Bahria University Islamabad Campus (BUIC)

IMPACT OF SOFT SKILLS ON ENGINEER'S TASK PERFORMANCE IN MANUFATURING INDUSTRIES OF PAKISTAN

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ABSTRACT

It is universally accepted that soft skills are equally significant as hard skills for professional development, however the manufacturing industries in Pakistan is still unaware of the different soft skills that could influence engineer's performance. There is a need to identify such soft skills which have more effect on the task performance of the engineer. The aim of this study is to address soft skills issues faced by the engineers and the impact of those soft skills issues on the performance of an engineer. Questionnaire survey was used, and the targeted population was engineers of Pakistan. Cluster sampling and Stratified sampling technique was used is this study. Islamabad, Rawalpindi and Lahore were taken as clusters and electronics industry was taken as strata. Total 450 questionnaires were floated among the respondents and 145 responses were used for the analysis of this study. Results shows a positive influence of soft skills on the task performance of the engineers and the most important soft skill found was conflict management skill in electronics industries of Pakistan. This study intends to prove that soft skills are equally important, and they play a very major role on the task performance of an engineer. Through this the organizations will come to know about the advantages of training their engineers about the soft skills. Also, the organization's success rate will change positively.

Key Words: Soft skills, Task Performance, Skilled Engineers, **Manufacturing Industries, Training**

Dedication

This thesis is dedicated to my beloved parents and teachers for being such important role models and for their continuous support and encouragement regarding my goals.

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In the Name of Allah, the most Beneficent, the most Merciful

First all praises to Allah, the Almighty, on whom ultimately we depend for sustenance and guidance.

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May Allah bless them all with eternal happiness.

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CHAPTER 1: INTRODUCTION

Management is a key role for the success of any project. People stand in amazement when they gaze upon great projects from history like the Great Wall of China, pyramids and structures from ancient cities. The question arises that does a degree in engineering means that an engineer can supervise engineering projects and engineers? Usually technical skills are the criteria used to promote engineers or other technical persons to management positions. Generally, it is presumed that technical skills are the most important criteria for better performance of the engineers. Research in different areas suggests that technical skills are not necessary for managerial performance. Different models of management propose that technical skills are secondary abilities of management and the primary abilities of the management are the non-technical skills [1].

Technical skills, which are also recognized as the hard skills, are the expertise that an engineer possesses related to their field [2]. They help an engineer perform specialized tasks. These are the skills that can be learned through books and practice. For example, a person has a typing speed of 60 words per minute. These are the skills which can be seen through naked eye and are also known as hard skills [3]. They are learned by a formal education and can be observed and measured. With technical skills an engineer can be able to apply his knowledge and understanding and use related equipment efficiently. They are always ready to accept changes in technology and can handle equipment and machines proficiently.

The organization requires an engineer to be rich in non-technical skills as well. They are also identified as general skills [4], generic skills, necessary skills and soft skills [3], [5]. While recruiting for a job, organizations not just only focus on the technical skills or hard skills but also on the non-technical skills or soft skills of the applicant. Soft skills help the engineer to enhance the way they carryout technical skills [3]. There are huge number of

skills present under the umbrella of soft skills. Soft skills include flexibility skills, communication skills [6], [7], patience skills, problem solving skills [8], leadership skills [6], [9], creativity or innovation skills, collaboration skills [10], entrepreneurial skills [8] and emotional intelligence skills [5], [7]. These skills can't be learned in a formal education and are not precise for a specific job position [4]. They can be used at any job position.

To be successful, an organization does not only need quantity of trained engineers but the quality in the trained engineers also. China which is known as 'sleeping dragon' has skilled engineers that are not only technical but non-technical as well [3]. Where technical skills are important, non-technical skills are also equally substantial for the success of the projects [11]. Engineers also work in a team at any task or project. To create an effective product or creative project an engineer must build a strong team. For the completion and success of any project or task assigned to an engineer, teamwork is very critical [12]. If engineers lack in soft skills they can cause poor coordination, miscommunication, ineffective coordination, poor organization and negative attitude [11], [13]. These problems can weaken his team and they all collectively affect the overall performance of the team.

Previous studies have shown that soft skills highly contributes towards the overall success of the project [14]. When it comes towards the employment of fresh graduates of engineering and management sciences, soft skills were found to have a major role in the employability of these students [15]. An effective manager uses his technical skills to find the best appropriate path for the success of the project and after that uses his soft skills to manage the people for the implementation of the plan [5]. Even though, it is also linked to the managers' experience, but the soft skills and hard skills helps to prepare for the ground by utilizing the resources in the best possible way. Researchers finds that developing a pool of

effective future leaders is the principal goal of the schools, but the weakness in certain soft skills of graduates has been observed which are necessary for successful managers [6].

Task performance is defined as the efficacy or successfulness with which the job holder execute activities that contributes toward the company's technical principals, which can be directly executing a part of its technology related operation, or indirectly that is by delivering it with services or materials needed [16]. High performance employees are necessary for the accomplishment of a project and the success of an organization.

Nasir et al. (2011) discussed that soft skills are the aids that can increase individual output in all fields and his research also recommends that non-technical skills are as much important for job performance as technical skills or traditional job qualifications. Historically, hard skills, which are also known as the technical skills, were known to be the solitary skills for the career employment or advancement; nonetheless currently it is seen that whenever companies are cutting positions or are right-sizing, only technical skills are not enough [2]. This is because non-technical skills are very crucial for high-yielding performance in workplaces nowadays, so leaders of the organizations are focusing on the soft skills development. A study was conducted, and it was observed that most important skills were non-technical skills as human skills was ranked as most important set of skills, then conceptual skills ordered as second, after that hard skills or technical skills, and political skills in the last for effective task performance [17].

Non-technical skills include *communicative skills*; it is the most important skill, it includes effective communication both orally and in writing at different levels with different people [8]. *Flexibility skills*; this skill involves accepting change because the industry is changing continuously and adopt new techniques and methods. *Problem solving skills*; this skill involves critical thinking, analytical skills [9] and creativity. It involves the ability to

shape and interpret data as well as figure out the exact problem and come up with the solution [8]. It also involves the ability to think ahead and plan accordingly. *Leadership skills*; this involves the capability to lead in different activities [8], [9]. *Patient skills*; this involves dealing with other group members and clients of different tolerance level and listen to them patiently. *Innovation*; this skill involves creativity and innovation. *Collaboration*; this skill involves the capability to work with people from different cultural background to accomplish common goals [8]. As most of the companies operate globally, the engineers must work globally and in teams, it's very difficult to communicate properly because of difference in language and culture and there is also a barrier of time zone because of which difference in office hours occurs [10], [18] but they should respect the attitude and opinions of other team members. *Emotional intelligence*; as the engineers works in teams so they should be able to understand the emotions of other team members and must also be conscious of their own emotions [5].

This research emphases on the soft skills of the engineers and the effect of those soft skills on the task performance of the engineer. The understanding of non-technical skills or soft skills is as essential as the understanding of technical skills for increasing the performance of the engineer. The study also intends to guide engineers to improve their soft skills/non-technical skills.

PROBLEM STATEMENT

It is universally accepted that soft skills are equally important as technical skills or hard skills for professional development, however the manufacturing industries in Pakistan is still unaware of the different soft skills that could influence engineer's performance. There is a need to identify such soft skills which have more impact on the task performance of the engineer.

RESEARCH QUESTIONS

The following empirical study anticipates finding the impact of soft skills of engineers on the performance of the engineer in manufacturing industries of Pakistan. This study intends to find the answers of following questions:

- How Communication skills impact on Engineers' task performance?
- Does Leadership skills have any impact on Engineers' task performance?
- Is there any effect of Teamwork skills on Engineers' task performance?
- How Achievement Motivation skills affects Engineers' task performance?
- Is there any influence of Conflict Management skills on Engineers' task performance?

OBJECTIVES

This study aims to find the impact of soft skills on the task performance of the engineers in manufacturing industries of Pakistan. Following are the objectives of this research:

- To understand Communication skills influence on Engineers' task performance
- To recognize the effect of Leadership skills on Engineers' task performance
- To comprehend Teamwork skills effect on Engineers' task performance
- To understand the influence of Achievement Motivation skills on Engineers' task performance
- To know the effect of Conflict Management skills on Engineers' task performance

SIGNIFICANCE OF THE STUDY

Soft skills still need better understanding in Pakistan. Majority of the people in Pakistan are unaware of different soft skills and the effect of these soft skills on the performance of the engineers. In daily work routine, engineers have to deal with lots of people for the completion of the project. Nowadays, employees are mostly hired based on grades in different industries of Pakistan. This study aims to explain about the different soft skills. The results of this study will be very beneficial for the manufacturing industries as well as other industries of Pakistan. Results of this study will tell about the impact of soft skills on the engineers' performance and which soft skill is more important for the better task performance. Through this study engineers and managers will get to know that on which soft skill they must focus for their better performance. Recruiters will also get to know from this study that while taking the interviews, only technical skills doesn't matter, and they also have to focus on the soft skills of the interviewee.

CHAPTER 2: LITERATURE REVIEW

For decades' employers are complaining about employees lacking in non-technical skills, especially communication [5]. This problem doesn't occur in a specific country but in every developing country. German Engineering Association suggested that there should be 20% part of the non-technical skills in the engineering courses [5]. According to him the graduates should be aware of communication skills, leadership skills, should have cultural awareness, and should be able to work in teams.

An engineer was always expected to deal with the technical issues but as time passed it was observed that a wide range of non-technical skills are also required from an engineer for an organization to be successful [1]. An organization depends on engineers to get the technical work done and management for all the managerial decisions. But in professional life, engineers must make not only technical decisions but also have to make the non-technical as well [19]. When the engineers have unification among the hard skills and soft skills, he can serve the organization in a better way.

Soft skills and Hard skills

Hard skills or technical skills are the skills, technical competence or expertise related to the field of the employee or worker, whether the field is engineering or technical [3]. These skills can be developed through both formal and informal ways. Professional qualification is also way to learn the technical skills [14]. For getting a job, technical skills are needed i.e. knowledge and technical expertise [2].

Hard skills or technical involve the skills in the technical category, handling with administrative skills and data [9]. Employers want the new workers to have technical skills as

well as the non-technical skills [2]. Hysong (2008) [20] posited that technical skills are the common criteria used to elevate technical professionals into management. He also posited that the need for hard skills or technical skills lessen as a manager ascend to advanced position of management but still, for first-tier managers, technical skills are still crucial as they have to guide important functions to their subordinates and to find out the soundness of their decisions.

Non-technical skills or soft skills [4] differ context wise and nations wise. It may be considered technical skill in one area and non-technical skill in the other area [5], [9]. According to him Cultural awareness training might be important for a chemist, but for human resource management it is necessary.

Table 1: Soft Skills [5]

Creativity	*Communication Skills*
Sociability	Negotiation Skills
Teamwork Capability	Critical and Structured Thinking
Responsibility	Cultural Awareness
Time Management	Self-Management
Problem Solving Skills	Conflict Management
Project Management	Honesty/Integrity
Patience	Leadership

Soft skills include characteristics that are common to all kind of jobs [3]. Some of the examples of non-technical skills discussed by Schulz (2008) are listed in table 1. But these examples are not complete. For example, emotional intelligence, flexibility, passion, persistence or imagination can also be added.

Communication, achievement motivation, teamwork, leadership and conflict management are the most important soft skills highlighted in previous studies are shown in table 2. Frequency method was used for the selection of these soft skills.

Communication Skills:

Communication is one of the most important skill in the list of non-technical skills and most of the jobs require this skill. Communication has remained cause of many disasters and tragedies in the health care, financial industry and wider environment during last few years [2].

Table 2: Soft skills in literature

Soft Skills	Literatures												
	1	2	3	4	5	6	7	8	9	10	11	12	*n*
Effective communication	✓	✓			✓		✓	✓	✓	✓	✓	✓	9
Leadership	✓	✓			✓	✓			✓	✓		✓	8
Achievement motivation	✓	✓			✓		✓		✓	✓	✓	✓	8
Teamwork and collaboration	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	11
Conflict management	✓	✓	✓	✓		✓			✓		✓	✓	8
Self-control	✓		✓			✓		✓	✓				5
Adaptivity	✓		✓	✓	✓	✓							5
Social awareness		✓	✓			✓		✓					4
Negotiation	✓	✓								✓	✓		4
Influencing	✓		✓						✓				3
Building trust	✓					✓				✓			3
Empathy	✓		✓			✓							3

Cultural awareness	✓								✓				2
Perceived role and responsibilities	✓										✓		2
Coordination	✓										✓		2
Delegation	✓										✓		2
Notes: 1. IPMA (2006); 2. PMI (2008); 3. Boyatzis (2011); 4. Ahadzie *et al.* (2008); 5. Dainty *et al.* (2004); 6. Golemon *et al.* (2004); 7. Musa *et al.* (2012); 8. Zaharim *et al.* (2012); 9. Fisher (2011); 10. Edum-Fotwe and McCaffer (2000); 11. Belassi and Tukel (1996); 12. Hyväri (2006)													

Nowadays, it is the most important skill in world-wide business environment and it is supposed that everyone has this skill, but this assumption is wrong [2]. The engineers should have the ability to communicate effectively, clearly and with confidence [6]. As engineers gain technical knowledge throughout their degree but not everyone they work with has the same understanding of technical knowledge. So, while working in a team effective communication is the basic need. As mentioned by Bambacas & Patrickson (2009) [21], if someone have the best idea in the universe even that idea can also fail if he does not communicate it. So, managers as well as engineers need good communication skills to become successful in their professional life. Communication skills include listening; one should not only speak what he wants others to do. But he should also listen to what others want to say. If others won't be listened the communication process will fail, and the real message will be ignored. Non-verbal communication; the way one uses his hand gestures, making eye contact, body language and tone and pitch of his voice all together make a message he wants to convey. Written skills; if the written reports are not clear and not organized it would be a great problem for other team members to perform their tasks [22]. Concise message; not talking too much that the real message gets lose in the conversation. Just using a few words to convey the message. Open mindedness; one should be friendly and open minded to listens to what other want to say. Clarity; one should convey his message

directly and clearly, so others can easily understand it. It also includes presentation skills, conflict resolution, giving feedback, receiving feedback and handling objections [9]. As engineers has to solve great challenges and deal with so many other people and departments while working in a team they need technical skills to perform their tasks and also the ability to communicate their thoughts and their ideas [22].

Based on above knowledge, it is hypothesized that communication skills of engineers will have some relationship with task performance which will ultimately contribute towards the organizational success.

H1: Engineers' better communication skills will lead to better task performance.

Leadership Skills:

Leadership skill involves the ability to supervise a team and ability to lead them [8]. This skill is also important to manage projects, lead in discussions, make decisions, motivate and support others in team and manage their performance [6], [8]. Leadership is classified as self-leading, group leading and leading the organization [23]. In most of the jobs, engineers have to lead a team and manage projects. So, they must have excellent leadership skills to take on their responsibilities and perform them efficiently and inspire other members as well. A leadership skill involves motivation; leaders should motivate their team to work hard and achieve organizational goals. A true leader always mentor and build self-esteem of his team members. Delegation; a leader should not take on every task rather he should assign the tasks in whole team according to team members specialties. If a leader tries to take on every task he needs to struggle a lot to get work done [24]. Commitment; a leader should follow what he agreed to do and should fulfill his promises which he makes to staff. This way employees

will get a positive and respectable image of their leader. Planning and organizing; a leader should plan for achieving organizational goals and then try to follow that plan. Coaching; a leader must have the capability to coach and mentor his team members. Leadership also includes communication; a leader must communicate his ideas and organizational goals and his strategies about how he has divided the tasks to achieve these goals [25]. It also involves negotiation, critical thinking, problem solving, risk assessment, and making decisions even when uncertainty is associated with it [25]. Good leaders examine the strengths and weaknesses of his organization to assess the current situation of an organization and then shape their strategies to get successful in the marketplace.

Based on above knowledge, it is hypothesized that leadership skills of engineers will have some relationship with task performance which will ultimately contribute towards the organizational success.

H2: Engineers' better leadership skills will lead to better task performance.

Achievement Motivation Skills:

Achievement motivation is usually theorized as a person's inherent quality that motives him or her to face challenges in order to achieve success. These qualities drive a person to set difficult yet achievable goals, indulge ambiguity and experience uncertainties, find new and innovative solutions for the problems, calculate the risks, and accept responsibility personally for the results of his or her behaviors [26]. The internal motivation factor always triggers the motivation of employee to give his best and put in place the most promising effort for the success of the organization. Managers who acts aggressively, micromanages, or make inappropriate comments have weak soft skills and there are more

chances that their employees will not respond to them in positive manner [27]. In organizations, success stories of people continue, who know how to master the non-technical skills because of their much better employment opportunities and those stories becomes source of inspiration and motivation for other employees in that organization [5]. Technical skills alone are not enough to be on the top priority nowadays when it comes to job promotion, therefore employers get motivation to polish their non-technical skills as well [2].

Based on above knowledge, it is hypothesized that achievement motivation skills of engineers will have some relationship with task performance which will ultimately contribute towards the organizational success.

H3: Engineers' better achievement motivation skills will lead to better task performance.

Teamwork Skills:

Teamwork is defined as the capability of a person to work helpfully with others in a task [28]. This means respecting others, contributing to discussions, negotiating/persuading and co-operating with others. "Project Management Body of Knowledge" states that for project success, teamwork is a very critical factor and one of the foremost responsibilities of a project manager is to develop effective project team [12]. Although teamwork is documented as an essential factor in success of a project, teamwork skills are generally taken for granted. Many people assume that people are effective at working in a team, so they pay little attention towards learning these skills or teaching them. Teamwork skills are defined as the capability to resolve conflict, plan and task coordination, good communication, ability to set goals, collaborative problem-solving skills and control

performance, and being able to get and give feedback effectively [28]. A person with good teamwork skills will work with diverse teams, will build cooperative affiliation with colleagues and clients, and will also negotiate and manage the conflicts [29].

Based on above knowledge, it is hypothesized that teamwork skills of engineers will have some relationship with task performance which will ultimately contribute towards the organizational success.

H4: Engineers' better teamwork skills will lead to better task performance.

Conflict Management Skills:

Soft skills are fundamentally devised from unrevealed but interconnected emotional intelligence [14], [30]. Emotional competence framework made up of four clusters was devised by Goleman (1998) [31] which were relationship management (developing others, communication, leadership, conflict management, influence, change catalyst and building bonds); social awareness (service orientation, organizational awareness and empathy); self-awareness (self-confidence, emotional self-awareness and accurate self-assessment) and self-management (adaptability, trustworthiness, achievement, self-control, conscientiousness, initiative and drive). The first two groups are form the social skill element. and the last two come under the personal skill umbrella. Conflict management is resolving and negotiating disagreements [32]. Cognitive abilities have control of general tactics for learning, capacity to distinguish between tasks, thinking and problem-solving, awareness of how a person learns and tackles tasks [28]. Golemon et al. (2004) stated that for all level professions, emotional intelligence is twice as important as hard skills. Their emotional intelligence model, which can be gathered through learning and could result in magnificent

workplace performance, is a combination of emotional competencies and personality traits including social competencies and self-awareness. Similarly, different scopes of project managers' emotional competencies defined by Zuo, Zhao, Nguyen, Ma and Gao (2018) are emotional, social and cognitive intelligence.

Based on above knowledge, it is hypothesized that cognitive skills and management skills of engineers will have some relationship with task performance which will ultimately contribute towards the organizational success.

H5: Engineers' better conflict management skills will lead to better task performance.

Task Performance

Despite the growing interest in increasing the task performance of an employee, very less empirical attention has been given to the soft skills. According to a study, 75% of job success in the long-term depends on non-technical skills and 25% depends on hard skills or technical skills and another research indicates that technical skills or hard skills only contributes 15% to a person's success and non-technical skills or soft skills contributes 85% towards one's success [2]. Task performance is defined as the efficacy or successfulness with which the job holder execute activities that contributes toward the company's technical principals, which can be directly executing a portion of its technological operation, or by indirectly delivering the company with services or materials needed [16]. Task performance is the accomplishment of allocated tasks for attaining organization's goal [33]. It can also be defined as how effectively an employee is completing the expected related work activities [16]. Positive relationship has been seen between the task related communication and the

performance of new engineers [34]. When it comes to emotional intelligence and task performance, positive relationship is seen [35].

Theoretical Framework

This study directs the attention on the non-technical issues faced by the engineers and the impact of those non-technical issues on the task performance of the engineer. The understanding of non-technical issues is as essential as the understanding of technical issues for increasing the performance of the engineer. For this purpose, hypotheses are developed in such a way, that they will show the impact of non-technical skills on the task performance of the engineer.

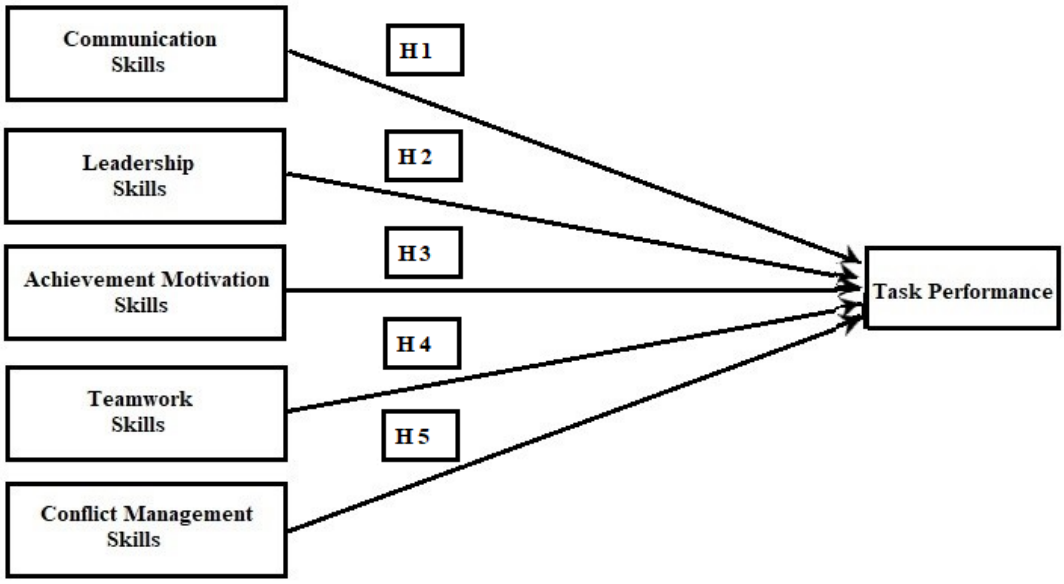


Figure 1: Schematic Diagram of Theoretical Framework

In this study, task performance is the dependent variable and soft skills are the independent variables. Soft skills are the important skills required for the better task performance. Soft skills selected for this study are leadership skills, communication skills, achievement motivation skills, conflict management skills, teamwork skills. A hypothesis is taken against each non-technical skill. Soft skills impact on task performance of the engineer is also measured in this study and hypothesis is also selected for this purpose. Further items of task performance and soft skills will also be measured in this research in the form of questions.

CHAPTER 3: METHODOLOGY

Research Design:

Quantitative research technique was used to conduct this research. Instrument was adopted from Lee (1994) and Project Manager Competency Development (PMCD) Framework established by PMI [34], [36]. Deductive research approach was used in this study in which a hypothesis is formed based on existing theory, then a research strategy is formed to test that hypothesis. Questionnaire survey method was used to get the right amount of data. It is one of the most common used methods for data collection using standardized measurement tools.

Sample Size:

According to Pakistan Engineering Council (PEC), total number of engineers in Pakistan are 260,000 including 239,000 S and 17,423 females [37]. Data of respondents were only taken from major cities, Lahore, Islamabad and Rawalpindi. For this Power and Precision tool was used which is an experimental tool to find the sample size. Fisher zero Approximation was used with the help of this software and 5% value of statistical level of significance (α) was selected. Correlation coefficient value (r) retrieved from previous studies was 0.30, therefore it is used to find the size of the sample. Sample size of 110 was determined through this. Report which is generated by the software is given in the appendices.

Sample size of 110-150 engineers was targeted for gathering the data. All the respondents were engineers. In addition, they were full time or part time employee with job experience of 2 years or more. Questionnaire filled by self-employed person was not considered. The reason for not considering self-employed person's information was to gather

unbiased reliable data. The respondents were provided with a paper-based questionnaire to get the information from them. Online Google survey was also used to gather data. Any sort of personal information was not asked from them.

Sampling Technique:

Cluster and random stratified sampling technique were used in this study. In cluster sampling population is divided into separate groups called clusters. For this, samples were taken from Lahore, Islamabad and Rawalpindi. A stratified random sample is a population sample which needs the population to be separated into smaller groups, called 'strata'. From each stratum or group, random samples can be taken. Strata were made based on their fields i.e. electronics manufacturing industries.

Targeted Population:

The population of this study consisted of all the engineer participants working in manufacturing industries of Pakistan. Mechanical, Electrical, Computer Science and Mechatronics engineers were mainly focused while collection of data. Data was taken from only those engineers who were registered with the Pakistan Engineering Council (PEC). Email of registered engineers was also available on the website of Pakistan Engineering Council.

Data Collection Methodology:

Samples were distributed randomly among the engineers and some questionnaires were also shared through internet to the targeted population and their response were taken. Total 450 questionnaires were distributed among the targeted population and 154 responses were collected resulting in 34% response rate and out of them only 145 responses were useful yielding in 32% response rate.

The questionnaire consisted of two sections. First section was demographic section in which profile of the respondents was obtained. Section 2 presented soft skills variables and variables of task performance with their descriptions[14]. According to the principle of "Seven plus or minus two" [38], scale of five was adopted through which users conveniently judge. Five-point Likert scale, shown in Table 3, was used to ask the respondents to rate the significance of each variable (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree).

Table 3: Scale used in the questionnaire

Options	Value
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

Data Analysis:

Analysis of data was done through software. SPSS (Statistical Package for the Social Sciences) was used for this purpose. SPSS is used for the statistical analysis of the data. To check the reliability and validity of the data, different tests were applied on dependent and independent variables. Reliability and Validity of the data was checked through EFA. As the data collection is Likert Scale so following tests were performed:

- Reliability Analysis
- Factor Analysis
- Normality Test

- Correlation
- Simple Linear Regression

Thus, the development of the questionnaire was done through the assistance of comprehensive literature review. As discussed in above sections, non-technical skills of engineers are measured in different dimensions like leadership skills, communication skills, teamwork skills, conflict management skills etc. Different variables and their items proposed by Lee (1994) and Project Manager Competency Development (PMCD) Framework established by PMI [34], [36] are adopted in this study. None of the questions were reverse-coded and it was also considered that all the respondents of this research were educated, and they could understand English easily, so no translation was done on the instrument.

First of all, reliability analysis was done on the data. Cronbach's alpha was observed through this. Items of some variables were excluded to get the acceptable value of Cronbach's alpha, so that the reliability can be proved. It is used to find the internal uniformity of the research. It also tells about the reliability of the instrument used. After reliability test, validity test was done to find the validity of the questionnaire. It is used to test the proposed hypothesis that there exists a relationship between the variables and their constructs or not. It is a statistical procedure through which at the same time we can test different hypothesis. EFA was run and factor loadings of the questions were observed. For the significance of the questionnaire, KMO and Bartlett's Test of Sphericity was also run.

Normality test was also run on the data and histogram, stem-and-leaf plots, Q-Q plots and boxplots were also observed. It is used to find the outliers in the data and to see the results of the responses so that any irregularity or wrong data can be removed from the analysis. It also tells the pattern of the responses. The correlations between the dependent and independent variables was found by running the Correlation test in SPSS. Strength of

relationship between the variables is determined by Correlation analysis. The result of this analysis shows values between +1 and -1. Value of +1 indicates to the positive linear relation between the variables and -1 shows the linear negative or inverse relationship between the variables.

Regression test was also run on the data for further confirmation of the results. In regression analysis summary of the model is also shown. Regression analysis is done to find that how much dependent variable is influenced by one or more independent variables. It also tells about the significance of the model and tells if there is a null hypothesis also present.

CHAPTER 4: RESULTS

The data was analyzed by version 24 of SPSS (Statistical Package for the Social Sciences). All the tests were conducted on SPSS and it was also made sure that no incomplete or invalid entry is present in the data.

Descriptive Statistics

Descriptive statistics are shown in Table 4 illustrating standard deviations (SD) and means of all six dimensions and two under study demographic variables i.e. age and experience. Maximum age of the respondents was observed to be 46 and minimum was 23 and Mean age was observed to be 27. As minimum experience required for this study was 2 years so it can be seen, and maximum experience of respondents were 27 years. Mean experience of the respondents of this study is 4 year.

Table 4: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age	23	46	27.21	3.816				
Experience	2	27	4.26	3.855				
Communication Skills	2.40	5.00	3.9366	.60677	-.181	.201	-.403	.400
Leadership Skills	2.40	5.00	3.9655	.61071	-.219	.201	-.205	.400
Conflict Management Skills	2.20	5.00	3.8979	.66002	-.309	.201	-.428	.400
Achievement Motivation Skills	2.40	5.00	3.9793	.59054	-.240	.201	-.253	.400
Teamwork Skills	2.60	5.00	4.1421	.59578	-.354	.201	-.385	.400
Task Performance	2.17	5.00	3.9161	.62735	-.351	.201	-.337	.400

Gender of the respondents of our study is shown in table 5. Male respondents were 93.1% in our study and female respondents were 6.9%.

Table 5: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	135	93.1	93.1	93.1
	Female	10	6.9	6.9	100.0
	Total	145	100.0	100.0	

Qualification of the respondents is shown in Table 6. 81.4% of the respondents had bachelor's degree, 17.2% had master's degree and only 1.4% respondents had PhD degree.

Table 6: Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's	118	81.4	81.4	81.4
	Master's	25	17.2	17.2	98.6
	PhD	2	1.4	1.4	100.0
	Total	145	100.0	100.0	

Designation of the respondents was also asked while collecting the data. Respondents of this study were senior engineers, team leaders, assistant managers, managers, project managers and assistant directors. All respondents had working experience of more than 2 years. Table 7 shows the frequencies of their designations.

Table 7: Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Senior Engineer	122	84.1	84.1	84.1
	Team Lead	4	2.8	2.8	86.9
	Assistant Manager	7	4.8	4.8	91.7
	Manager	7	4.8	4.8	96.6
	Project Manager	4	2.8	2.8	99.3
	Assistant Director	1	.7	.7	100.0
	Total	145	100.0	100.0	

Reliability Analysis

Reliability analysis was done for each variable and Cronbach's Alpha for each variable was measured through the SPSS software. It is used to measure the uniformity or consistency of data. Value of Cronbach's Alpha should be equal to or greater than 0.7 to be acceptable.

Table 8 shows reliability statics of Communication Skills. There were 6 items selected for Communication Skills. Communication skill's value was observed to be below that 0.7 so one item i.e. CS3 was deleted because that item was probably confusing for the respondents. The Cronbach's Alpha value of five items of Communication skills was 0.724. This shows that the questions of this variable were reliable to use for the study.

Table 8: Reliability Statics

Variable	Cronbach's Alpha	Number of Items
Communication Skills	.724	5
Leadership Skills	.717	5
Conflict Management Skills	.754	5
Achievement Motivation Skills	.713	5
Teamwork Skills	.804	5
Task Performance	.824	7

Table 8 also shows reliability statics of Leadership Skills. There were 5 items selected for Leadership Skills. The Cronbach's Alpha value of 5 items of Leadership skills was 0.718. This shows that the questions of this variable were reliable to use for the study. Table 8 also shows reliability statics of Conflict Management Skills. There were 5 items selected for Conflict Management Skills. The Cronbach's Alpha value of 5 items of Conflict Management skills was 0.753. This shows that the questions of this variable were reliable to use for the study.

Table 8 also shows reliability statics of Achievement Motivation Skills. There were 5 items selected for Achievement Motivation Skills. The Cronbach's Alpha value of 5 items of Achievement Motivation skills was 0.701. This shows that the questions of this variable were reliable to use for the study. Table 8 also shows reliability statics of Teamwork Skills. There were 5 items selected for Teamwork Skills. The Cronbach's Alpha value of 5 items of Teamwork skills was 0.801. This shows that the questions of this variable were reliable to use for the study. Table 8 shows reliability statics of Task Performance. There were 5 items

selected for Task Performance. The Cronbach's Alpha value of 7 items of Task Performance was 0.822. This shows that the questions of this variable were reliable to use for the study.

Values of Cronbach's alpha for Communication Skills, Leadership Skills, Conflict Management Skills, Achievement Motivation Skills, Teamwork Skills and Task Performance were 0.724, 0.718, 0.753, 0,701, 0.801 and 0.822 respectively. All values were within the range, which confirms the reliability of the scale used.

Validity Test

EFA test was run through SPSS to find the validity of the questionnaire and the model. Factor loadings of the items and variables were observed, and AVE values were also examined. KMO (Kaiser-Meyer-Olkin) and Bartlett's test were also run. Kaiser (1974) [39] recommends that KMO value should be greater than 0.5 and if the value is below 0.5, then sample size should be increased or some variables should be excluded. KMO value between 0.5 and 0.7 are moderate, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great, and values greater than 0.9 are excellent [40]. Bartlett's Test of Sphericity should also be statistically significant ($p < 0.05$) to prove the validity of the questionnaire [41]. Moreover, Chi-Square value divided by df should also be greater than 3. Principal Component Analysis (PCA) was done with Eigenvalues greater than 1 and Varimax rotation was selected as there were only independent and dependent variables present in this study. Table 9 shows the KMO and Bartlett's test values of each of the variable selected in this study.

Table 9: KMO and Bartlett's Test of Sphericity of variables

Variable	*Kaiser-Meyer-Olkin Measure of Sampling Adequacy*	*Bartlett's Test of Sphericity*		
		Chi-Square	**df**	**Sig.**
Communication Skills	0.748	131.75	10	0.000
Leadership Skills	0.751	128.85	10	0.000
Conflict Management Skills	0.763	166.20	10	0.000
Achievement Motivation Skills	0.776	120.12	10	0.000
Teamwork Skills	0.833	201.17	10	0.000
Task Performance	0.776	262.96	15	0.000

Factor loadings were also calculated and only factor loadings that are greater than 0.4 represents meaningful values [42]. Table 10 shows the factor loading for Task Performance. Factor loading values for TP3, TP4, TP5, TP6 and TP7 were below 0.4, so the item with minimum factor loading was removed i.e. TP7 (0.149). After removing that item from the analysis, factor loadings got in acceptable range as shown in table 10.

Table 10: Initial Factor Loadings of Task Performance

	Component	
	1	2
TP1	.773	.168
TP2	.768	.122
TP3	.778	.256
TP4	.634	.373
TP5	.242	.742
TP6	.251	.817
TP7	.149	.825

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 11: Corrected Factor Loading of Task Performance

	Component
	1
TP1	.726
TP2	.668
TP3	.783
TP4	.748
TP5	.667
TP6	.682

Table 18 in the appendices shows the factor loading results of all the selected items of the questionnaire. TP7 was removed because of factor loading less than 0.4, and the factor loadings for all other items ranges between 0.4 to 0.8 indicating the acceptable value of validity.

Exploratory Factor Analysis of complete model was also done. Average Variance Extracted (AVE) was also checked whose value should be greater than 0.5 to prove the convergence validity of the model [43]. Table 12 shows the AVE values of the model.

Table 12: Average Values Extracted (AVE)

	Initial	Extraction
Communication Skills	1.000	.585
Leadership Skills	1.000	.662
Conflict Management Skills	1.000	.718
Achievement Motivation Skills	1.000	.607

Teamwork Skills	1.000	.628
Task Performance	1.000	.560

Extraction Method: Principal Component Analysis.

Table 13 shows the KMO and Bartlett's Test of the model and table 14 shows the factor loading of the complete model. KMO value is 0.898 which shows that strong correlation is present between the variables of the model.

Table 13: KMO and Bartlett's Test of complete model

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.898
Bartlett's Test of Sphericity	Approx. Chi-Square	393.618
	df	15
	Sig.	.000

Table 14: Factor Loadings of complete model

	Component
	1
Communication Skills	.765
Leadership Skills	.814
Conflict Management Skills	.848
Achievement Motivation Skills	.779
Teamwork Skills	.793
Task Performance	.749

Extraction Method: Principal Component Analysis.

Normality Test

Normality test was run through SPSS to find that how much is the data scattered and are there any outliers or any irregularity in the data. Boxplots, histograms, Stem-and-Leaf plot and Normal Q-Q plots were some of the plots which were observed in the normality test.

Skewness and Kurtosis was also calculated in this test. Values of Skewness and Kurtosis is also explained in the descriptive section above. Figure 2 shows the histogram of Communication skills.

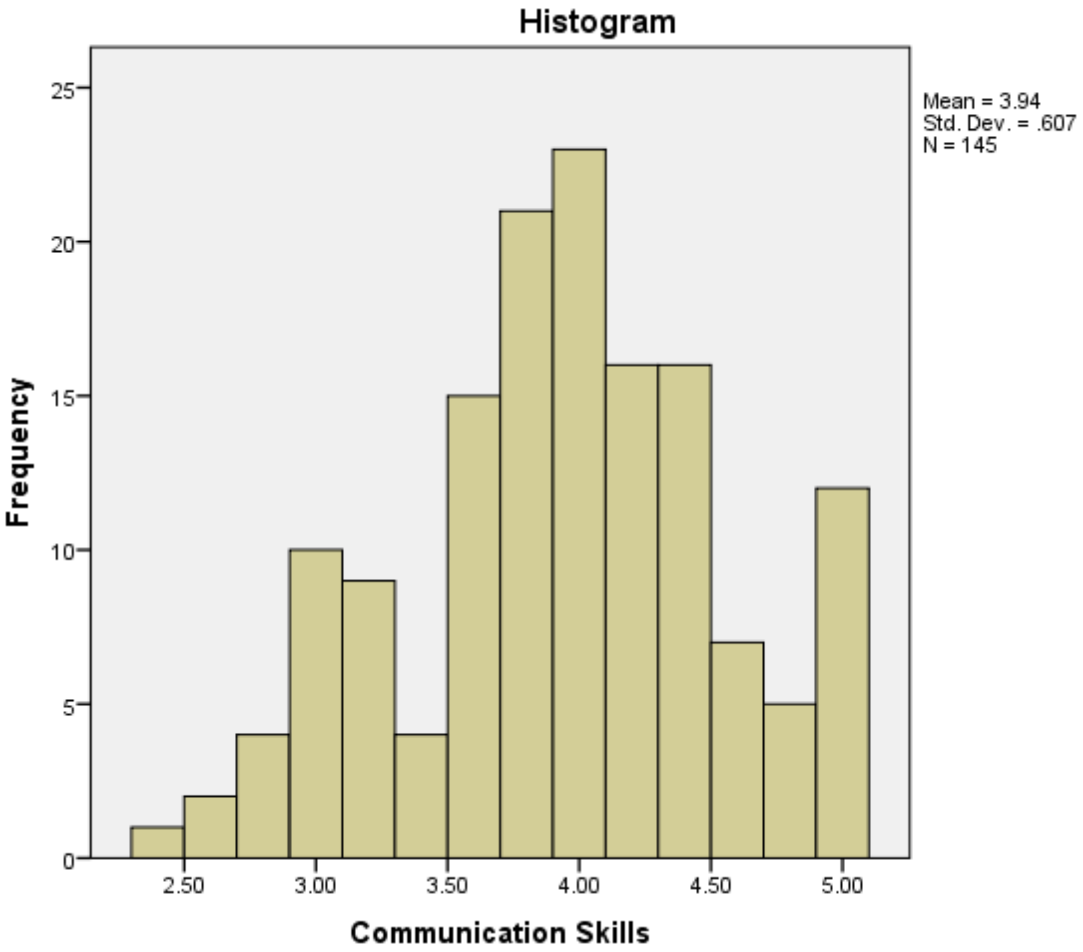
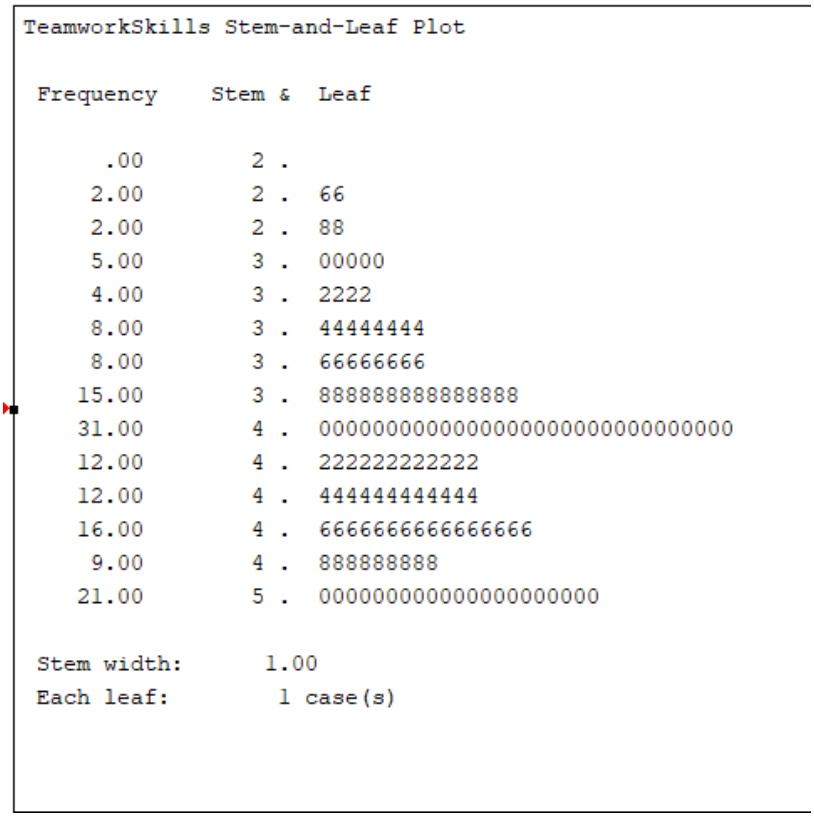


Figure 2: Histogram of Communication Skills

The Skewness and Kurtosis value can also be observed through histogram. Value of Standard Error divided by Statistical value of skewness and kurtosis should be less than 1.96 when the sample size is less than 200 and not more than 2.58 when the data exceeds 200 samples [41]. From table 4, standard error value of skewness of communication skills is 0.201 and statistical value of skewness is -0.181. Value of Standard Error divided by Statistical value of skewness is equal to -1.11, which is less than 1.96.

Stem-and-leaf plot of Teamwork Skills is shown in figure 3. It shows that what are the frequencies of answers of the respondents. Through this graphical form of quantitative data can be seen, which is also similar to the histogram but is better at assisting in envisioning the shape of the distribution.



TeamworkSkills Stem-and-Leaf Plot

Frequency	Stem &	Leaf
.00	2 .	
2.00	2 .	66
2.00	2 .	88
5.00	3 .	00000
4.00	3 .	2222
8.00	3 .	44444444
8.00	3 .	66666666
15.00	3 .	888888888888888
31.00	4 .	0000000000000000000000000000000
12.00	4 .	222222222222
12.00	4 .	444444444444
16.00	4 .	6666666666666666
9.00	4 .	888888888
21.00	5 .	000000000000000000000

Stem width: 1.00
Each leaf: 1 case(s)

Figure 3: Stem-and-Leaf Plot of Teamwork Skills

The Q-Q plot or the quantile-quantile plot is a probability plot, which is graphical form of probability distribution of the quantities. Figure 4 shows the Q-Q plot of Task Performance.

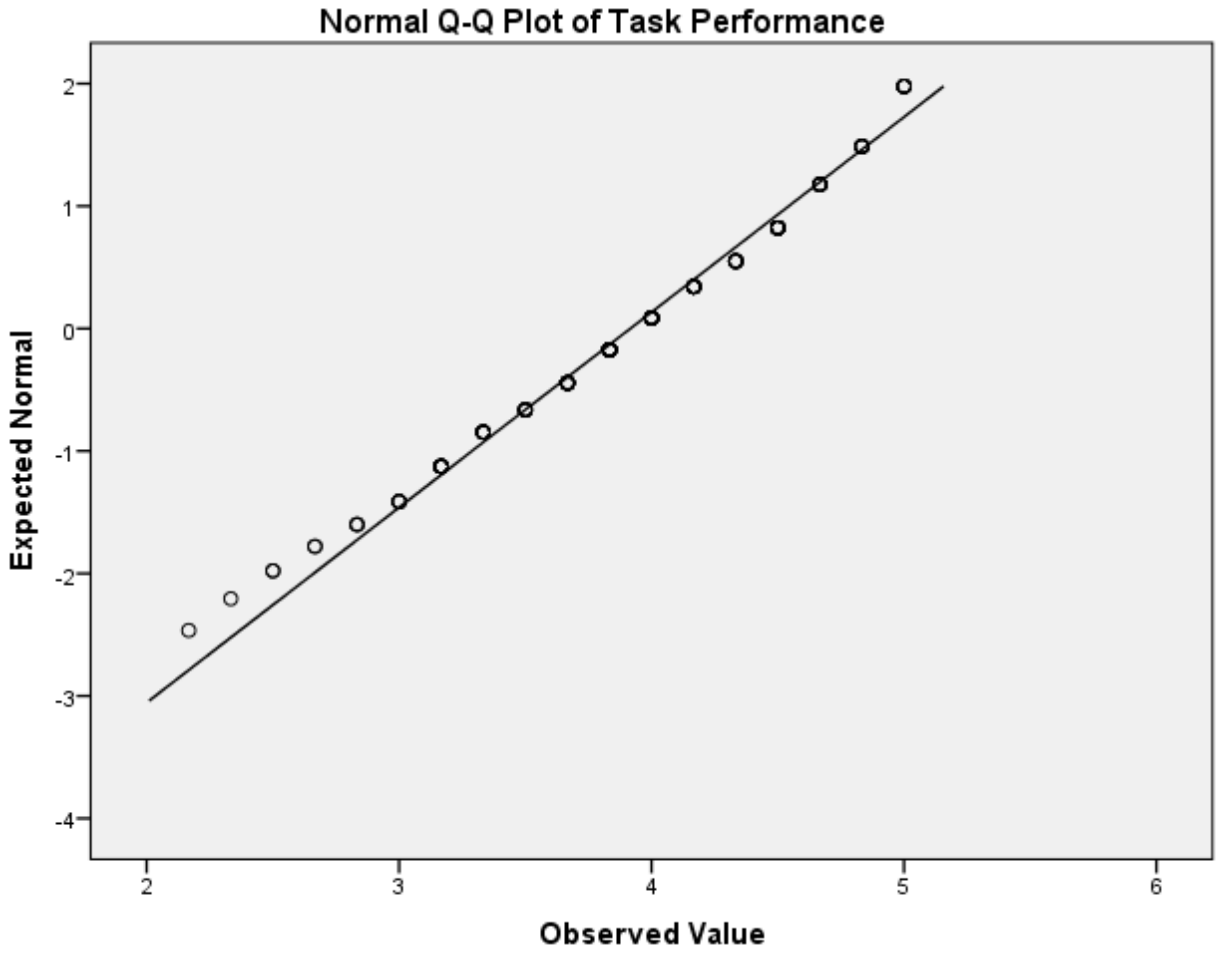


Figure 4: Q-Q Plot of Task Performance

Boxplot of the data was also observed for each variable. Figure 5 shows the boxplot of Task Performance. The middle line in the box shows the medians of the values.

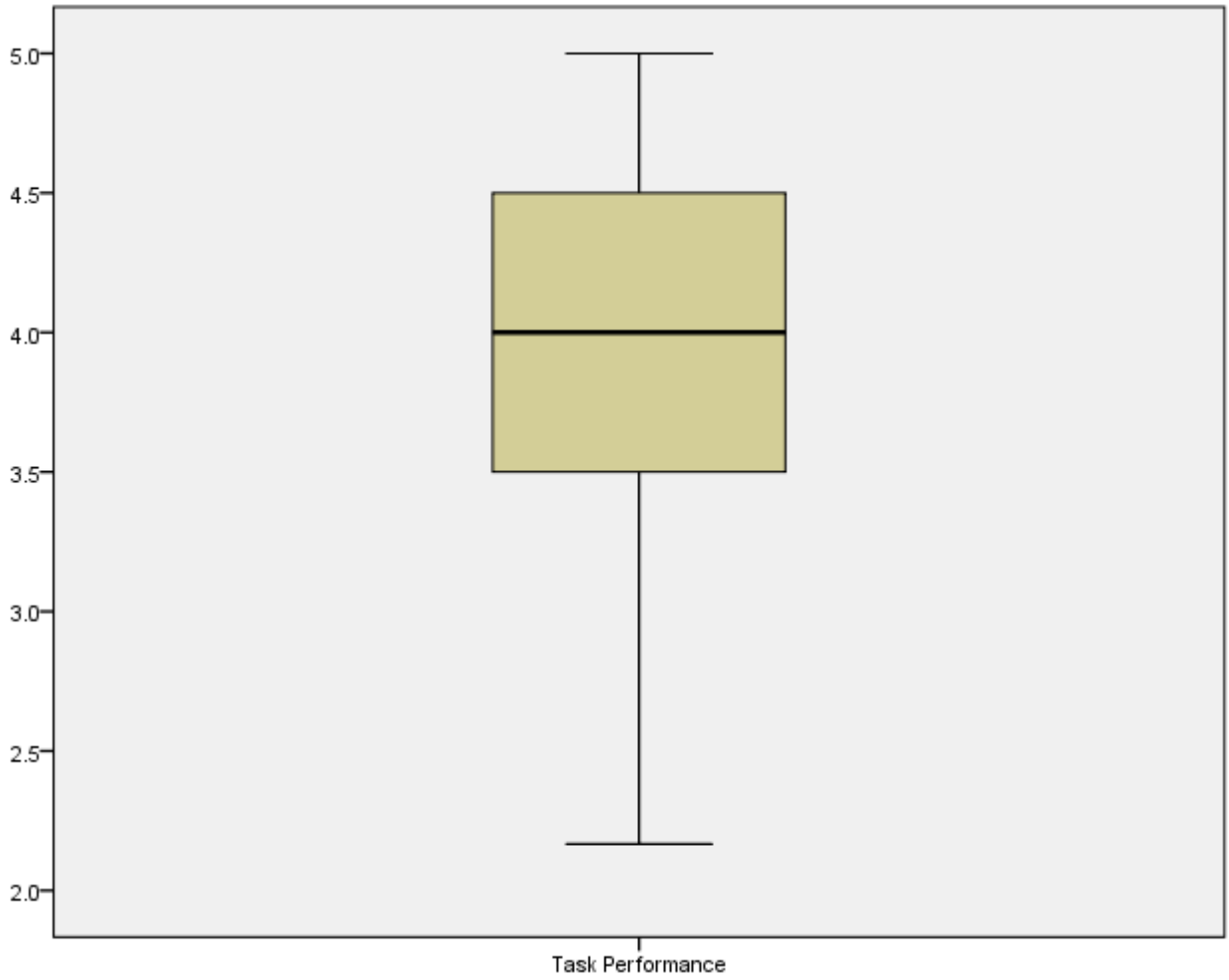


Figure 5: Boxplot of Task Performance

Correlation

Correlation is used to find the dependence of variables on one another. Correlation values ranges between -1 and +1. Correlation value of -1 shows the reverse connection between the variables i.e. if there is an increase in one variable, the other variable will decrease and +1 shows a direct connection between the variables i.e. if there is an increase in one variable, the other variable will increase too. Whereas 0 shows that there is no linear relationship present between the variables. If the Correlation coefficient's value lies between 0 to ±0.3, then there lies a weak relationship. If the value is greater than 0.3 and less than 0.7,

then there exists a moderate direct relationship between the selected variables. When the value of Correlation coefficient is greater than 0.7 and less than 1, then there exists a strong relationship between then variables [44]. But according to Field (2013) [41], correlation value ranging between ±0.6 and ±0.75 indicates a direct or indirect strong relationship and in values that are greater than 0.75 or lesser than -0.75, there may exist a mediator or moderator between the variables.

Table 15: Correlations

	Mean	S.D	Communication Skills	Leadership Skills	Conflict Management Skills	Achievement Motivation Skills	Teamwork Skills	Task Performance
Communication Skills	3.93	.60	*0.724*					
Leadership Skills	3.96	.61	.562**	*0.718*				
Conflict Management Skills	3.89	.66	.594**	.639**	*0.753*			
Achievement Motivation Skills	3.97	.59	.504**	.521**	.593**	*0.701*		
Teamwork Skills	4.14	.59	.488**	.622**	.594**	.567**	*0.801*	
Task Performance	3.91	.62	.495**	.502**	.578**	.519**	.485**	*0.822*

**. Correlation is significant at the 0.01 level (1-tailed). Cronbach's alpha is reported on diagonal in italic

In our study, affiliation between the variables was observed through Pearson's Correlation. Table 15 shows the correlation between our variables. It was found out that the correlation between Leadership Skills and Communication Skills was statistically significant and moderately correlated ($r = 0.562$; $p < 0.01$). Conflict Management Skills and Communication Skills was statistically significant and moderately correlated ($r = 0.594$; $p <$

0.01). The value of correlation between Conflict Management Skills and Leadership Skills were also statistically significant and moderately correlated ($r = 0.639$; $p < 0.01$).

Achievement Motivation Skills and Communication Skills were statistically significant and correlated ($r = 0.504$; $p < 0.01$). This indicates a moderate correlation between them. Achievement Motivation Skills and Leadership Skills were also statistically significant and moderately correlated ($r = 0.521$; $p < 0.01$). The value of correlation between Achievement Motivation Skills and Conflict Management Skills was statistically significant and moderately correlated ($r = 0.593$; $p < 0.01$). Teamwork Skills and Communication Skills were statistically significant and moderately correlated ($r = 0.488$; $p < 0.01$). Teamwork Skills and Leadership Skills were statistically significant and moderately correlated ($r = 0.622$; $p < 0.01$). Teamwork Skills and Conflict Management Skills were also statistically significant and moderately correlated ($r = 0.594$; $p < 0.01$).

Teamwork Skills and Achievement Motivation Skills were statistically significant and moderately correlated ($r = 0.567$; $p < 0.01$). Task Performance and Communication Skills were statistically significant and moderately correlated ($r = 0.495$; $p < 0.01$) which proves the hypothesis H1 that is; Engineers' better communication skills will lead to better performance.

Task Performance and Leadership Skills were statistically significant and moderately correlated ($r = 0.502$; $p < 0.01$) which proves the hypothesis H2 that is; Engineers' better leadership skills will lead to better performance.

Task Performance and Conflict Management Skills were statistically significant and moderately correlated ($r = 0.578$; $p < 0.01$) which proves the hypothesis H5 that is; Engineers' better conflict management skills will lead to better performance.

Task Performance and Achievement Motivation Skills were statistically significant and moderately correlated ($r = 0.519$; $p < 0.01$) which proves the hypothesis H3 that is; Engineers' better achievement motivation skills will lead to better performance.

Task Performance and Teamwork Skills were statistically significant and moderately correlated ($r = 0.485$; $p < 0.01$) which proves the hypothesis H4 that is; Engineers' better teamwork skills will lead to better performance. As all the soft skills lead to better task performance therefore this study also confirms that Engineers' non-technical skills will lead to better performance.

Regression

For the further confirmation of the results, regression analysis was done. For predicting the values of one variable (dependent variable) from one or more variables (independent variables), regression analysis is used [41]. It is also used to prove the causality between the dependent variable and independent variables [45]. Simple linear regression and multiple regression test was run for our model. Table 15 shows the summary of the model. R square value, also known as the model fit value, was observed to be 0.394 which means that 39.4% change in Task Performance can be because of the soft skills. By increasing the soft skills of engineers, task performance will also increase. By controlling three variables significance of the model was also proved. Its values are also shown in the appendices. This means that task performance is only 39.4% dependent on the selected soft skills and there must be also some other soft skills on which task performance is dependent.

Table 16: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.644[a]	.415	.394	.48841

a. Predictors: (Constant), Teamwork Skills, Communication Skills, Achievement Motivation Skills, Leadership Skills, Conflict Management Skills

Table 18 in the appendices reports the analysis of variance (ANOVA) of our model. The summary table shows about the sum of squares and about the degree of freedom associated. The important part of that table is F-ratio as it tells about the inaccuracy level in the model, and this value should be greater than 1 [41]. The greater the value of F-ratio would be, the better the model will be. The significance value for F-ratio was found to be less than 0.001 ($p < 0.001$), which is highly significant. This means that there is less than 0.01% chance that that this F-ratio would occur if there was a null hypothesis present. By controlling three values, model fit was done, and it is attached in appendices.

Simple liner regression for each independent variable was carried out and resulting values are shown in table 17. All five variables were positively related to the Task Performance and were significant predictor of Task Performance, Communication Skills ($\beta = 0.504$, $p < 0.001$), Leadership Skills ($\beta = 0.535$, $p < 0.001$), Conflict Management Skills ($\beta = 0.576$, $p < 0.001$), Achievement Motivation Skills ($\beta = 0.561$, $p < 0.001$) and Teamwork Skills ($\beta = 0.537$, $p < 0.001$). Unstandardized β coefficient value was observed.

Table 17: Linear Regression Analysis

Variable	Constant	β	ΔR^2	Sig.
Communication Skills	1.932	0.504	0.244	0.000
Leadership Skills	1.795	0.535	0.278	0.000
Conflict Management Skills	1.673	0.575	0.376	0.000
Achievement Motivation Skills	1.683	0.561	0.286	0.000
Teamwork Skills	1.690	0.537	0.267	0.000

Again, from the regression analysis, it is proved that Conflict Management Skills have the most impact on Soft Skills of the engineers as it has the highest R square value among the other variables.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

Conclusion

The main objective of conducting this study was to explore the impact of soft skills on Engineers' task performance in manufacturing industries of Pakistan. The outcomes of the research show that there exists a positive moderate relationship between soft skills of Engineers' and task performance. By increasing the soft skills, task performance is also increased. Among the different soft skills selected, it was observed that Conflict Management Skills have the most impact on the Task Performance of the engineers with highest correlation value ($r = 0.578$; $p < 0.01$). If an Engineer has better Conflict Management Skills and is better at resolving the conflicts with others, then he would have better Task Performance at work.

After Conflict Management Skills, Achievement Motivation Skills have the most impact on Task Performance with second highest correlation value ($r = 0.519$; $p < 0.01$). Teamwork Skills have the least impact among selected variables on Task Performance of engineers with lowest correlation value ($r = 0.485$; $p < 0.01$). Therefore, it is determined that by increasing any of the selected soft skills, task performance of an engineer will also be increased.

Through regression analysis it is also proved that conflict management skills have the most impact on task performance of the engineer. Conflict management skills have the highest R square value. All the hypothesis of this study are proven to be correct. The hypothesis assumed were; Engineers' better communication skills will lead to better task performance, Engineers' better leadership skills will lead to better task performance,

Engineers' better achievement motivation skills will lead to better task performance, Engineers' better teamwork skills will lead to better task performance, Engineers' better conflict management skills will lead to better task performance, and Engineers' non-technical skills will lead to better task performance.

The findings of this research can help organizations to increase the performance of their employees. Moreover, this research will also help organizations to understand the soft skills and the impact of those soft skills on the performance of the engineer.

Recommendations

Following are the recommendations from this study:

- From the findings of this study, it is perceptible that soft skills have an impact on the performance of the engineers. Too less importance is being given on the soft skills in manufacturing industries of Pakistan. Organizations should focus on the soft skills and should conduct trainings and seminars to improve the soft skills of engineers.
- As engineers also works in team, therefore Teamwork skills are also very important for better task performance. It is recommended that soft skills should be explicitly taught at all education levels. On education level, also little consideration is being given to the soft skills of the students. Teachers and instructors should also focus on soft skills rather than giving all their attention towards the hard skills of the students. Different seminars on soft skills should also be organized by schools and universities. Awareness on the importance of soft skills should be raised among people.

- If engineers would have better communication skills, they will be able to gather more information about the tasks assigned to them and will be able to clear the concepts of other stakeholders too. Without communication skills, engineers would not be able to give better task performance and will also not be able to communicate about the directions and the status of project. Leadership skills are also very important for any engineer as he must lead the project assigned to him and guide the stakeholders. Therefore, if an engineer would have better teamwork skills, he would be more efficient and would have better performance.
- Conflict management skills were found to have the most impact on performance of the engineers. It is recommended that at every level, more attention should be given towards the conflict management skills as an engineer with better conflict management skills will be able to negotiate better with the stakeholders and will also maintain a healthy environment of the workplace by managing his conflicts with other employees of the organization and also by managing conflicts between the other employees of the organization.

Limitations and Future research

The main limitation of this study is that majority of the respondents were male and female respondents were too less in number because there were very few female employees as managers and senior engineers in manufacturing industries of Pakistan. Therefore, in future data from more female employees can also be taken as they may have different effect on performance due to soft skills. Other main limitation of this study is that soft skills of engineers is observed only in manufacturing industries of Pakistan. Therefore, in future other

industries could also be focused and soft skills of engineers of industries other than manufacturing industries can also be observed.

Only selected number of soft skills were chosen for this study and in future soft skills other than communication skills, conflict management skills, teamwork skills, achievement motivation skills and leadership skills can also be observed. In this study, impact of soft skills on task performance was observed and in future, research on soft skill's impact on other variables can also be done as there are many other factors and variables on which soft skills have impact on.

Education level and designation were also ignored and there may be any impact of education level and experience present on the soft skills of the engineers or the performance of the engineers. In future, study could also be conducted to observe the effect of education level and designation on the performance of the engineer as engineers with different education level and different designation may have different responses.

In present study, different soft skills of only engineers were observed, whereas, in future target population other than engineers can also be taken as in any industry like management personnel or diploma holders are also present and research on them can also be done. In this study random sampling technique was used and in future other sampling techniques could also be used to diverse the findings. And same theoretical model can also be used in other regions for research and data of both can be compared.

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Appendices

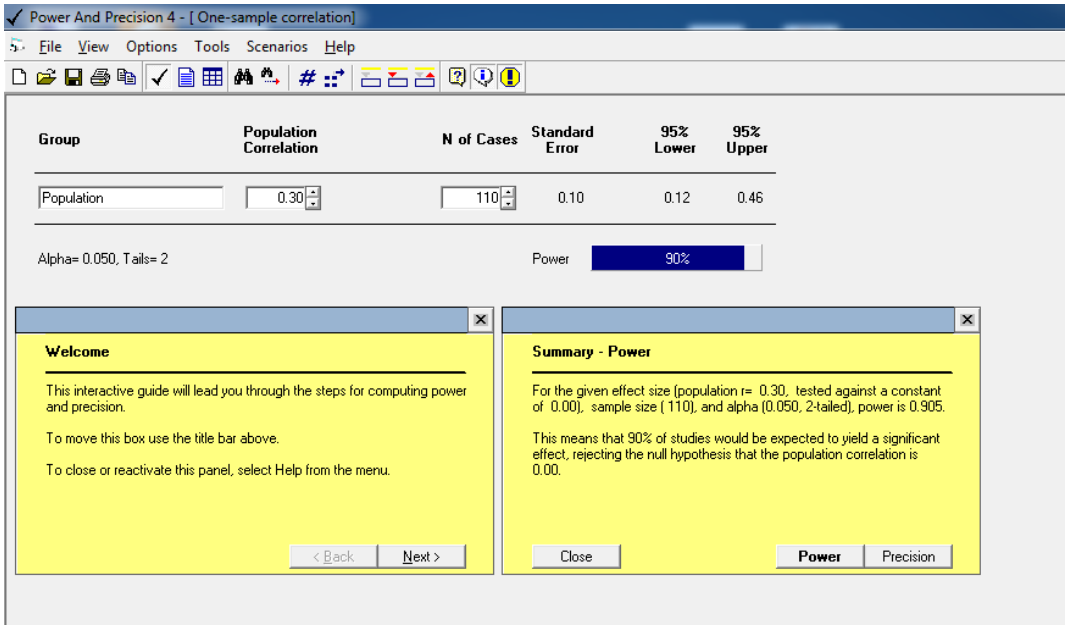

Figure 6: Sample Size through Power and Precision tool

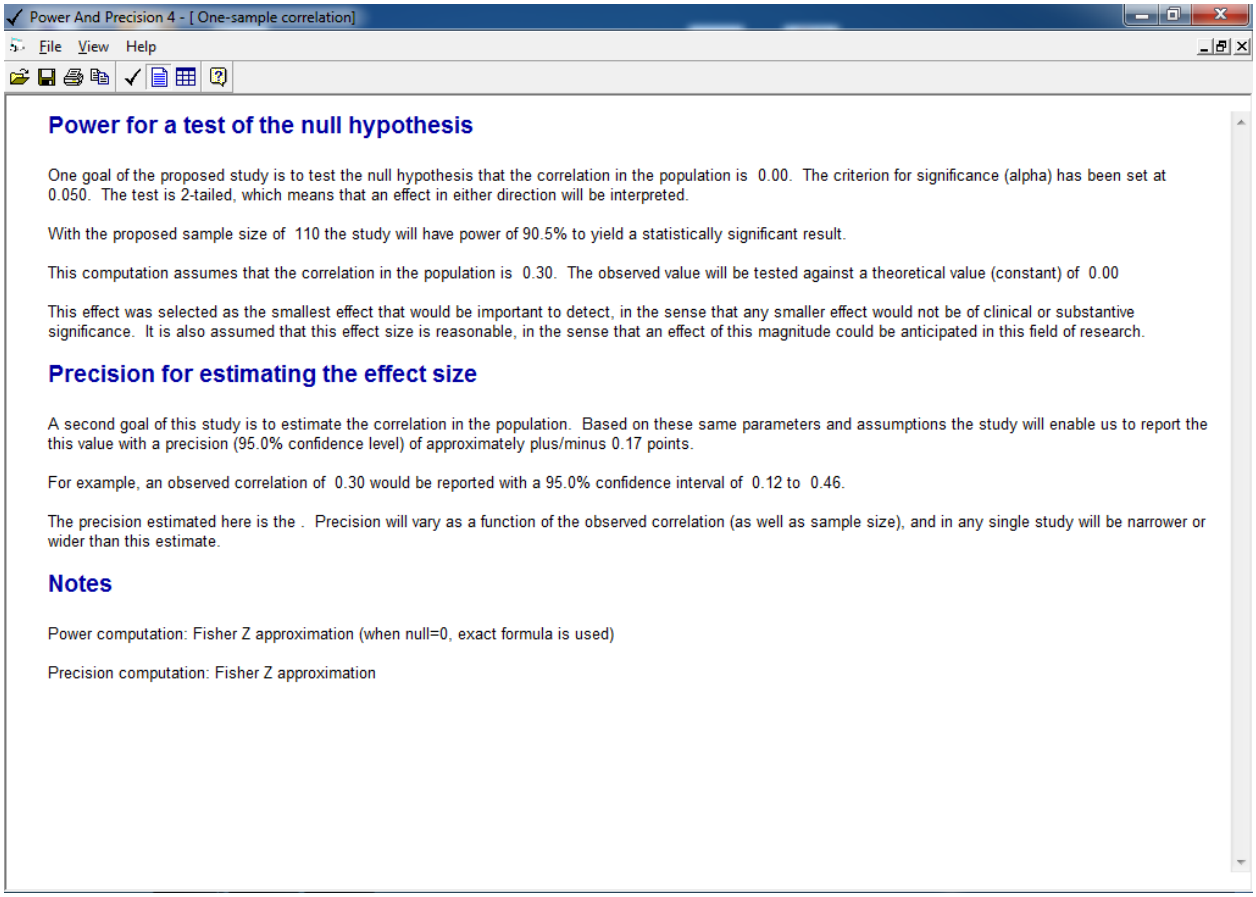

Figure 7: Sample Size Summary

Table 18: Factor Loadings

Variable	Item	Description	Loading
Communication Skills	CS1	Engineer understands explicitly the content of communication	0.493
	CS2	Engineer maintains effective formal lines of communication in the project	0.430
	CS4	Engineer uses appropriate information sources to solve the project works	0.486
	CS5	Engineer aligns the information in an appropriate situation to the audience	0.554
	CS6	Engineer constantly seeks opportunities to communicate the project status and directions	0.424
Leadership Skills	LS1	Engineer performs high performance with positive expectations	0.630

	LS2	Engineer makes a contribution to building effective relationships with stakeholders	0.799
	LS3	Engineer establishes mentoring relationships for team members' development	0.710
	LS4	Engineer takes accountability for delivering the project tasks	0.662
	LS5	Engineer uses influencing skills to stakeholders when required	0.622
Conflict Management Skills	CMS1	Engineer is aware of team rules when delivering project tasks	0.759
	CMS2	Engineer recognizes conflict occurring within the project	0.819
	CMS3	Engineer seeks to avoid possible conflict of interests to all stakeholders	0.641
	CMS4	Engineer resolves the conflict with a satisfactory solution	0.712
	CMS5	Engineer maintains self-control in all situations	0.613
Achievement Motivation Skills	AMS1	Engineer adapts flexibly towards project changes	0.736
	AMS2	Engineer responds positively upon the issues important to others	0.720
	AMS3	Engineer uses assertiveness (confidence & boldness) when necessary	0.723
	AMS4	Engineer actively listens to other members or stakeholders	0.694
	AMS5	Engineer makes sacrifices where necessary despite the challenges	0.532
Teamwork Skills	TS1	Engineer maintains effective relationships among team members	0.806
	TS2	Engineer understands the roles of team members to the project	0.771
	TS3	Engineer works with others to clearly identify the project plan	0.739
	TS4	Engineer shares the expertise with others involved in the project	0.710
	TS5	Engineer attempts to build consensus for making team decisions	0.715
Task Performance	TP1	Job knowledge	0.726
	TP2	Overcoming obstacles to complete a task	0.668
	TP3	Problem solving (ability to solve problem quickly and correctly)	0.783
	TP4	Operating equipment, using tools, or both	0.748

TP5	Working safely	0.667
TP6	Concentrating to the duties	0.682

Table 19: ANOVA[a] Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.515	5	4.703	19.716	.000[b]
	Residual	33.158	139	.239		
	Total	56.674	144			

a. Dependent Variable: Task Performance

b. Predictors: (Constant), Teamwork Skills, Communication Skills, Achievement Motivation Skills, Leadership Skills, Conflict Management Skills

Table 20: Model summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.589[a]	.347	.333	.51221	.347	25.006	3	141	.000
2	.644[b]	.415	.394	.48841	.068	8.036	2	139	.000

a. Predictors: (Constant), Communication Skills, Teamwork Skills, Leadership Skills

b. Predictors: (Constant), Communication Skills, Teamwork Skills, Leadership Skills, Achievement Motivation Skills, Conflict Management Skills

Table 21: ANOVA[a] table of model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.682	3	6.561	25.006	.000[b]
	Residual	36.992	141	.262		
	Total	56.674	144			

2	Regression	23.515	5	4.703	19.716	.000[c]
	Residual	33.158	139	.239		
	Total	56.674	144			

a. Dependent Variable: Task Performance

b. Predictors: (Constant), Communication Skills, Teamwork Skills, Leadership Skills

c. Predictors: (Constant), Communication Skills, Teamwork Skills, Leadership Skills, Achievement Motivation Skills, Conflict Management Skills

Table 22: Coefficients[a] of model

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.991	.342		2.895	.004
	Leadership Skills	.221	.096	.215	2.293	.023
	Teamwork Skills	.234	.094	.222	2.494	.014
	Communication Skills	.275	.087	.266	3.157	.002
2	(Constant)	.764	.338		2.257	.026
	Leadership Skills	.101	.097	.098	1.040	.300
	Teamwork Skills	.095	.096	.091	.993	.323
	Communication Skills	.148	.089	.143	1.670	.097
	Conflict Management Skills	.253	.093	.266	2.728	.007
	Achievement Motivation Skills	.198	.093	.186	2.136	.034

a. Dependent Variable: Task Performance