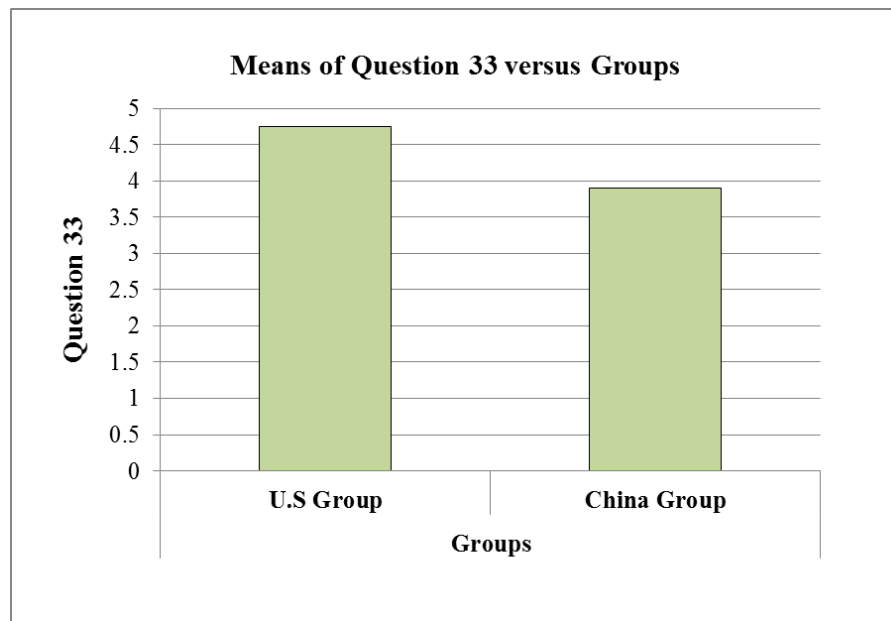


Figure 5.8: Means of Question 33 versus Groups

Question 34 (shown in Figure 5.9) “*Management authorities behave consistently in front of team members of different genders*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups. Also, higher ratings given by the teams from United States indicate that management authorities in the U.S companies treated employees of all genders equally, and the lower ratings given by the teams from China imply that management authorities from the Chinese companies showed some discrimination among the employees of different genders.

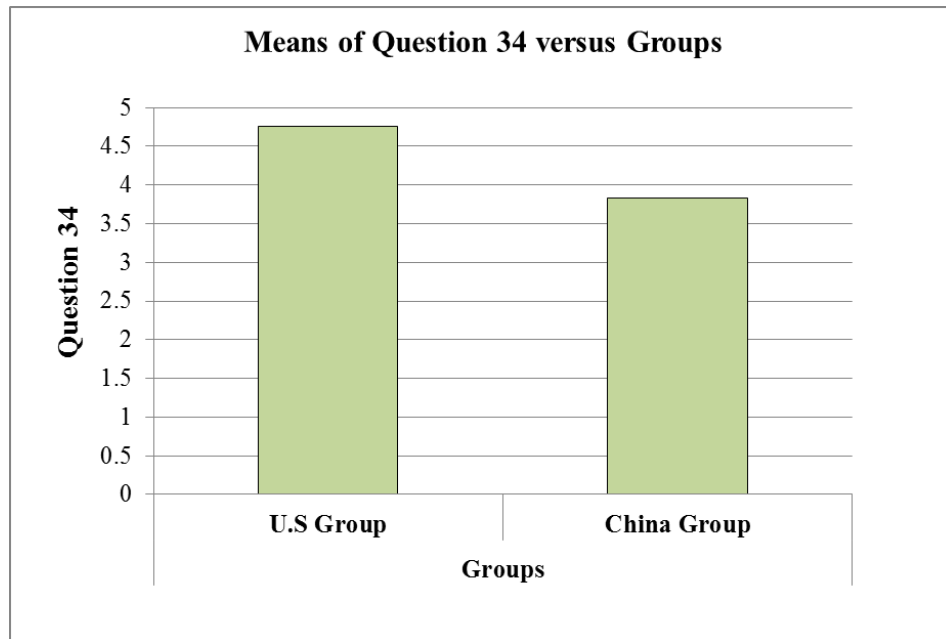


Figure 5.9: Means of Question 34 versus Groups

Question 35 (shown in Figure 5.10) “*Some of the team members assume themselves to be better skilled than others because of their ethnicity*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups and such differences among ethnicities is more prominent amongst the teams from China.

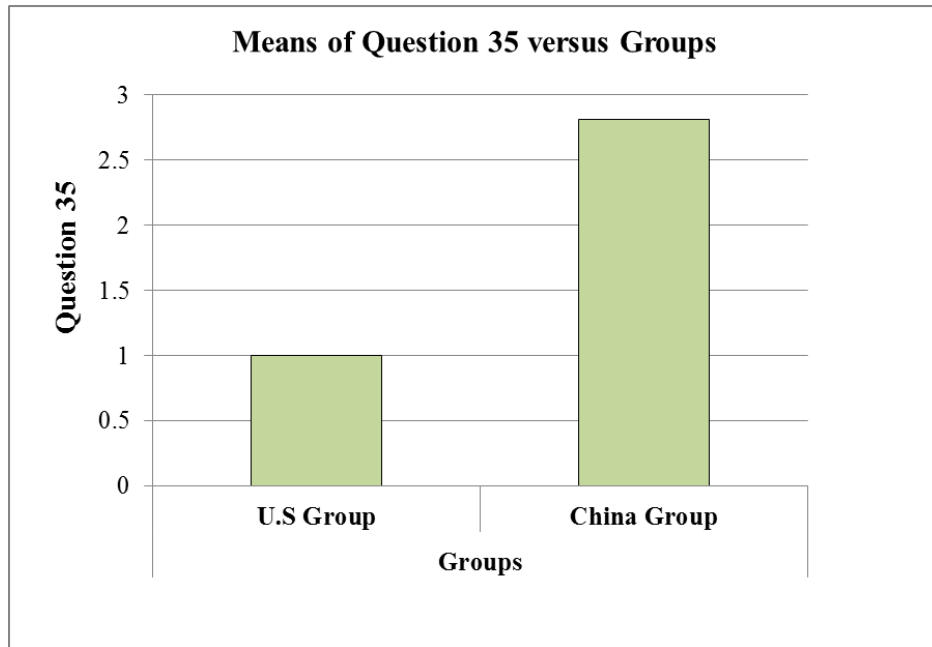


Figure 5.10: Means of Question 35 versus Groups

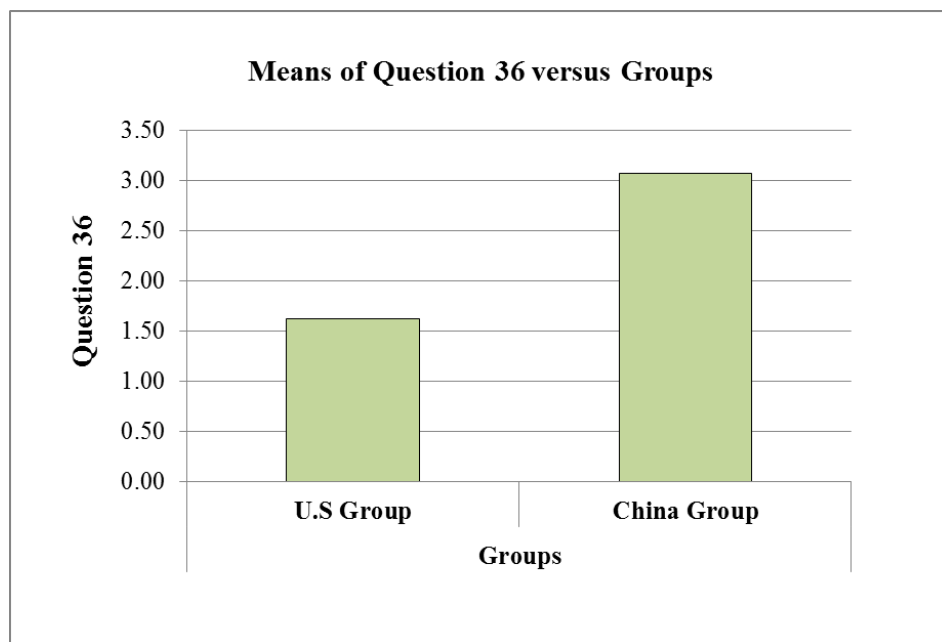


Figure 5.11: Means of Question 36 versus Groups

Question 36 (shown in Figure 5.11) “*Do you think working with a team member of the same ethnicity as you is more beneficial*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups. The lower ratings given by the employees of teams from United States indicate that working with members of their same ethnicities is not beneficial for them. But the higher ratings given by the teams from China imply that working with members of their same ethnicity is beneficial to them.

Question 40 (shown in Figure 5.12) “*Do you feel satisfied by overcoming the resistance in order to get team members do what they are supposed to do*” was significant with the two groups: United States and China. Results show that there was a significant difference between the groups and such differences among ethnicities is more prominent amongst the teams from China.

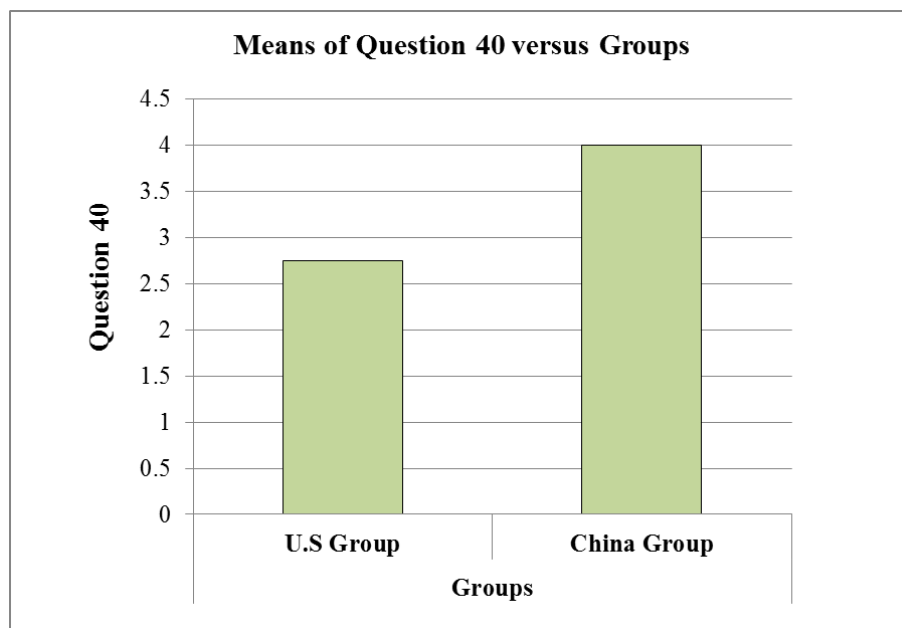


Figure 5.12: Means of Question 40 versus Groups

5.2.6 Attributes versus Groups

Teams participating in this survey are primarily from two countries: The United States and China. For convenience in analysis, teams from the United States are listed under Group 1 and teams from China are listed under Group 2. A one-way analysis of variance was performed to test for differences among the groups participating in this research. The independent variables considered in this analysis are the two groups and each of the 15 dimensions is a dependent variable.

Table 5.9 summarizes all the statistically significant attributes, P-values and the R-square values as generated by the MINITAB software. The results indicate that three out of the fourteen attributes considered are statistically significant while the rest being non-significant. The attributes which are statistically significant are *Training & Support*, *Performance Feedback* and *Personality*. The attributes which are not significantly affected by any of the independent variables are *Job Satisfaction*, *Team Leadership*, *Communication*, *Cohesion*, *Team Diversity*, *Conflict Management*, *Individual Roles*, *Team Efficacy*, *Gender & Ethnic Differences*, *Team Trust* and *Skills & Knowledge*. The level of significance, $\alpha = 0.05$.

Table 5.9: Summary of one-way ANOVA for Attributes versus Groups

Attributes	P Value (Significance at $\alpha = 0.05$)	R-square Value
Training & Support	0.001	21.75%
Performance Feedback	0.025	10.09%
Personality	0.002	18%

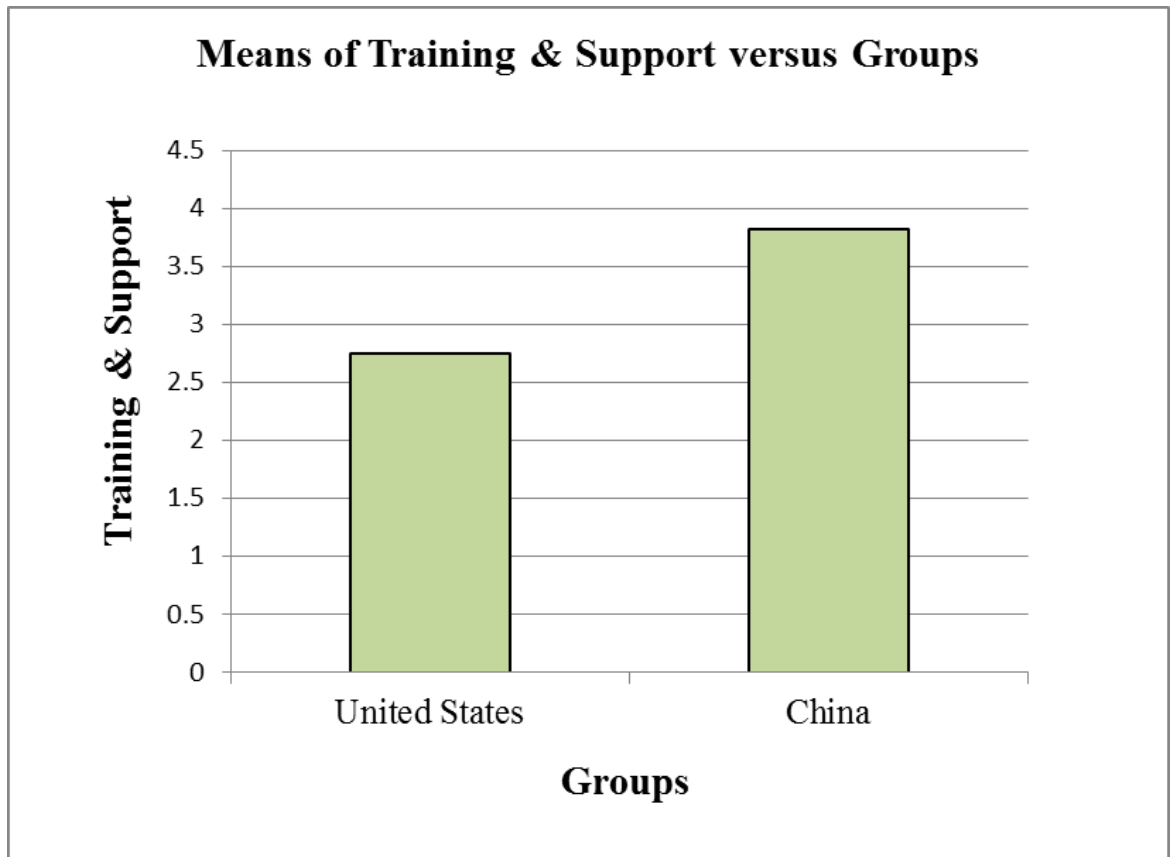


Figure 5.13: Means of Training & Support versus Groups

Figure 5.13 shows the graph plotted between the means of the attribute *Training & Support* and the two groups: United States and China. Training & Support (shown in Figure 5.13) was statistically significant with the groups. From Figure 5.13 it can be inferred that there was a statistical difference in the training & support provided for teams working in China and United States. Also, higher ratings given by teams from China show that they were more satisfied with the Training & Support provided by their respective managements than their U.S counterparts.

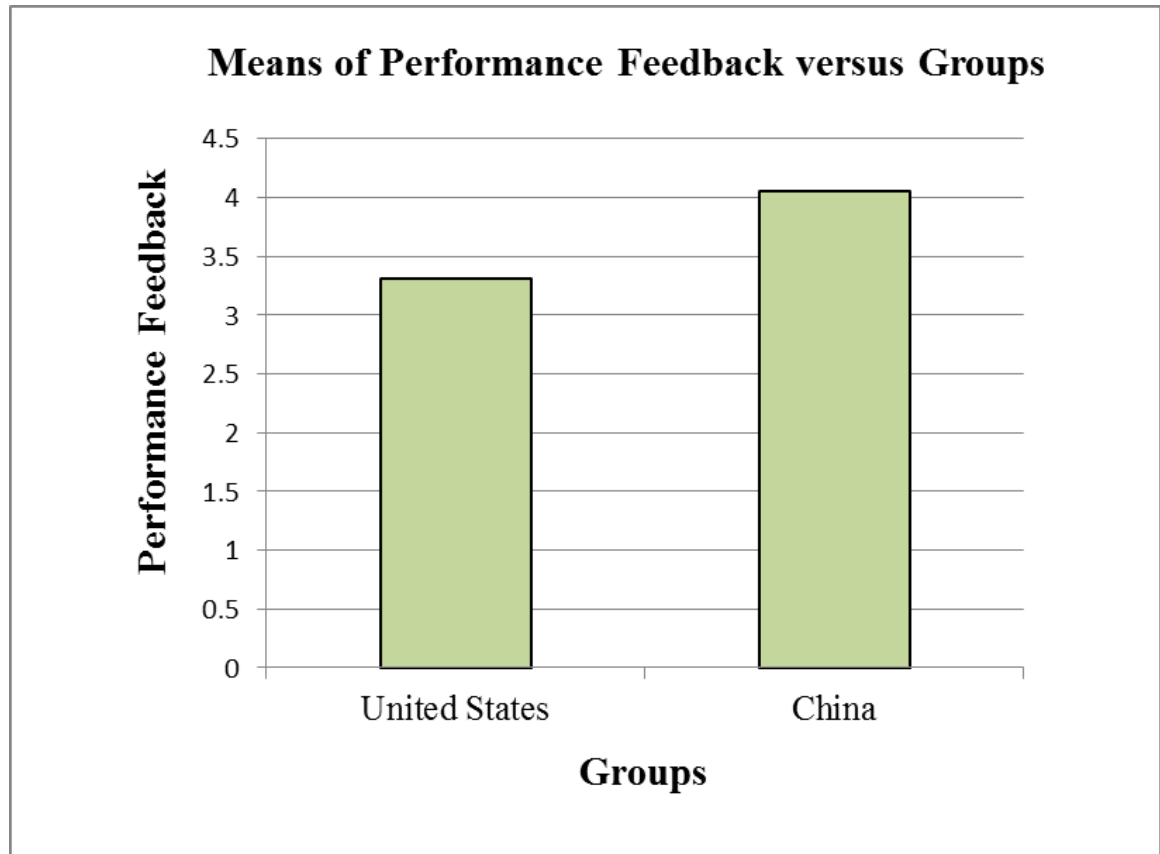


Figure 5.14: Means of Performance Feedback versus Groups

Figure 5.14 shows the graph plotted between the means of the attribute *Performance Feedback* and the two groups: United States and China. Performance feedback (shown in Figure 5.14) was statistically significant with the groups. Results show that there was a statistical difference in the performance feedback provided for teams working in China and United States. Also, higher ratings given by teams from China show that they were

more satisfied with the opportunities provided for overcoming weaknesses and improving skills by their respective managements than their U.S counterparts.

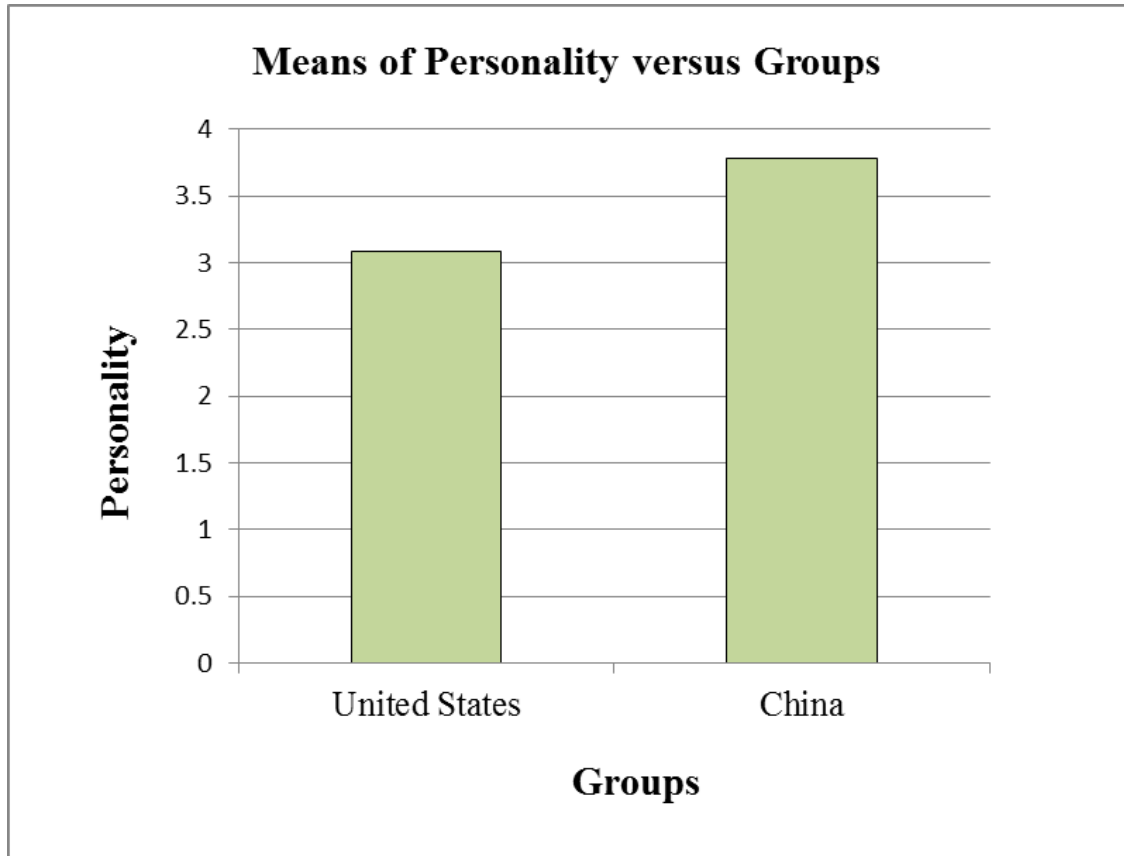


Figure 5.15: Means of Personality versus Groups

Figure 5.15 shows the graph plotted between the means of the attribute *Personality* and the two groups: United States and China. Personality (shown in Figure 5.15) was statistically significant with the groups. Results show that there was a statistical difference in the personality of the employees within teams working in China and United States. Also, higher ratings given by teams from China show that their personality traits

were more influenced by outside issues (such as work atmosphere) than their U.S counterparts.

5.2.7 Questions versus Teams from United States

A one-way ANOVA was performed for all the forty three questions from the survey questionnaire. Teams participating in this research from the manufacturing companies in the United States are the independent variables and each of the forty three questions is a dependent variable. Table 5.10 summarizes all the statistically significant questions with their corresponding P-values and R-square values. Out of the forty three questions in the survey questionnaire only four questions came out to be statistically significant.

Question 13 & 28 (shown in Table 5.10) correspond to the attributes *Training & Support* and *Performance Feedback*. These results are consistent with the results from section 5.2.8 *Attributes versus Teams from United States*. It is interesting to note that the other two questions which were statistically significant are questions 15 & 17 (shown in Table 5.10), both of which correspond to the attribute *Team Diversity*.

Table 5.11 shows the means of the responses given by the 4 teams from the United States for each of the significant questions.

Table 5.10: Summary of one-way ANOVA for Questions versus Teams from United States

Question #	Questions	P Value (Significance at $\alpha = 0.05$)	R-square Value
Q13	Overall how satisfied are you with the training provided in your company?	0.028	87.50%
Q15	Management and team members support your efforts to work on your weaknesses and convert them into your strengths ?	0.013	91.49%
Q17	Members of many varied differences are valued, offered opportunities to interact, and to be involved in meetings and activities ?	0.034	86.21%
Q28	Members find team meetings efficient and productive and look forward to this time together?	0.014	91.30%

Table 5.11: Means of Questions versus Teams from United States

Questions	Teams in United States			
	Team 1	Team 2	Team 3	Team 4
Q13	2.00	2.50	3.00	4.50
Q15	1.00	1.00	1.50	3.00
Q17	3.5	3	1.5	4.5
Q28	4.00	3.00	1.50	4.50

5.2.8 Attributes versus Teams from United States

A one-way analysis of variance was performed to test for differences among the teams participating in this research from the manufacturing companies in United States. The independent variables considered in this analysis are the teams from the manufacturing companies in United States and each of the 15 dimensions is a dependent variable.

Table 5.12 summarizes all the statistically significant attributes, P-values and the R-square values as generated by the MINITAB software. The results indicate that only two out of the fourteen attributes considered are statistically significant while the rest being non-significant. The attributes which are not significantly affected by any of the independent variables are *Job Satisfaction, Team Leadership, Communication, Cohesion, Team Diversity, Conflict Management, Individual Roles, Team Efficacy, Gender & Ethnic Differences, Team Trust, Personality, Skills & Knowledge*. The level of significance, $\alpha = 0.05$.

Table 5.12: Summary of one-way ANOVA for Attributes versus Teams in U.S

Attributes	P Value (Significance at $\alpha = 0.05$)	R-square Value
Training & Suuport	0.024	88.51%
Performance Feedback	0.036	85.83%

Table 5.13: Means of Attributes versus Teams in United States

Attributes	Teams in United States			
	Team 1	Team 2	Team 3	Team 4
Training & Support	2.17	2.50	2.33	4.00
Performance Feedback	3.75	3.50	1.50	4.50

Table 5.13 shows the means of the responses given by the 4 teams from United States for each of the significant attributes. From the Table 5.13 it can be inferred that:

- Team 4 was the most satisfied with the training & support provided to them by the management.
- Among the 4 teams, Team 4 received good performance feedback from their management.

5.2.9 Questions versus Teams from China

A one-way ANOVA was performed for all the forty three questions from the survey questionnaire. Teams participating in this research from the manufacturing companies in China are the independent variables and each of the forty three questions is a dependent variable. Table 5.14 summarizes all the statistically significant questions with their corresponding P-values and R-square values. Out of the forty three questions in the survey questionnaire only five questions came out to be statistically significant.

Question 5, 25 and 38 (shown in Table 5.14) correspond to the attributes *Team Leadership*, *Team Efficacy* and *Team Trust* respectively. These results are consistent with the results from section 5.2.10 *Attributes versus Teams from China*. It is interesting to note that the other two questions which are statistically significant are questions 9 & 39 (shown in Table 5.14) and correspond to the attributes *Communication* and *Personality*; both of these attributes were not significant in section 5.2.10 *Attributes versus Teams from China*.

Table 5.15 shows the means of the responses given by the 18 teams from the China for each of the significant questions.

Table 5.12: Summary of one-way ANOVA for Questions versus Teams in China

Question #	Questions	P Value (Significance at $\alpha = 0.05$)	R-square Value
Q5	The team leader provides encouragement to each member in applying his/her knowledge and skills to the job?	0.003	70.99%
Q9	Team members are receptive to feedback and criticism?	0.009	66.88%
Q25	Your team believes and encourages in creative approach of doing things?	0.019	63.93%
Q38	Team members can be trusted upon what they said they will do?	0.001	75.08%
Q39	Do you feel really annoyed if management insists on a particular procedure?	0.029	62.11%

Table 5.13: Means of Questions versus Teams from China

Questions	Teams in China																	
	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Team 8	Team 9	Team 10	Team 11	Team 12	Team 13	Team 14	Team 15	Team 16	Team 17	Team 18
Q5	4.00	4.00	4.00	4.67	4.33	4.50	4.33	2.33	3.67	2.00	4.50	4.50	4.50	4.50	4.50	5.00	5.00	4.00
Q9	4.50	2.50	4.00	3.33	4.33	4.00	4.00	2.00	2.33	4.50	4.00	3.50	4.50	4.50	5.00	3.00	5.00	2.67
Q25	4.00	3.50	3.50	4.00	4.67	5.00	4.67	2.00	2.33	3.50	4.00	4.00	4.50	4.50	4.50	5.00	4.00	4.67
Q38	5.00	4.50	4.50	4.33	4.33	5.00	4.33	2.00	2.67	3.00	4.50	4.00	5.00	4.50	4.50	4.50	4.00	4.00
Q39	4.00	4.50	3.50	2.33	2.67	2.50	3.00	2.67	4.33	3.50	4.50	2.00	2.50	3.50	2.00	4.50	2.50	3.67

5.2.10 Attributes versus Teams from China

A one-way analysis of variance was performed to test for differences among the teams participating in this research from the manufacturing companies in China. The independent variables considered in this analysis are the teams from the manufacturing companies in China and each of the 15 dimensions is a dependent variable.

Table 5.16 summarizes all the statistically significant attributes, P-values and the R-square values as generated by the MINITAB software. The results indicate that three out of the fourteen attributes considered are statistically significant while the rest being non-significant. The attributes which are not significantly affected by any of the independent variables are *Job Satisfaction, Communication, Cohesion, Training & Support, Team Diversity, Conflict Management, Individual Roles, Performance Feedback, Gender & Ethnic Differences, Personality, and Skills & Knowledge*. The level of significance, $\alpha = 0.05$.

Table 5.16: Summary of one-way ANOVA for Attributes versus Teams from China

Attributes	P Value (Significance at $\alpha = 0.05$)	R-square Value
Team Leadership	0.031	61.79%
Team Efficacy	0.01	66.54%
Team Trust	0.002	72.59

Table 5.17: Means of Attributes versus Teams from China

Attributes	Teams in China																	
	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Team 8	Team 9	Team 10	Team 11	Team 12	Team 13	Team 14	Team 15	Team 16	Team 17	Team 18
Team Leadership	3.50	4.00	3.67	3.89	4.11	4.67	4.22	3.00	4.22	2.33	4.33	4.33	3.83	4.33	4.50	4.00	4.83	4.11
Team Efficacy	4.00	3.67	3.67	4.00	4.44	4.67	4.56	2.22	3.00	3.17	3.83	4.17	4.50	4.50	4.17	4.50	3.83	4.33
Team Trust	4.75	4.25	4.50	4.33	4.17	4.50	4.67	2.50	2.83	3.00	4.00	4.25	4.75	4.50	4.25	4.00	4.00	4.50

Table 5.17 shows the means of the responses given by the 18 teams from China for each of the significant attributes. From the Table 5.17 it can be inferred that:

- Team 17 showed that their leadership was more supportive among all the 18 teams.
- Team 6 had the highest team efficacy among the 18 teams.
- Team 1 and 13 had higher team trust when compared to the other teams

5.4 Regression Analysis

Table 5.18 summarizes all the stepwise regression analyses and their R-Square values.

Table 5.18: Summary of Stepwise Regression Analysis

Subject	Regression Model	R-Square Value	Significance
Team Quality question V/s other questions	$1.944 + (0.221)Q25 + (0.24)Q1 - (0.142)Q39 + (0.170)Q14$	50.95	Yes
Team Quality V/s other attributes	$0.6355 + (0.5)Job\ Satisfaction + (0.359)Team\ Trust$	47.9	Yes
Team Quality question V/s other questions for Group 1 (U.S)	* ERROR * Not enough data in column	N/A	N/A
Team Quality V/s other attributes for Group 1 (U.S)	No variables entered or removed	N/A	N/A
Team Quality question V/s other questions for Group 2 (China)	$0.2334 + (0.303)Q14 + (0.263)Q1 + (0.237)Q10 + (0.145)Q2$	71.43	Yes
Team Quality V/s other attributes for Group 2 (China)	$0.8076 + (0.50)Job\ Satisfaction + (0.338)Team\ Efficacy$	58.6	Yes

5.4.1 Stepwise regression analysis of Questions: (All Teams Combined)

Out of the 43 questions from the survey questionnaire, four questions (Q29 – Q32) define “Overall Team Quality”. An average of these four questions was taken and was considered as the dependent variable. A stepwise regression analysis was performed by using each of the remaining 39 questions as predictor variables and the average of the four questions (Q29 – Q32) as response variable. The results shown below were generated by making use of the software, MINITAB 15.

The output model for the stepwise regression analysis with the regression coefficients can be written as:

$$Y_{Overall\ Team\ Quality} = 1.944 + (0.221)Q25 + (0.24)Q1 - (0.142)Q39 + (0.170)Q14$$

Where,

Q 1 = Overall how satisfied are you with the company you work for?

Q 14 = Management and team members support your efforts to work on your weaknesses and convert them into your strengths?

Q 25 = Does your team believes and encourages in creative approach of doing things?

Q 39 = Do you feel really annoyed if management insists on a particular procedure?

The outcomes show that the overall quality of a team increases when there is higher job satisfaction amongst the employees, when higher team efficacy exists within the team and when the training & support provided is finest. However, the overall quality of a

team decreases when there is a conflict between the employees and the management during decision making process.

5.4.2 Stepwise regression analysis of Attributes: (All Teams Combined)

There are a total of 14 attributes corresponding to the 39 questions in the survey questionnaire, i.e. each attribute is well-defined by a set of questions. The stepwise regression analysis was performed by taking the 14 attributes as predictor variables and overall team quality as the response variable.

The output model for the stepwise regression analysis with the regression coefficients can be written as:

$$Y_{Overall\ Team\ Quality} = 0.6355 + (0.5)Job\ Satisfaction + (0.359)Team\ Trust$$

From the results, it can be interpreted that the overall quality of a team depends on the attributes job satisfaction and team trust, i.e. presence of higher job satisfaction among the employees and presence of high mutual trust among the employees would lead to increased overall quality of a team.

5.4.3 Stepwise regression analysis of Questions: (For teams from China)

A stepwise regression analysis was performed exclusively for the teams from China. A stepwise regression analysis was performed by using the average of the four questions (Q29 – Q32) as response variable and each of the remaining 39 questions as predictor variables. The results shown below were generated by making use of the software, MINITAB 15.

The output model for the stepwise regression analysis with the regression coefficients can be written as:

$$Y_{\text{Overall Team Quality}} = 0.2334 + (0.303)Q14 + (0.263)Q1 + (0.237)Q10 + (0.145)Q2$$

Where,

Q 1 = Overall how satisfied are you with the company you work for?

Q 2 = If you have ever offered a suggestion to your management, how satisfied were you with the response?

Q 10 = There are feelings of unity and togetherness among group members (members spend time knowing each other)?

Q 14 = Management and team members support your efforts to work on your weaknesses and convert them into your strengths?

The outcomes show that the overall quality of a team is more when there is greater job satisfaction amongst the employees, when unity exists within the team and when the training & support provided is optimum.

5.4.4 Stepwise regression analysis of Attributes: (For teams from China)

A stepwise regression analysis was performed by taking the 14 attributes as predictor variables and overall team quality as the response variable exclusively for the teams from China.

The output model for the stepwise regression analysis with the regression coefficients can be written as:

$$Y_{Overall\ Team\ Quality} = 0.8076 + (0.50)Job\ Satisfaction + (0.338)Team\ Efficacy$$

From the results, it can be interpreted that the overall quality of a team depends on the attributes job satisfaction and team efficacy, i.e. presence of higher job satisfaction among the employees and presence of optimistic beliefs among the employees would lead to increased overall quality of a team.

A separate stepwise regression analysis was not performed for the teams from United States because of insufficient data.

CHAPTER 6

DISCUSSIONS AND CONCLUSIONS

This chapter briefly discusses the results from the previous chapter. Based on the findings from the results, this chapter interprets the results and provides few recommendations. Lastly, this chapter concludes by discussing the limitations faced during the study and the need of future work.

6.1 Summary of Results

This study identified 14 vital attributes which could possibly affect the overall quality of a team. A generic survey was developed based on these 14 attributes such that each attribute was defined by a group of questions. Additionally, there were four questions corresponding to the overall team quality. This survey showcases an employee's perspective on the overall quality of a team.

A one-way ANOVA analysis was performed on the responses obtained from the survey and the results are summarized below:

- The one-way ANOVA results for attributes versus teams revealed that team efficacy, team trust, personality and skills & knowledge are the attributes which were significant for teams. While questions Q5, Q9, Q15, Q4, Q25, Q26, Q37, Q38, Q39 and Q42 were significant with teams for the one-way ANOVA of questions versus teams.
- The one-way ANOVA results for attributes versus teams from United States showed that training & support and performance feedback are the attributes which

were significant for teams. While questions Q13, Q15, Q17, and Q28 were significant with teams for the one-way ANOVA of questions versus teams from United States.

- The one-way ANOVA results for attributes versus teams from China revealed that team leadership, team efficacy and team trust are the attributes which were significant for teams. While questions Q5, Q9, Q25, Q38 and Q39 were significant with teams for the one-way ANOVA of questions versus teams from China.

Also, a stepwise regression analysis was performed on the responses obtained from the survey and the results are summarized below:

- The stepwise regression analysis for the team quality question versus other questions showed that Q1, Q14, Q25 and Q39 were significantly affecting the overall team quality.

Also, the stepwise regression analysis for team quality (response variable) versus other attributes (predictor variables) showed that job satisfaction and team trust were significantly affecting the overall team quality.

- The stepwise regression analysis for the team quality question versus other questions for Group 2 (China) showed that Q1, Q2, Q10 and Q14 were significantly affecting the overall team quality.

Also, the stepwise regression analysis for team quality (response variable) versus other attributes (predictor variables) for Group 2 (China) showed that job satisfaction and team efficacy were significantly affecting the overall team quality.

- The stepwise regression analysis for Group 1 (United States) could not be done due to insufficient data (smaller sample size).

Figure 6.1 shows all the significant attributes yielded from the one-way ANOVA of all teams combined as well as teams from United States and China.

6.2 Overall Discussion

Differences between teams from China and The United States

A one-way ANOVA was performed to test for differences among the two groups participating in the research. Results showed that the attributes *Training & Support* and *Performance Feedback* were given higher ratings by the teams from China when compared to teams from The United States. This essentially means that teams from China were provided with better training and had better management support when compared to teams from The United States. Moreover, this also shows that the companies or the firms from China constantly try to motivate their employees by providing them with opportunities for feedback. This difference can primarily be attributed towards the varied working cultures of the two nations, which drives their management functionality.

However, the results also show that the attribute *Personality* was given higher rating by the teams from China when compared to teams from The United States. This shows that personality traits of the employees from China are more dependent on external factors such as work atmosphere and management responses. For example, for questions such as “*Do you really feel annoyed if management insists on a particular procedure*” or “*Do you contribute more when working in an appreciative atmosphere amongst team members*” employees from China strongly agreed to them showing how sensitive their personality is

towards various external factors. However, employees from The United States were comparatively less affected by such external factors, meaning that their performance at work remained more or less consistent even with the presence/absence of such factors. This is very interesting as it portraits how unique and different the personality traits of the employees are among the two nations.

Summary of significant and insignificant attributes yielded from ANOVA

Also discussed below are the common significant and insignificant attributes resulted from the ANOVA performed in Chapter 5.

Table 6.1 summarizes the significant attributes from all the analysis of variances performed with the fourteen attributes. Mostly, the attributes *Team Leadership*, *Training & Support*, *Team efficacy*, *Performance Feedback*, *Team Trust*, *Personality and Skills & Knowledge* were comparatively given a different rating by each team, which implies that employees as a team and also as individuals had diverse perspective's towards the above stated attributes.

Table 6.1: Summary of Significant Attributes from ANOVA

Significant Attributes
Team Leadership
Training & Support
Team Efficacy
Performance Feedback
Team Trust
Personality
Skills & Knowledge

It is also interesting to see how few of the attributes were not significant in all of the ANOVA performed. Table 6.2 summarizes the insignificant attributes from all the analysis of variances performed with the fourteen attributes. Mostly, the attributes *Job Satisfaction, Communication, Cohesion, Team Diversity, Conflict Management, Individual Roles and Gender & Ethnic Differences* were nearly given the same rating by each team, which implies that employees as a team and also as individuals had approximately similar perspective towards the above stated attributes.

Table 6.2: Summary of Insignificant Attributes from ANOVA

Insignificant Attributes
Job Satisfaction
Communication
Cohesion
Team Diversity
Conflict Management
Individual Roles
Gender & Ethnic Differences

6.3 Validating research objectives

The objectives for this study were as follows:

1. To structure a comprehensive list of attributes which could affect a Team's

Overall Quality:

As a primary objective of this research, it was imperative to consider all the attributes that had the potential to affect the team's overall quality from an

employee's perspective. Based on the extensive literature review conducted, 14 attributes that could possibly affect the team's overall quality were identified. A survey questionnaire was then developed such that each of the attributes was defined by a set of questions.

2. To identify the significant attributes that affected a Team's Overall Quality from an employee's perspective:

The survey questionnaire was used to collect responses from the employees working in teams from the manufacturing sector. A total of 22 teams participated in this study. Statistical analysis (both one-way ANOVA and stepwise regression analysis) was performed on the gathered responses to yield the significant attributes (as discussed in Chapter 5). The identified significant attributes can be further used to improve the overall quality of a team.

3. To compare the responses between the two groups: United States and China.

This study had respondents primarily from the following two countries: United States and China. There were 4 teams comprising of 8 employees from the United States and 18 teams comprising of 42 employees from China. Results from the one-way ANOVA and the means plot for questions versus groups indicate that management authorities from the U.S companies treated employees of all ethnicities and genders equally, while there was some discrimination among employees from China. However, teams from China had a higher job satisfaction when compared to the teams from United States. Also, the team efficacy and the

training & support provided for teams in China were higher when compared to the teams from United States.

6.4 Recommendations

The overall quality of a team can be improved by focusing on the significant attributes that were acknowledged during the analysis of the survey questions and attributes. The attributes which were consistently significant among the various analyses performed are *Job Satisfaction*, *Team Trust* and *Team Efficacy*. The overall quality of a team can be improved by:

- Taking proper measures to ensure that the employees working within the team have optimal job satisfaction.
- Creating a harmonious and a cordial environment among the team members where each member of the team can trust the other member.
- Providing opportunities and scope for a creative approach while simultaneously encouraging the team members in their approach of doing things.

6.5 Limitations of Research

There were a few limitations for this study. The major limitation of this study was the inaccessibility to a larger population which restricted the research in reaching the originally targeted sample size. Healthcare sector in particular was very challenging as employees preferred not to disclose information due to confidential issues. Also, there were a few impending issues such as missing values in the responses collected through survey. Moreover, there were very few participants from the United States which made the data analysis challenging because of the smaller sample size.

Although there is an enormous amount of literature existing on teams, the other limitation of this study is that, quality of teams has never been measured or studied before. Therefore, there are no standard criteria or defined methods to estimate the quality of a team. However, this particular aspect can also be viewed as this research's greatest strength. Since there were no pre-established formats available, this research had the complete freedom of developing a fresh approach to measure a team's quality without having the need to confine to a preexisting format.

6.6 Need of Further Research

The robustness of the metrics developed in this study can be further increased by incorporating a larger sample size of teams across various nations. Additional analysis and comparisons can be made in regard to the working cultures across various nations and among various sectors.

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APPENDIX

Metrics affecting Team Quality

Dear employee,

I am a master's student in the Department of Industrial Engineering at the University of Nebraska-Lincoln. I am conducting a survey for my thesis; the purpose of this survey is to analyze which dimensions of Team Quality in the context of employees are important.

Quality in Teams is a very important aspect as studies show that there exists no proper metrics to evaluate a team's quality from the employee perspective. Based on the analysis, a model would be developed which would not only evaluate but also assist in improving a team's quality.

In order to conduct this research, I am recruiting employees who are working or have worked in the past as a part of a team. You will be asked to respond to the survey based on your perception of working with teams. You will find participation in this study to be an enjoyable experience. If you have any questions, please contact me by phone at (402) 304-7739 or e-mail me at shiva.bhagavatula@huskers.unl.edu.

Thank you for your interest, your time & effort are greatly appreciated.

Shiva Bhagavatula

Metrics affecting Team Quality

***1. Please print your name (Optional), the name of your company (Optional) and the related sector (Required field) such as Manufacturing/Healthcare, etc in the space below (Name/Company Name/Sector).**

It is preferable to have your name and the name of your company, but if you wish not to disclose them, please "N/A" the blank spaces; however sector is a required field.

***2. Overall how satisfied are you with the company you work for?**

- Extremely Dissatisfied
- Not Very satisfied
- Neither Satisfied nor Dissatisfied
- Very Satisfied
- Extremely Satisfied

***3. If you have ever offered a suggestion to your management, how satisfied were you with the response?**

- Never offered a suggestion
- Extremely Dissatisfied
- Not very Satisfied
- Very Satisfied
- Extremely Satisfied

***4. Team members are satisfied with the priorities and direction of the department or group they are working with ?**

- Extremely Dissatisfied
- Not Very Satisfied
- Neither Satisfied nor Dissatisfied
- Very Satisfied
- Extremely Satisfied

Metrics affecting Team Quality

***5. Your team leader helps the team to focus on what can be learned from both successes and failures?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***6. The team leader provides encouragement to each member in applying his/her knowledge and skills to the job?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***7. Your team leader encourages participation in the decision-making process, rather than he/her making all the decisions for the team?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***8. Your company clearly communicates its goals and strategies to your team ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***9. Do team members feel free to express their feelings as well as facts?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***10. Team members are receptive to feedback and criticism?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***11. There are feelings of unity and togetherness among group members (members spend time knowing each other)?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***12. Team members look forward to participating in the group meetings as group members make each other feel as a part of the group?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***13. Overall how satisfied are you with the training provided in your company?**

- Extremely Dissatisfied
- Not Very Satisfied
- Neither Satisfied nor Dissatisfied
- Very Satisfied
- Extremely Satisfied

***14. Management puts efforts to identify the strengths and weaknesses of the individuals in your company ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***15. Management and team members support your efforts to work on your weaknesses and convert them into your strengths ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***16. How long have you been working for the company?**

- Less than a year
- 1-2 years
- 3-5 years
- 6-10 years

***17. Members of many varied differences are valued, offered opportunities to interact, and to be involved in meetings and activities ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***18. Specific boundaries are not created and do not exist among representatives and leadership team members?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***19. Conflict within the team is dealt openly and is considered to be important to decision-making and personal growth?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***20. Team members value each individual's opinion ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***21. Are team members willing to spare extra time to resolve issues if any in order to maintain a friendly environment at work ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***22. Team members understand and accept their roles in getting tasks done ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***23. I can see the link between my work and company's objectives ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***24. Your role is equally challenging as other team members' role ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***25. The procedures followed are effective to guide team functioning ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***26. Your team believes and encourages in creative approach of doing things ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***27. Each individual of the team contributes effectively towards the common goal ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***28. Members find team meetings efficient and productive and look forward to this time together?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***29. Are opportunities for feedback and updating skills provided and taken advantage of by team members?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

*30. Team members complete the given task in a timely manner ?

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

*31. Your team has always been producing high quality work ?

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

*32. Individual members of the team have been contributing high quality work ?

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***33. The team's overall goals are aligned with your personal goals ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***34. Do management authorities behave consistently in front of team members of all ethnic backgrounds ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***35. Do management authorities behave consistently in front of team members of different genders ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***36. Some of the team members assume themselves to be better skilled than others because of their ethnicity ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***37. Do you think working with a team member of the same ethnicity as you is more beneficial ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***38. Are members of your team dependable and committed to their work ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***39. Team members can be trusted upon what they said they will do ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***40. Do you feel really annoyed if management insists on a particular procedure ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

Metrics affecting Team Quality

***41. Do you feel satisfied by overcoming resistance in order to get team members do what they are supposed to do ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***42. Do you contribute more when working in an appreciative atmosphere amongst team members ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***43. Do you think all the individuals in your team are rightly qualified for their position/role ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree

***44. Team members have the appropriate skills and knowledge required for the job ?**

- Strongly disagree
- Somewhat disagree
- Don't agree or disagree
- Somewhat agree
- Strongly agree